Comments of

COALITION FOR SAFE BUILDING MATERIALS

(California Pipe Trades Council, California Professional Firefighters, Consumer Federation of California, Planning and Conservation League, Center for Environmental Health, Sierra Club of California and Communities for a Better Environment)

on the

DRAFT ENVIRONMENTAL IMPACT REPORT
FOR
ADOPTION OF REGULATIONS PERMITTING STATEWIDE RESIDENTIAL USE OF CHLORINATED POLYVINYL CHLORIDE (CPVC) PLASTIC PLUMBING PIPE WITHOUT FIRST MAKING A FINDING OF POTENTIAL PREMATURE METALLIC PIPE FAILURE DIE TO LOCAL WATER OR SOIL CONDITIONS
STATE CLEARINGHOUSE NO. 2006012044

VOLUME III

APPENDICES TO THE COMMENTS OF
ADAMS BROADWELL JOSEPH & CARDOZO

September 14, 2006

December 2004

Curriculum Vitae

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Current

Senior Fellow, Economic Studies, The Brookings Institution (since 7/95, Visiting Fellow 7/94 – 6/95)
Co-Director of the European Central Bank's International Wage Flexibility Project
Board of Reviewers, *Industrial Relations*
Consultant on labor economics and statistics

Previous Professional Positions

Director, National Community Development Policy Analysis Network, 1/96-10/01.
Senior Economist, President's Council of Economic Advisors 7/93 - 6/94
Professor of Economics, Department of Economics, University of California, Berkeley (6/95 - 7/95, Associate Professor 7/87 - 6/95, Assistant Prof. 7/80-6/87)
Visiting Assistant Professor of Industrial Relations, Sloan School of Management, M.I.T. (Spring 1986)

Education

Ph.D. in Economics, M.I.T., 1981
B.A. in Social Studies, Bard College, 1976

Journal Articles

"School Readiness and Genetic Differences," *The Future of Children,* forthcoming Vol. 15, #1 (Spring, 2005).

"Racial Discrimination in Labor Markets with Announced Wages," *American Economic Review,* forthcoming, with Kevin Lang and Michael Manove.

"The IQ Paradox is Still Resolved: Reply to Loehlin (2002) and Rowe and Rodgers (2002)" *Psychological Review,* (October, 2002) with James R. Flynn.

"A Foundation for Behavioral Economics," *American Economic Review, Papers and Proceedings,* (May, 2002) with Jessica Cohen.

"Heritability Estimates vs. Large Environmental Effects: The IQ Paradox Resolved," *Psychological Review* (April 2001) with James R. Flynn.

"Near Rational Wage and Price Setting and the Long Run Phillips Curve," *Brookings Papers on Economic Activity*, 2000:I, with George Akerlof and George Perry.

"Racial Test Score Differences as Evidence of Reverse Discrimination: Less than Meets the Eye," *Industrial Relations*, Vol. 38, #3 (July,1999) p331-363, with Thomas J. Kane, reprinted in Harry J. Holzer and David Neumark eds. *The Economics of Affirmative Action,* Edward Elgar: Camberley Surrey (2004).

"The Macroeconomics of Low Inflation," *Brookings Papers on Economic Activity*, 1996:I, pp. 1-76, with George Akerlof and George Perry.

"An Analysis of Unemployment in Sri Lanka," *Journal of Development Studies*, 31 (4), April 1995, pp. 620-36, with Kevin Lang.

"Labor Supply with Hours Restrictions," *International Economic Review*, Vol. XXXIV, no. 1, February 1993, pp. 169-92, with Shelly Lundberg.

"Hedonic Damage Estimates: Assuming the Can Opener." *Journal of Forensic Economics*, Vol. III, no. 3, Fall 1990, pp. 51-60, reprinted in *A Hedonic Primer for Economists and Attorneys*, John O. Ward (ed.), Lawyers & Judges Publishing Company, Tucson, 1992.

"Error Components in Grouped Data: Is it Ever Worth Weighting?" *Review of Economics and Statistics*, Vol. LXXII, no. 2, May 1990, pp. 328-333.

"Does It Matter What We Trade? Trade and Industrial Policies When Labor Markets Don't Clear," *Industrial Relations Research Association Series, Proceedings of the Forty-Second Annual Meeting*, December 28-30, 1989, Atlanta, pp. 527-535.

"Employee Crime, Monitoring, and the Efficiency Wage Hypothesis," *Journal of Labor Economics*, July 1989, with Lawrence Katz, Kevin Lang, and Lawrence Summers.

"The Changing Structure of the Female Labor Market, 1976-1984," *Industrial Relations Research Association Series, Proceedings of the Forty-First Annual Meeting*, December 26-30, 1988, New York, with Rachel Friedberg and Kevin Lang.

"Labor Market Segmentation and the Union Wage Premium," *Review of Economics and Statistics*, August 1988, with Kevin Lang.

"The Reemergence of Segmented Labor Market Theory," *American Economic Review, Papers and Proceedings*, May 1988, with Kevin Lang.

"Bargaining Unit, Union, Industry and Locational Correlates of Union Support in Certification and Decertification Elections," *Industrial Relations*, Fall 1987, with Douglas Wholey and James Robinson.

"The Impact of the Runaway Office on Union Certification Elections in Clerical Units," *Industrial Relations Research Association Series, Proceedings of the Thirty-Ninth Annual Meeting*, December 28-30, 1986, with Beatrice Frieberg.

"Crime and Punishment Again: The Economic Approach with a Psychological Twist," *Journal of Public Economics*, 1986, reprinted in Gianluca Fiorentini and Stefano Zamagni eds. *The Economics of Corruption and Illegal Markets* Edward Elgar:Cheltenham (1998)

"A Test of Dual Labor Market Theory," *American Economic Review*, September 1985, with Kevin Lang.

"Accounting for the Decline in Union Membership, 1950-1980," *Industrial and Labor Relations Review*, April 1985, with Jonathan Leonard.

"Differences Between Risk Premiums in Union and Nonunion Wages and the Case for Occupational Safety Regulation," *American Economic Review, Papers and Proceedings*, May 1984.

"The Effect of Company Campaigns on Certification Elections: Law and Reality Once Again," *Industrial and Labor Relations Review*, July 1983.

"The Productivity Crisis: Secular or Cyclical?" *Economics Letters*, #9, 1982.

"The Economic Consequences of Cognitive Dissonance," *American Economic Review*, June 1982, with George Akerlof, reprinted in George Akerlof, *An Economic Theorist's Book of Tales*, Cambridge University Press, 1984.

Books and Monographs

Urban Problems and Community Development, Brookings 1999, Co-editor with Ronald Ferguson.

Looking Before We Leap: Social Science and Welfare Reform. Brookings, 1995. Co-editor with Kent Weaver.

Labor and an Integrated Europe. Brookings, 1993. Co-editor with Lloyd Ulman and Barry Eichengreen.

The U.S. Labor Market Effects of European Economic Integration: Policy Considerations. National Commission for Employment Policy, 1993.

The Dynamics of Trade and Employment. Ballinger, 1988. Co-editor with Laura Tyson and John Zysman.

Book Chapters

"Inflation and Unemployment in the U.S. and Canada: A Common Framework," in Pierre Fortin and Craig Riddell eds. *Growth, Employment and Technology: Perspectives on Economic Policies* (forthcoming) with George Akerlof, Pierre Fortin and George Perry.

"Instinct and Choice: A Framework for Analysis" in Cynthia Garcia Coll Elaine L. Bearer, and Richard Lerner eds. *Nature and Nurture: The Complex Interplay of Genetic and Environmental Influences on Human Behavior and Development*, Erlbaum, 2004, p145-170. with Jessica Cohen.

"Have the New Human Resource Management Practices Lowered the Unemployment Rate?" in *The Roaring 90s*, A. Krueger and R. Solow editors, Russel Sage Foundation, 2002, with Jessica Cohen and Adam Posen.

"Editors' Introduction," to *Urban Problems and Community Development*, W. Dickens and R. Ferguson (eds.), Brookings, 1999.

"Rebuilding Urban Labor Markets: What Community Development Can Accomplish," in *Urban Problems and Community Development*, W. Dickens and R. Ferguson (eds.), Brookings, 1999.

"Why Has the AFDC Caseload Increased?," in *Looking Before We Leap*, W. Dickens and K. Weaver (eds.), Brookings, 1995.

"The Effects of Family Caps," in *Looking Before We Leap*, W. Dickens and K. Weaver (eds.), Brookings, 1995.

"Editors' Introduction," to *Labor and an Integrated Europe*, Ulman, Eichengreen, and Dickens (eds.), Brookings, 1993.

"The U.S. Labor Market Effects of EC92: A Labor Rents Perspective," in Ulman, Eichengreen, and Dickens, *Labor and an Integrated Europe*, Brookings, 1993.

"Labor Market Segmentation: Reconsidering the Evidence," in William Darity, ed., *Labor Economics: Problems in Analyzing Labor Markets*, Kluwer Academic, 1993, with Kevin Lang.

"Why Do Firms Monitor Workers?" in Weiss, Y., ed., *Advances in the Theory and Measurement of Unemployment*, Macmillan: London, 1990, with Lawrence Katz, Kevin Lang, and Lawrence Summers.

"Neoclassical and Sociological Perspectives on Segmented Labor Markets," in Paula England and George Farkas, eds., *Industries, Firms, and Jobs: Sociological and Economic Approaches*, Plenum Press: New York, 1988, with Kevin Lang.

"The Effect of Trade on Employment: Techniques and Evidence, " in Tyson, Dickens and Zysman, *The Dynamics of Trade and Employment*, Ballinger, 1988.

"Why It Matters What We Trade: A Case for Active Policy," in Tyson, Dickens and Zysman, *The Dynamics of Trade and Employment*, Ballinger, 1988, with Kevin Lang.

"Where Have All the Good Jobs Gone?" in Kevin Lang and Jonathan Leonard, eds., *Unemployment and the Structure of Labor Markets*, Basil-Blackwell, 1987, with Kevin Lang.

"Inter-Industry Wage Differences and Industry Characteristics," in Kevin Lang and Jonathan Leonard, eds., *Unemployment and the Structure of Labor Markets*, Basil-Blackwell, 1987, with Lawrence Katz.

"Safety Regulation and 'Irrational' Behavior," in Benjamin Gilad and Stanley Kaish, eds., *Handbook of Behavioral Economics*, JAI Press, 1986.

"Occupational Safety and Health Regulation and Irrational Behavior: A Preliminary Analysis," in John D. Worrall and David Appel, eds., *Workers' Compensation Benefits: Adequacy, Equity and Efficiency*, ILR Press, 1985.

"Occupational Safety and Health Regulation and Economic Theory," in William Darity, ed., *Labor Economics: Modern Views*, Kluwer-Nijhoff, 1984.

Published Comments, Speeches, Opinion Articles, and Reviews

"The Comparative Advantage of Faith Based Organizations in Community Development and the Implications for Public Policy: Comment on Avis Vidal's The Role of Congregations in Community Development," in E.J. Dione ed. *Sacred Places, Civic Purposes: Should Government Aid Faith-Based Charity?* Brookings, 2002.

"Great Leap Forward," *New Scientist* (April 20, 2001), with James R. Flynn.

Comment on Charles Wyplosz, "Do We Know How Low Inflation Should Be?" in *Why Price Stability? Proceedings of the First ECB Central Banking Conference*, ECB, 2001, Alicia G. Herrero, Vitor Gaspar, Lex Hoogduin, Julian Morgan, and Bernhard Winkler eds.

"Why a Little Inflation is Good," *The Milken Institute Review*, 2000 (4th quarter) p12-18, with George Akerlof and George Perry.

Comments on Lawrence F. Katz and Allan B. Krueger, "The High Pressure U.S Labor Market of the 1990s," *Brookings Papers on Economic Activity*, 1999:1.

"Information and Productivity," FEED, Summer, 1998

"Low Inflation or No Inflation?," *The Brookings Review* XIV:4 (Fall 1996), p. 46, with George Akerlof and George Perry.

"The High Cost of Zero Inflation," *Challenge* (Sept.-Oct., 1996), p. 11-17, with George Akerlof and George Perry.

"If Things Are So Good Why Do We Feel So Bad," *Durell Journal of Money and Banking*, Volume 8, No. 3, (Summer 1996) p. 13.

"A Bad Bill That Needs to be Fixed," *All Politics, CNN/Time* Counterpoint, Web Site http://allpolitics.com/issues/counterpt/9608/02/.

Comments on Jagdish Bhagwati, "Trade and Wages: A Malign Relationship?," in *Imports, Exports and the American Worker*, Brookings 1996, Susan Collins, ed.

Participant in and invited on-line dialog, "One Nation Underpaid," *FEED*, (Spring 1996), Web Site http://www.feedmag.com/96.03dialog/96.03dialog1.html, /96.03dialog2.html, and /96.03dialog3.html.

"Trade and Wages," Speech given at Institute for International Education APEC Symposium

October 22, 1994 San Francisco California, Conference Proceedings, IIE, D.C., 1995.

"Does The Bell Curve Ring True?," *The Brookings Review* XIII:3 (Summer 1995), p. 18-22, with Thomas Kane and Charles Schultze.

Comments on Peter Gottschalk and Robert Moffitt, "The Growth in Earnings Instability in the U.S. Labor Market," *Brookings Papers on Economic Activity*, 1994:2.

Comments on Gregory Saltzman, "Public Sector Bargaining Laws Really Matter: Evidence from Ohio and Illinois," in Richard Freeman and Casey Ichniowsky, eds., *When Public Sector Workers Unionize*, University of Chicago Press, 1988.

Comments on Kevin Murphy and Robert Topel, "The Evolution of Unemployment in the U.S. 1968-1985," in Stanley Fischer, ed., *NBER Macro Economics Annual*, MIT Press, 1987.

Comments on a session on part-time and temporary workers at the Winter meetings of the Industrial Relations Research Association. *Proceedings of the Thirty-Ninth Annual Meeting*, December 28-30, 1986.

Comments on a session on civilian and military job training at the Winter meetings of the Industrial Relations Research Association. *Proceedings of the Thirty-Ninth Annual Meeting*, December 28-30, 1986.

"What Do the British Want from Worker Participation? A Review," *Sloan Management Review*, Winter, 1981.

Grants

Russell Sage and Century Foundation small grant for study of the effects of changing human resource management policies on the relationship between inflation and unemployment, with Adam Posen. January 1999 – February 2001.

National Science Foundation grant to study the implications of low inflation for economic performance. September 1997- August 1999, with George Akerlof

Casey, MacArthur, and Rockefeller Foundation grant to develop the National Community Development Policy Analysis Network and publish *Urban Problems and Community Development,* January 1996 to October 2001. With Ronald Ferguson and the NCDPAN steering committee.

National Commission for Employment Policy grant to study the effects of European economic integration on the U.S. labor market, October 1991-July 1992.

Small Business Administration grant to study the effects of turnover on training costs for small businesses, July 1987-June 1988.

National Science Foundation grant of super computer time for a study of labor market structure,

August 1986-July 1987, with Kevin Lang.

National Science Foundation Applied Economics grant to study alternative explanations for Labor Market Segmentation including efficiency wage models. August 1986-July 1987, with Kevin Lang.

Faculty Development Summer Research Grant, University of California, Summer 1985.

Office of Technological Assessment grant to study Trade, Business Relocation and U.S. Labor Adjustment, October 1984-April 1985, with Laura Tyson and John Zysman.

National Science Foundation Research Grant to study dual labor markets, August 1984-July 1986, with Kevin Lang.

Testimony and Government Service

Co-director (with Erica Groshen) of a thirteen country collaborative project sponsored by the European Central Bank (along with IZA and the New York Federal Reserve) to use micro data to assess the extent of wage rigidity, and the relation of rigidity to economic outcomes, and to labor market and governmental institutions. We have held two conferences for participants, and in June of 2004 held our final conference in Frankfurt. We are now working with the country teams to develop our final report.

Presented a seminar on estimating wage rigidity using micro data at the Bank of Portugal and consulted with bank staff, November 2004.

Participated in a seminar on the implications of downward nominal wage rigidity for central bank policy held at the Bank of Norway. Consulted with Bank of Norway staff. June 2003

Participated in the first European Central Banking conference in Frankfurt. Presented a seminar at the European Central Bank on applying work on the effects of low inflation to Europe. Consulted with bank staff. November 2001.

Served as a consultant to the Montgomery County Public Schools' legal team defending against charges of reverse discrimination in acceptance of children for the county's special, gifted and talented programs. Winter and Spring of 2000.

Presented seminars on continuing work on the welfare effects of low inflation at the Bank of Canada, May 31, 1999.

Reviewed Clinton Administration plans for reforming Affirmative Action contracting rules, Spring 1996 and Summer 1997.

Presented seminar on the effects of downward nominal wage rigidity on the long run trade-off between inflation and unemployment to the governors and staff of the Federal Reserve (with George Akerlof and George Perry). October 1996.

Reviewed draft of OSHA's economic analysis of its proposed ergonomics standard for White House, February, 1995.

Participant in Panel Briefing for Congressional Staff on State of Labor Markets and Labor Policy, September 19, 1994.

Senior Economist with the President's Council of Economic Advisors July 1993-July 1994. I consulted on a wide range of labor market and macro economic issues and helped in the development of legislation for the administration's school-to-work initiative, its reemployment initiative, OHSA reform, and welfare reform. I directed the CEA's efforts to prepare for a special G7 ministers' meeting on job generation and acted as Laura Tyson's deputy at the meeting advising her and Vice President Gore on their participation. On numerous occasions I represented the CEA at deputy cabinet and cabinet level meetings. I helped convene a deputy level strategic planning initiative on labor markets and directed a sub-group to develop plans for more effective enforcement of anti-discrimination laws.

Member of advisory panel for Office of Technological Assessment, review of OSHA's selection of control technologies and assessment of their impacts and costs, 1993 to 1995.

"Efficiency Wage Theory: You Get What You Pay For," Before the Public Utility Commission of the State of California, June, 1992.

"An Evaluation of DRA's Proposed Methodology for Determining Appropriate Levels of Compensation for SoCAL Employees," Before the Public Utility Commission of the State of California, July 17, 1989.

Prepared an analysis of the causes of unemployment in Sri Lanka for the World Bank, 1990, with Kevin Lang.

"The Socio-Economic Consequences of the Construction of Luz SEGS VIII for the State of California and the Project Area," Before the California Energy Commission, March 2, 1989.

"Did the State of California Deliberately Discriminate Against Women in Setting Salaries in the 1930s and If So, Did That Discrimination Continue Past the 1937-38 Changes to the State's Methods for Determining Compensation?" Testimony in U.S. District Court, February 8-24, 1989.

"Does the NLRA Still Protect Workers' Rights to Collective Bargaining?" Before the Labor Subcommittee of the U.S. Senate Labor and Human Resources Committee, January 29, 1988.

Working Papers

"Low Birth Weight and Social Disadvantage: Tracking their relationship with children's IQ during the period of school attendance," submitted to *Intelligence* November (2004), with Naomi Breslau, James Flynn, Edward Peterson, and Victoria Lucia.

"Networks and Neighborhoods: The Consequences of Economic Segregation and Geographic Mobility," Brookings mimeo, March 1997.

"Do Labor Rents Justify Strategic Trade and Industrial Policy?" Brookings mimeo, June 1995.

"Bilateral Search as an Explanation for Labor Market Segmentation and Other Anomalies," NBER Working Paper #4461, September 1993, with Kevin Lang.

"Good Jobs: Increasing Worker Productivity With Trade and Industrial Policy," Berkeley Mimeo, 1991.

"A Goodness of Fit Test of Dual Labor Market Theory," NBER Working Paper #2350, with Kevin Lang.

"Wages, Employment and the Threat of Collective Action by Workers," NBER Working Paper #1856.

"Testing Dual Labor Market Theory: A Reconsideration of the Evidence," NBER Working Paper #1670, with Kevin Lang.

"Structural Change and the Decline of Union Density," NBER Working Paper #1882, with Jonathan Leonard.

"Are Efficiency Wages Efficient?" NBER Working Paper #1935, April 1986, with Lawrence Katz and Kevin Lang.

"Interindustry Wage Differences and Theories of Wage Determination," with Lawrence Katz, NBER Working Paper #2271, 1987.

"Consistent Estimation Using Data from More than One Sample," NBER Technical Paper #33, July 1984, with Brian Ross.

"Are Asset Demand Functions Determined by CAPM?" NBER Working Paper #1113, April 1983, with Jeffrey Frankel.

"The Productivity Enhancing Effects of R&D Expenditures: Another Look," Berkeley mimeo, March 1983, with Kathryn Marshall.

"Work and Personality: A Structural Interpretation of the Class-Values Relation," a Group for Work Democracy discussion paper, Cambridge, Massachusetts, June 1979.

"Instrumental Variables Estimation of a Two-Market Disequilibrium Model of the U.S. Economy," M.I.T. mimeo, March 1979.

Referee

American Economic Review
The Brookings Institution
Econometrica
Economic Development and Cultural Change
Economic Development Quarterly
Economic Inquiry
Economic Journal
Economica
Economics Letters
Economics of Education Review
Empirical Economics
European Economic Journal
Industrial and Labor Relations Review
International Review of Law and Economics
Journal of Applied Econometrics
Journal of Behavioral Economics
Journal of Development Economics
Journal of Economic Behavior and Organization
Journal of Human Resources
Journal of International Economics
Journal of Labor Economics
Journal of Law, Economics, and Organization
Journal of Macroeconomics
Journal of Molecular Psychiatry
Journal of Money, Credit and Banking
Journal of Political Economy
Journal of Public Economics
Journal of Public Policy Analysis and Management
Levy Institute
National Academy of Sciences
National Institute of Aging
National Science Foundation
Oxford Economic Papers
Oxford University Press
Psychological Bulletin
Psychological Review
Quarterly Journal of Economics
Regional Science and Urban Economics
Review of Economic Studies
Review of Economics and Statistics
Review of General Psychology
Review of Industrial Organization
Social Science and Humanities Research Council of Canada
Social Science Quarterly
World Bank

DECLARATION OF JULIA E. MAY IDENTIFYING CALIFORNIA MANUFACTURING OF CPVC PLASTIC PIPE, PIPE FITTINGS, OR ADHESIVES FOR DRINKING WATER APPLICATIONS, AND AIR EMISSIONS ASSOCIATED WITH THESE CALIFORNIA MANUFACTURING FACILITIES

I, Julia E. May, do declare and if called as a witness would testify as follows:

1. I am an air quality expert and hold an engineering degree from the University of Michigan (1981). I have 18 years of experience researching industrial air emissions and chemical use for non-profit community organizations.

2. I have confirmed that the following companies manufacture CPVC plastic pipe, fittings, and/or cement or adhesives certified for potable drinking water uses at their California facilities: IPS or Industrial Polychemical Services; Dura Plastics; Harvel Plastics; Spears Manufacturing; King Brothers or KBI; and T. Christy Enterprises.

3. I have confirmed that Oatey Co. manufactures CPVC cement/adhesive for drinking water uses in either California or Ohio.

4. I performed research through the Toxic Release Inventory (TRI) databases kept by the U.S. Environmental Protection Agency on EPA's Envirofacts website (http://www.epa.gov/enviro/). I found two of the above seven California manufacturers to be reported by EPA TRI database as emitting toxic chemicals. The online documents provided by US EPA which provide chemical use and emissions data for these companies are called "Form R's" and are submitted by the company to US EPA. EPA's most recent full data available online for query is 2002. Emission summaries are included in the table below.

5. The TRI database listed IPS Corporation and Oatey company as emitting thousands of pounds of Methyl Ethyl Ketone in 2002, and sending thousands more offsite for either incineration or energy recovery.

6. I searched an online database of the California Air Resources Board (CARB) http://www.arb.ca.gov/app/emsinv/facinfo/facinfo.php) and found

IPS Corp. in California listed: http://www.arb.ca.gov/app/emsinv/facinfo/facdet.php?co_=19&ab_=SC&facid_=800367&dis_=SC&dbyr=2002&dd= The air emissions results of this search are included in the table below and the web page listing the data for this facility is attached (entitled "Facility Details"). The most recent year's data available from the California Air Resources Board website on this facility lists 21.51 tons per year (tpy) of Total Organic Gases, including 18.24 tpy of Reactive Organic Gases (ROG). Reactive organic gases are those which easily react in the atmosphere to form ground-level ozone (a primary component of smog). They are also called organic precursors, or VOCs (volatile organic compounds).

7. The San Joaquin Air Pollution Control District (SJAPCD) provided me with data on permitted air emissions for Harvel Plastics, according to permits issued by the SJAPCD. SJAPCD has four permits for Harvel Plastics for operations using PVC and CPVC materials, beginning with intake into silos of resin materials, transfer and blending systems, and scrap material grinding and pulverizing. The actual pipe forming involving heating and extruding the pipe appears to be exempt from their permitting, since no permits were present for that part of the operation.

8. I reviewed the attached document from the Bay Area Air Quality Management District (with heading "Plant number") which identifies 25 permitted air emission sources at Oatey Co. in Newark, California, and provides computed air emissions as of January 16, 2003 of 0.29 tons per year (tpy) of particulate matter (or 580 lbs/year) and 26.78 tpy (or 53,560 lbs/year) air emissions of organic precursor (which means chemicals which cause the formation of ground level ozone, or which are ozone precursors).

9. The following table provides the results of my research on the issues discussed above:

Company, address, & phone number	Manufacturing of CPVC materials for drinking water uses in California	Results of research on air emissions from these facilities
IPS Corp (Industrial Polychemical Services) Address: 17109 S MAIN ST, Carson, CA, also listed as Gardena, CA Phone (800) 421-2677, (310) 898-3352 Manufacturer of Adhesives	IPS manufactures several adhesives for drinking water uses with CPVC pipe at its plant in Gardena, California. One example is named "2714."	**CARB online database,** 2002 (most recent year available) air emissions: Reactive Organic Gases (ROG): 18.24 tons per year (tpy), Total Organic Gases: 21.51 tpy **US 2002 EPA TRI online database:** Methyl Ethyl Ketone (MEK) used onsite and released to air: Air stack releases of 6,462 lbs, plus air fugitive releases of 750 lbs. Additional MEK used onsite but ultimately transferred offsite: An additional 45,796 lbs of MEK are used onsite but ultimately sent out of state to Kansas after use for "Energy Recovery." (This company also reported use of over 38,000 lbs of MEK to EPA's TRI in the previous year, 2001)
Dura Plastic Products 533 East Third St, PO Box 2097 Beaumont, CA Phone (951) 845-3161	Dura Plastics manufactures CPVC pipe which is approved for potable uses at their Beaumont, California facility.	*I could not find this company listed in the US EPA TRI database nor the CARB database under this name, address, or zipcode.*
King Bros. Industries (KBI) 29101 The Old Road, Valencia, CA Phone (661) 257-3262	King Bros. manufactures CPVC valves & fittings for potable uses (NSF approved) at is facility in Valencia, California.	*I could not find this company listed in the US EPA TRI database nor the CARB database under this name, address, or zipcode.*

Spears Manufacturing Company 15853 Olden St, PO Box 9203 Sylmar, CA 91342, Facility in Gardena CA, (818) 364-1611	Spears manufactures pipe fittings for both PVC and CPVC at its California facility.	*I could not find this company listed in the US EPA TRI database nor the CARB database under this name, address, or zipcode.*
T. Christy Enterprises, Inc. Address 403 West Brenna Lane, Orange, CA 92667 Phone (714) 507-3300	T. Christy manufactures cement for CPVC pipe that is approved for drinking water uses at its facility in Anaheim, California.	*I could not find this company listed in the US EPA TRI database nor the CARB database under this name, address, or zipcode.*
Harvel Plastics, Inc. 7001 Schirra Ct, Bakersfield, CA 93313 Phone (610) 252-7355	Harvel Plastics manufactures CPVC pipe for potable water uses at is facility in Bakersfield, California.	**San Joaquin Air Pollution Control District permitting data received by telephone conversation April 11, 2005:** First Permit: Pneumatic blowing of raw material plastic resin into silos in receiving: Up to 6.2 lbs/day of PM10 (Particulate Matter 10 microns or less) emissions are permitted. The emission factor (used to calculate emissions) for this activity is 0.0335 lbs of PM10 emissions per ton of material received. Second Permit: Pneumatic transfer systems & blending: Up to 8 lbs/day PM10 emissions are permitted for this operation. Emission factors used range from 0.014 to 0.04 lbs PM10 emissions per ton of material throughput. Third & Fourth Permits together: Scrap grinding and pulverizing: Up to 8.2 lbs/day PM10 emissions are permitted for this operation. Emission factor used is 0.17 lbs PM10 emissions per ton of material throughput. Pipe extrusion including melting: exempt from SJAPCD air permitting

Oatey Co. 6600 Smith Ave., Newark, CA, 94560 Phone (888) 466-2839	Oatey manufactures CPVC cement for drinking water uses, (an example is Low VOC Flo Guard Gold (number 31901 for 4 oz size, but this also comes in many other sizes, with different product numbers). at its facility in Newark, California as well as in Ohio.	**BAAQMD permit Air Emission Data** (attached): Emissions computed Jan 16 2003: Particulate: 0.29 tpy Organic precursor: 26.78 tpy **US 2002 EPA TRI online database:** Methyl Ethyl Ketone (MEK) used onsite and released to air: Stack or point air releases of 7,200 lbs. Additional MEK used onsite but ultimately transferred offsite: An additional 6,600 lbs of MEK used onsite is ultimately sent to a California facility offsite for incineration (to Onyx Env Services L.L.C. 1704 W. First St., Azusa, CA, LA County)

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and that this declaration was executed on this 21st day of April 2005.

Julia E. May
Air Quality Expert

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Community relations

San Francisco Bay Area Water Transit Authority
Media relations

SEIU 790 – BART Employees, San Joaquin Health Employees
Strike crisis communications

St. Anton Partners
Community relations

Coalition Against Neighborhood Nevada Casinos
Strategic communications, coalition building – Native American gaming issues

Yuba County Entertainment
Strategic communications, coalition building – Native American gaming issues

A native of Daly City, California Mark A. Capitolo has over 12 years experience in managing political and public affairs campaigns for candidates, ballot measures, labor unions, business groups and non-profit coalitions.

Prior to forming his consulting practice, he was the Director of Public Affairs for Barnes Mosher Whitehurst Lauter & Partners in Sacramento, where he directed media relations for several political campaigns and public affairs clients.

Capitolo is experienced in several policy issues including education, transportation, infrastructure, organized labor and Native American gaming.

In addition to his political background, Capitolo was a freelance journalist, with several pieces published in the *California Journal Weekly* and *Sacramento Bee/Neighbors.*

Capitolo is a former Communications Director for California State Senate Majority Leader Don Perata, and has provided communications and political consulting to Assembly Speaker Emeritus Herb Wesson.

He spent three years as a Senior Account Executive for Hopcraft Communications where he helped develop paid and earned media programs for statewide ballot measure campaigns and issue advocacy programs for non-profit coalitions.

Capitolo is a regular volunteer and supporter of the Capitol Focus Youth Political Awareness Program, which exposes thousands of young people to the political process each year.

Capitolo earned his Bachelor's degree in Government from California State University Sacramento.

Selected Clients

Rivera Lakes Joint Venture - University Park
Local government relations, marketing consulting

California Applicant Attorneys Association
Media relations, political organizing

Sacramento RiverCats
Special event marketing

California Commission on Jobs and Economic Growth
Strategic communications

Citizens Against Casinos
Strategic communications, coalition building – Native American gaming issues

California Infrastructure Coalition
Membership development, media relations

Ramco Enterprises

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in strictest confidence ... The chemical industry'ssecrets / HIGH-LEVEL CRIME / Italy develops a case formanslaughter because workers breathed *vinyl chloride*

By JIM MORRIS
Staff

VENICE, Italy - In America, the allegation would be gross negligence. The proceeding would be civil, not criminal, and only money would be at stake.

In Italy, the willful exposure of workers to cancer-causing chemicals has been given another name: manslaughter.

Thirty-one former executives of two Italian chemical companies are standing trial and may go to jail for ignoring warnings and allowing their employees to breathe horrific amounts of ***vinyl chloride*** and its relative, ethylene dichloride, inside a plant at Porto Marghera on the western shore of the Venice Lagoon.

"Cagionavano il delitto di strage," the indictment reads. "They caused the crime of massacre."

More than 150 former workers at the plant - owned first by Montedison, then Enichem - have died of cancer since 1973, and another 600 or so are thought to be suffering from work-related illnesses.

The defendants also are accused of polluting the lagoon with dioxin, a powerful carcinogen.

"People still collect shellfish from the lagoon and sell it to restaurants in Venice," said Fabrizio Fabbri, a Rome-based organizer for the environmental group Greenpeace. "The bottom sediment is like a slimy, black tar."

The trial, a criminal proceeding that also holds the possibility of civil damages, began in March and is expected to last a year. It already has had an impact.

In late May, most of the 500 or so individual plaintiffs in the case - sick workers and relatives of those who died - accepted a $36.5 million settlement offer from the two companies, a development that all but emptied the courtroom. It was an extraordinary concession on the part of Italian industry.

"Social consciousness is changing," the lead prosecutor, Felice Casson, said in an interview. "This case is contributing heavily to that."

Many of the Porto Marghera men who have died or are ailing started at the plant in the 1950s and '60s.

"These men were on the front lines of a war, only they didn't know it," said Fiamengo Bruna, whose 56-year-old husband, Ido Bettin, died of cancer 10 years ago. "It was a war without guns. They had no means of defending themselves."

Oliviero Saretta's children used to joke that he was "radioactive" when he came home from work.

"He had to wash himself and change his clothes at the plant," said Saretta's wife, Natalina Fassina. "In spite of that he still smelled of chemicals."

Saretta died of cancer, at 58, in 1987.

Nicola Palmieri, general counsel for Milan-based Montedison, said that the company's settlement with the workers and their families should not be construed as an admission of liability.

"These people have suffered," Palmieri said. "We do not believe we should drag them through extended litigation, through the very unpleasant rituals of testimony."

Federico Stella, an attorney representing Enichem's parent, Rome-based ENI, declined comment.

Fabbri views the 63 billion-lira settlement as nothing more than a shrewd public-relations move.

"They want to cut out the biggest part of the plaintiffs to reduce attention on the trial," he said.

Montedison, in particular, had good reason to want a lower profile. The company - which operated the Porto Marghera plant from 1966 to 1987 (although ENI acquired the property in 1983) - had ample evidence of ***vinyl chloride***'s hazards.

In the early 1970s, it was one of four sponsors of animal research in Italy that demonstrated carcinogenic effects at low levels of exposure.

At the same time, documents show, Montedison and other European manufacturers formed an alliance with American companies such as Dow Chemical and Union Carbide, trading health information about ***vinyl chloride*** and at one point signing a

secrecy agreement forbidding the disclosure of research findings.

"The Americans should fear this case," Casson said. "If this (legal theory of manslaughter) should be exported, it could be very dangerous for them. All of them were involved in keeping the worker exposure limits as high as possible."

The prosecution was motivated by two main sources: Greenpeace, which has campaigned internationally against the family of chemicals known as chlorinated hydrocarbons, and Gabriele Bortolozzo, a former Montedison and Enichem worker killed in a cycling accident in 1995.

Bortolozzo had begun reading about ***vinyl chloride*** in the 1970s. By the 1980s, many of his contemporaries at the plant had died or were dying of cancer; he started collecting death certificates and talking to widows. In 1985, he was isolated by Montedison in a dusty warehouse - punishment, he believed, for his obstinacy.

Bortolozzo retired in 1990 but continued his quest. In 1994, he captivated Casson with an elaborate tale of corporate indifference. For this Bortolozzo was ridiculed by the trade unions, with which he already had a strained relationship, and others who saw him as a threat to the Porto Marghera economy.

Casson spent the next three years collecting internal documents and combing the files of some 7,000 workers. In 1997, he charged the former Montedison and Enichem executives with precipitating human and environmental disasters, disdaining studies and warnings about conditions in the plant.

The indictment issued by the ``Tribunale di Venezia" specifically mentions the Italian animal-research program in the early 1970s, as well as a plant audit conducted by the University of Padua in 1975 and 1976. The audit detailed a "grave sanitary situation."

The upshot of the pervasive management neglect became apparent last year, when Italy's National Institute of Health reported that it had found statistically significant excesses of a number of cancers - including liver, brain and lung - in a mortality study of people who had worked at the plant between 1956 and 1995.

Bortolozzo would not have been surprised at the institute's revelations; he had written of a cancer epidemic years before.

"The real mortality from (***vinyl chloride***) is different from the `official' one," he asserted in a report published by an Italian magazine, ``Medicina Democratica," in 1994. "The data on deaths from angiosarcoma (an obscure cancer of the liver tied to ***vinyl chloride*** exposure) given by public bodies and companies are not reliable. Among those dead at Montedison because of ***vinyl chloride*** , only three have been officially recognized."

He continued: "Montedison has always had a state-of-the-art medical infrastructure, but with only one purpose: maintain the physical efficiency of the workers for production reasons. The message of the company was, `Look, there's nothing bad, really.' As a matter of fact, they keep (people) working in the same place. This is

fascism."

Bortolozzo's daughter, Beatrice, and son, Gianluca, are among the few plaintiffs who refused to settle with the chemical companies.

"We would never accept their money," Beatrice said. "This factory has stolen husbands, stolen fathers. You can't put a value on the life of a person."

Two Montedison retirees in their 60s, neither of whom wished to be quoted by name, said in an interview that they blame the company for the demise of most of their friends and their own poor health.

Each has been plagued by sexual dysfunction, liver abnormalities and a numbing of the extremities, which becomes more pronounced in cold weather. Cancer is always in the back of their minds.

Although it was clear by 1974 that ***vinyl chloride*** was carcinogenic, the men said, there was no monitoring in the plant, which made both ***vinyl chloride*** monomer and polyvinyl ***chloride*** resin, until the early 1980s.

"We tried not to think about it," one said. "We had to work, and we had three choices: Leave Italy, go to the factory or do outlaw activities."

He added, however, that he would not allow his son to work for Montedison.

"I would have killed him myself before I would have let him do that."

For many years, the retirees said, ***vinyl chloride*** levels inside the plant were staggering, reaching a potentially explosive 40,000 parts per million near the reactors, where the liquid monomer was turned into resin.

There is no reason to believe that conditions were much better in U.S. plants prior to 1974, when the government imposed strict new limits on ***vinyl chloride*** .

As late as 1973, for example, an average of one employee per quarter was overcome by ***vinyl chloride*** vapor at a Conoco PVC plant in Aberdeen, Miss., according to a company document. This would indicate levels in excess of 15,000 ppm.

Both American and European manufacturers had access to data generated by an Italian oncologist, Dr. Cesare Maltoni, who in July 1971 began a series of animal experiments on ***vinyl chloride*** that lasted a decade.

The research was sponsored by Montedison and three other chemical companies, Imperial Chemical Industries of England, Solvay of Belgium and Rhone-Progil of France.

Maltoni knew by the fall of 1972 that ***vinyl chloride*** could produce tumors in rats - notably, angiosarcoma - at levels as low as 250 ppm.

There was disagreement, however, about whether this finding was conveyed to the U.S. government.

The Chemical Manufacturers Association and its British counterpart, the Chemical Industries Association, said that the information was passed on to the National Institute for Occupational Safety and Health by manufacturers at a meeting on July 17, 1973 - six months before three angiosarcoma deaths were reported by the B.F. Goodrich Chemical Co. in Louisville, Ky.

NIOSH said it wasn't told. The agency's surveillance director, William Lloyd, became so enraged at the suggestion that NIOSH had sat on the Maltoni data that he went on British television and called the industry officials "damned liars."

In fact, the American companies had agreed in 1972 not to divulge any of Maltoni's findings without the Europeans' permission.

Documents show that two of Montedison's top medical officials in the 1970s, Emilio Bartalini (a defendant in the trial) and Tiziano Garlanda, provided confidential information to members of the CMA's ***vinyl chloride*** panel before the chemical was openly acknowledged to be a carcinogen.

Dr. Theodore Torkelson, a retired Dow toxicologist who was on the panel at the time, said that the secrecy pact has been misinterpreted. Its intent, he said, was merely to prevent the premature release of data.

"They didn't want somebody going off half-cocked," Torkelson said of the Europeans.

The agreement held until Goodrich revealed the Louisville angiosarcoma deaths in January 1974. In the months afterward, many wondered why Maltoni's research hadn't been taken more seriously.

Now 68, Maltoni explored this still-sensitive subject during an interview at his laboratory, incorporated into a 15th-century castle near Bologna.

In the early years, he said, he was virtually alone in his contention that ***vinyl chloride*** should be tightly controlled in the workplace.

"The relevance of my work was not perceived," Maltoni said. "At that time, the philosophy was, `Who cares about animal data? We want human data.' They were ready to attack me."

Louisville, he said, demonstrated that "animals may be highly predictive of an effect in humans."

And yet many industries and government bodies still require after-the-fact human evidence - decades-long epidemiological studies of dead workers - before they feel compelled to act.

"This is a tragedy," Maltoni said.

Montedison's failure to respond to what was universally described as solid research by Maltoni is one of the chief issues in the Venice trial.

"They knew for sure," prosecutor Casson said of the company. "They commissioned the work."

Said Montedison counsel Palmieri: "We knew that the product had some effect on health. We don't know exactly what happened (at Porto Marghera), whether there is causation. These workers may have contracted their illnesses in the workplace. Probably not." ... 1972-74 ...international tension In 1972, Dr. Cesare Maltoni, an Italian oncologist, confirmed a strong link between exposure to ***vinyl chloride*** and angiosarcoma, a rare liver cancer, in lab animals. Before sharing the research results with the American chemical industry, the European sponsors required a formal agreement of confidentiality. ..... we pledge to hold such information strictly in confidence within our company unless and until formally notified specific consent to its release has been granted by the European sponsors. ... March 23, 1973: An Allied Signal internal memo describes Dow Chemical's concerns about Maltoni's research and the desire to present a united front in providing the information to the National Institute for Occupational Safety and Health (NIOSH). Dow Management is extremely worried about this development and one of their executives is about to contact other producers (and presumably users) so that the industry (with permission of the European group) can as a group take all the data known to NIOSH. They do not want to act unilaterally. ... In early 1974, the cancer connection became public when B.F. Goodrich reported angiosarcoma cases among workers at its PVC plant in Louisville, Ky. This led to renewed interest in the European animal research, and a public statement by Britain's Chemical Industries Association that NIOSH had been told about the research the previous year. William Lloyd, a top NIOSH official, angrily denied the claim and discussed it in a July 19 letter to A.W. Barnes, a chemical industry executive in England. As regards the controversy as to who knew what about angiosarcoma of the liver associated with VC exposures, I have personally concerned myself with tracking down the rumors which began circulating the week of January 22, 1974, that NIOSH had previous knowledge of the problem. And, after thorough review of the facts which convinced me that there was no substance to these rumors, I strongly urged our Director to publicly state that there was no support for such stories. ... In his response, Barnes conceded that angiosarcoma was not discussed at a 1973 meeting attended by NIOSH representatives, but implied that NIOSH should have been more inquisitive. With hindsight it is the greatest of pities that we didn't happen to mention the liver in the initial presentation or, not having done so, that we weren't asked which sites were affected. ... 1973 ... moral and legal issues March 26, 1973: A letter to chemical executives from the Manufacturing Chemists Association, a trade group, discusses ethical and practical aspects of informing government agencies about ***vinyl chloride*** health research. There is also the aspect of moral obligation not to withhold from the Government significant information having occupational and environmental relevance, and the desirability of industry taking the initiative rather than at some later time having to defend another course. ... May 31, 1973: A Union Carbide internal memo raises a legal concern about the March 26 MCA letter: 1. The MCA letter to company executive contacts, dated March 26, 1973, could be construed as evidence of an illegal conspiracy by industry if the information were not

made public or at least made available to the government.

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GRIM NUMBERS/ The astonishingamount of *vinyl chloride* present at a plant inEngland

By JIM MORRIS
Staff

CHESTERFIELD, England - When he worked at the Vinatex PVC plant in the early 1970s, Colin Hadfield often marveled at his good fortune.

"It was the best job I ever had, the easiest job I ever had," Hadfield said. "I kept asking, `Is there any danger?' "

Assured by management that there wasn't, Hadfield put in 4 1/2 years at the plant, a joint venture of Conoco and a now-defunct British company, Stavely Chemicals Ltd.

Only later did he realize the downside of one of the most coveted blue-collar jobs in the North Midlands. He developed acroosteolysis, which caused his fingers to whiten and go numb. He became impotent, had pounding headaches, was constantly tired.

In a sense, Hadfield is lucky. He doesn't have cancer - as far as he knows - and has made it to age 63.

Dozens of other former Vinatex workers, who inhaled ***vinyl chloride*** at levels far exceeding even the most lenient standards of the time, are dead or dying.

"These people have got away with industrial murder," said David Foster, a haggard man of 55 who suffers from a liver ailment that may be a precursor to cancer. "They've known about this bloody stuff for a long time. They fooled people into believing it was bloody harmless."

John Knight, coordinator of the North Derbyshire Trade Union Safety Committee, estimates that only about half of the 250 people who worked at Vinatex during its 15-year history are still alive.

He and several associates have begun tracking down and interviewing the surviving

Vinatex workers, and the families of those who died.

"We're going to look into a range of things: government benefits, compensation awards, litigation," Knight said. "We're also going to look into publicizing it worldwide, because workers in other areas who've dealt with ***vinyl chloride*** have all been told the same story: that the chemical is perfectly safe, that you can taste it, you can touch it, you can smell it."

Vinatex opened here in the industrial north of England in 1969. After word circulated about the generous pay and relatively soft work, the new plant was deluged with applicants.

Business was good. By 1970 Vinatex was running 40 reactors, turning ***vinyl chloride*** monomer into PVC resin.

It took only a few years for the first cases of acroosteolysis - "white-finger," the workers called it - to appear. Much later came the cases of angiosarcoma, the liver cancer caused almost exclusively by exposure to ***vinyl chloride*** .

The chemical was present in astonishing amounts at Vinatex. One measurement in 1973 showed an airborne concentration of 50,000 parts per million - 100 to 1,000 times what most manufacturers then considered to be the safe limit.

"Anytime anybody had any suspicions or qualms, they were soon dispelled by management," said Foster, who drove a tanker truck for Vinatex. "People were afraid to speak out."

Geoffrey Larkin, 61, used to climb into the reactors to clean them. The vapors were so intoxicating, he said, that "you'd feel as though you'd just came out of the pub."

Larkin has since had two heart attacks, pneumonia and an enlarged spleen, which had to be removed.

By the early 1980s, Vinatex had settled more than 35 claims for compensation by acroosteolysis victims, and by 1984 it was out of business.

The deaths and illnesses did not stop, however, and questions are being raised about Houston-based Conoco's role in the debacle.

"Conoco took over the plant soon after it opened," Knight said. "They had some chaps come over from the United States and train people in production methods."

Said Hadfield, a former plant operator: "The idea was that they were making the same stuff in America, but they came here because it was more accessible to Europe."

Although Conoco had a 50 percent interest in Vinatex for its first 10 years, "we did not have any role in the day-to-day operation of the facility," spokesman Carlton Adams said. "We did share some information with them on some of the early (***vinyl***

chloride) studies."

On June 20, 1973, D.M. Jonas of Vinatex wrote to Conoco's Research and Development Department, then in Ponca City, Okla., seeking details of two studies sponsored by a group of American manufacturers.

Conoco's Flynt Kennedy responded on Aug. 30 that the studies were still in their early stages.

"There are no hard data to support specific health and safety problems related to VCM (***vinyl chloride*** monomer) at this time," Kennedy wrote. But he added, "I would agree that Vinatex should take appropriate steps so that worker exposure to VCM vapors is at the lowest practical value."

A few months earlier, Imperial Chemical Industries, the British conglomerate that supplied ***vinyl chloride*** monomer to Vinatex, had issued a misleading position paper stating that the compound caused cancer in rats at 30,000 parts per million, and that this was "greatly in excess of the levels to which workers in the industry are normally exposed."

In his letter, Kennedy called the Imperial paper "an excellent, concise summary of the problem regarding not only past information, but also the current situation."

He did not mention that Italian animal studies - well known to both American and European manufacturers by late 1972 - had found ***vinyl chloride*** to be carcinogenic at levels as low as 250 ppm.

According to the former Vinatex workers, Conoco was an active partner in the operation. Attorneys for the workers' union, however, saw no tactical value in pursuing the American firm in court.

"They got off very, very, very lightly," Foster said.

Already weakened by his liver condition, Foster has been told by his doctors that he may develop angiosarcoma, a particularly aggressive and painful cancer.

"It's a specter hanging over all our lives," he said. "We don't know when it's going to hit us."

Last year the disease claimed 55-year-old Graham Houghton, a former Vinatex truck driver. Former operator Barry Caudwell was diagnosed in February 1993 and was dead, at 59, by the following January.

"He was in terrible pain those last 11 months, terrible," said Caudwell's wife, Joan. "He couldn't walk very far, and his lung collapsed."

Cancers other than angiosarcoma also materialized.

Andrew Giove watched his once-strapping father, Marco, who cleaned reactors at

Vinatex, wither and die from a brain tumor last year at 65.

"They just get away with it," Giove said of the chemical companies. "They shouldn't be able to. They ruined a lot of people's lives."

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in strictest confidence / The chemical industry's secrets /TOXIC SECRECY / For years, makers and users of *vinyl chloride* concealed the terrible truth: The chemical can cause cancer

By JIM MORRIS
Staff, Copyright 1998, Houston Chronicle

LAKE CHARLES, La. - Blind and comatose, Dan Ross succumbed to brain cancer on Oct. 9, 1990.

A large and unpretentious man of 46, Ross had spent 23 years at the Conoco - later Vista - chemical plant here. He had made a good living, raised a family, saved for retirement.

After his diagnosis, Ross came to believe that he had struck a terrible bargain, forfeiting perhaps 30 years of his life through his willingness to work with ***vinyl chloride*** and other cancer-causing substances.

"Just before he died, he said, `Mama, they killed me,' " recalled his wife, Elaine. "I promised him I would never let Vista or the chemical industry forget who he was."

She hasn't. Her husband's untimely death set her and a local attorney, William Baggett Jr., on a circuitous course of litigation that led to the industry's well-insulated core.

During the past eight years, Baggett has acquired thousands of previously secret documents, most having to do with ***vinyl chloride*** - used to make one of the world's most common plastics.

These documents, and others obtained in recent months by the Houston Chronicle, suggest that major chemical manufacturers closed ranks in the late 1950s to contain and counteract evidence of ***vinyl chloride*** 's toxic effects.

Letters, memoranda and minutes of meetings depict a framework of dubious science

and painstaking public relations, coordinated by the industry's main trade association.

There are two dominant themes: Avoid disclosure and deny liability.

"There was a concerted effort to hide this material," said Dr. David Rosner, a professor of public health and history at Columbia University who has reviewed many of the documents as part of a research project. "It's clear there was chicanery."

In a prepared statement, the Chemical Manufacturers Association called such charges "irresponsible." The group said that it promotes a policy of openness among its members.

"We took the problem seriously," said Dr. Theodore Torkelson, a retired Dow Chemical toxicologist who chaired the CMA's ***vinyl chloride*** panel for 11 years in the 1970s and '80s. "We did what we thought was ethical, scientifically sound and morally responsible."

The documents present another scenario: That the chemical companies, through their silence and inertia, subjected at least two generations of workers to excessive levels of a potent carcinogen that targets the liver, brain, lungs and blood-forming organs.

Although they freely shared health information among themselves, the companies were evasive with their own employees and the government. They were unwilling to disrupt the growing market for polyvinyl ***chloride*** (PVC) plastic, used in everything from pipe to garden hoses.

"Even though they may be competitive in some spheres, in others they aren't," Baggett said. "They have a mutual interest in their own employees not knowing (about health effects), in their customers not knowing, in the government not knowing."

Put in context by hundreds of interviews, the documents flesh out a story that made headlines during the first half of 1974, only to be overshadowed by Watergate and Richard Nixon's resignation.

And they accentuate the problem of occupational cancer, which, by some estimates, takes more lives (50,000) each year than AIDS, homicide or suicide, but receives far less attention.

To this day, most manufacturers acknowledge only that ***vinyl chloride*** causes angiosarcoma, an extremely rare cancer of the liver. They insist that the exposure levels necessary to produce the disease have not been seen in two decades.

As a rule, this is true. Because of government-required controls - controls the industry resisted - ***vinyl chloride*** contamination in and around chemical plants has been reduced dramatically.

Significant exposures in some places occurred well into the 1980s, however. And unusual cancers other than angiosarcoma continue to kill chemical workers and

retirees prematurely.

On April 30, Henry Tousaint, who had spent 20 years at the PPG Industries plant in Lake Charles, died of mantle-cell lymphoma at age 54.

Tousaint and other PPG workers routinely cleaned chemical storage tanks and mixed pesticides, inhaling ***vinyl chloride*** , benzene and other carcinogens in the process. Those who complained of dizziness or breathing difficulties were given cough syrup, kept in gallon jugs, Tousaint said three months before his death.

"We didn't know no better," he said. "But they did."

Officials at the company's Pittsburgh headquarters would not comment.

Baggett won large settlements for both the Tousaint and the Ross families from PPG, Conoco and Vista, none of which admitted culpability. He is building a conspiracy case against 29 other chemical companies, the CMA and the Society of the Plastics Industry, alleging that they obfuscated evidence of ***vinyl chloride*** -related deaths and diseases.

"What I hope to achieve, through Billy, is that every man who works in a chemical plant is told the truth and tested on a regular basis in the proper manner," Elaine Ross said. "I want the chemical companies to be accountable for every little detail that they don't tell these men."

Since the death of her husband - a towering, blond man she met in Alabama when she was 17 and he was 20 - Ross has oscillated between despair, rage and listlessness. She gave up sewing, baking and other diversions. She can't sleep without tranquilizers, can't bear to look at Dan's picture.

She sees older couples and is filled with resentment, thinking: "That should have been us."

By the spring of 1959, the evidence was beginning to accrue.

Manufacturers of ***vinyl chloride*** - then known only as an explosion hazard and an intoxicant - came to realize that the compound might be poisoning the people who worked with it.

Dow had been discreetly testing the sweet-smelling, gaseous substance on rats, rabbits, guinea pigs and dogs at its Biochemical Research Laboratory in Midland, Mich.

The results were troubling. Adverse liver effects had been seen in animals that had inhaled only 100 parts per million of ***vinyl chloride*** , a fraction of the concentration to which many workers were exposed.

In a letter to the B.F. Goodrich Chemical Co.'s industrial hygiene director on May 12, 1959, one of the Dow scientists, V.K. Rowe, outlined the experimental findings

and concluded that ***vinyl chloride*** could produce "rather appreciable injury" among workers routinely exposed to 500 parts per million, then the voluntary standard. Rowe ended his letter with a plea:

" . . . this opinion is not ready for dissemination yet and I would appreciate it if you would hold it in confidence . . . "

For the next 15 years, the Goodrich hygienist and many others responsible for worker health in the chemical industry did a remarkable job of honoring such requests.

Before Dow began its animal work in 1958, there had been few investigations of ***vinyl chloride*** - although acute effects had been seen in guinea pigs as early as 1930, and liver damage had been found in 15 of 45 ***vinyl chloride*** workers examined as part of a 1949 study in the Soviet Union.

The Dow researchers published their data in the American Industrial Hygiene Association Journal in 1961, recommending a ***vinyl chloride*** exposure limit of 50 ppm.

No one outside of Dow listened. Indeed, a 1963 Yale University animal study sponsored by Allied Chemical found no significant effects below 500 ppm.

"The industry goofed up," said Torkelson, who helped conduct the Dow experiments. "Probably if they had listened to our 50 ppm (recommendation), we wouldn't have had a problem."

(The Occupational Safety and Health Administration didn't come into being until 1970; consequently, there was no government agency to force companies to act.)

In the fall of 1964, Goodrich - which would be commended for revealing a cluster of angiosarcomas at one of its plants a decade later - sought help from the Kettering Laboratory at the University of Cincinnati.

A puzzling hand disability had emerged among workers who cleaned the reactors - huge, blenderlike devices in which ***vinyl chloride*** monomer is turned into PVC resin - at a Goodrich plant in Louisville, Ky.

At the time, cleaners entered the reactors without respiratory protection to chip away the residue that built up on the walls.

"Nobody felt like ***vinyl chloride*** was a problem," said Jerome Heckman, a Washington attorney who has represented the Society of the Plastics Industry for 44 years. "The workers used to climb down in those damned reactors and play around in them because they got a great high out of it."

By 1966, it had become apparent that the hand condition - acroosteolysis, characterized by numbness and swelling of the fingers - was systemic, indicative of ***vinyl chloride*** 's toxicity. And it was not confined to reactor cleaners.

The following year, an epidemiological study of ***vinyl*** workers commenced at the University of Michigan. All company data, it was emphasized, would be held "in strictest confidence."

As the Michigan researchers catalogued cases of acroosteolysis, Dr. Pier Luigi Viola, an industrial physician for the Belgian chemical firm Solvay, attempted to produce the disease in monkeys and rats exposed to ***vinyl chloride*** gas in a Rome laboratory.

Instead, he produced cancer, albeit at high concentrations. American manufacturers grasped the significance of this unexpected finding.

"Since this report appears to be so convincing," Dr. George Roush, medical director of the Ethyl Corp. in New Orleans, wrote to a colleague on June 24, 1970, "I suppose that we must consider ***vinyl chloride*** as a carcinogen . . . "

By the end of 1972, Dr. Cesare Maltoni, an Italian oncologist, had seen angiosarcoma in rats exposed to as little as 250 ppm of ***vinyl chloride*** . The news traveled quickly across the Atlantic.

An Allied Chemical memorandum called Maltoni's results "disconcerting," and a Uniroyal memo concluded, "The work in Europe indicates we have a problem which cannot be ignored."

Although the Michigan acroosteolysis registry ultimately collapsed from lack of industry cooperation, its keepers managed to convey an important message to the Manufacturing Chemists Association, the trade group that later became the CMA: Get people out of the reactors, or at least limit exposures to 50 ppm.

The recommendation, included in a confidential report to the MCA in February 1969, was not followed. As a result, workers such as William Smith were needlessly exposed to high levels of ***vinyl chloride*** .

Smith entered his first reactor at the Goodyear Tire and Rubber Co. plant in Niagara Falls, N.Y., in November 1973.

He died, at 40, of a brain tumor on Sept. 15, 1993, leaving behind a wife and young daughter. He was hospitalized for the last eight months of his life, unable to speak.

"Every day I went to the hospital, and we would write on a pad," said his wife, Holly Cummings. "It took him half an hour or 45 minutes to get one stupid sentence down. It eventually got to the point where he couldn't even nod his head."

Cummings settled a lawsuit against Goodyear, but not before company lawyers tried to blame her husband's cancer on nitrates in lunch meat. "They asked me how much bologna he ate," Cummings said.

The wall of secrecy surrounding ***vinyl chloride*** was not breached until Jan. 23, 1974, when B.F. Goodrich announced that it had found three fatal cases of angiosarcoma among workers at its PVC plant in Louisville.

Although Goodrich was praised for its candor, it and other manufacturers knew a great deal about the chemical's toxic properties long before Louisville and understood the economic consequences of bad publicity.

Indeed, Goodrich - fearful of a broad indictment of PVC - had tried to stop publication of a European researcher's paper in 1966, according to a Monsanto memo. It is unclear whether Goodrich succeeded.

Goodrich said in a prepared statement that it "has always acted responsibly in addressing potential health risks associated with direct exposure to ***vinyl chloride*** ."

(An article on acroosteolysis, authored by four Goodrich medical officials, was published in the Journal of the American Medical Association in 1967. It was inconclusive, suggesting that the disease was not serious or common, was restricted to reactor cleaners and was due in large part to "personal idiosyncrasy.")

The Louisville cancer revelation in 1974 set in motion months of frenetic activity in Washington, highlighted by contentious OSHA and congressional hearings. Labor leaders and public-health advocates spoke of a cover-up by the ***vinyl*** industry; the industry accused them of overreacting and threatening its very survival.

OSHA adopted an emergency temporary standard of 50 ppm and later proposed a permanent standard of 1 ppm. A federal ban was imposed on the use of ***vinyl chloride*** as a propellant in hair sprays, pesticides and other aerosol products; a proposed ban on PVC liquor bottles was averted when the industry found a way to limit migration of ***vinyl chloride*** into the liquor.

(Mindful of "essentially unlimited liability to the entire U.S. population," as Union Carbide put it in 1973, some manufacturers already had begun to pull out of the aerosol market. Tests had shown that it was not unusual for hair spray users of that era to be exposed to hundreds or even thousands of parts per million of ***vinyl chloride*** ; a 1972 Carbide memo pointed out that "beauty operators applying hair spray on a daily, routine basis might actually be a better population to examine than chemical plant operators.")

Despite the convincing animal data from Italy and public pressure, the chemical companies did not acquiesce. A study commissioned by the Society of the Plastics Industry concluded that the new OSHA standard would eliminate at least 1.6 million jobs - from reactor cleaners to plastics fabricators - and have a minimum economic impact of $65 billion.

The SPI challenged the standard before a three-judge federal panel and lost on Jan. 31, 1975.

"I argued that it was arbitrary and capricious to say 1 (ppm), that they pulled that number out of their ear," said Heckman, the society's attorney. "I got killed in court."

In the panel's opinion, retired Supreme Court Justice Tom Clark wrote that "the

record shows what can only be described as a course of continued procrastination on the part of the industry to protect the lives of its employees."

Despite the dire predictions, the industry did not disappear.

Using technology developed in Japan in the late 1960s, manufacturers installed reactors that greatly reduced the need for manual cleaning. New ways were found to lower the ***vinyl chloride*** content of PVC resin from hundreds of parts per million to less than 1 ppm.

"The industry really, really changed," said Bill Carroll, a vice president with Occidental Chemical in Dallas and an officer with the ***Vinyl*** Institute, a trade association. "If you look at how close it might have come to being regulated out of existence - to come from that circumstance to the point of doing what had to be done to make the product safe, I think it's a tremendous success story."

There remained, however, the matter of cancer.

By the mid-1970s, clusters of disease were beginning to spring from plants such as the Monsanto chemical complex in Indian Orchard, Mass. For ***vinyl*** workers who had started in the 1940s, '50s and possibly the early '60s, the requisite latency for cancer had passed.

In the summer of 1975, a group of Monsanto workers approached the Massachusetts Department of Labor and Industries with the death certificates of 56 former colleagues and a list of others who had died.

A department physician found additional deaths and determined that there was a cancer excess among workers who had been assigned to Building 85, where PVC resin was fabricated into ***vinyl*** swimming-pool bottoms, wallpaper backing and other items. Pancreatic cancer had killed at a rate five times the national average.

The National Institute for Occupational Safety and Health did a study, as did Monsanto. Their conclusions were strikingly different.

Monsanto found "no occupationally related health problem" at the plant. NIOSH found an excess of digestive-system cancers and said it suspected "occupational factors."

Workers, understandably, were frustrated and confused. Erik Wengstrom, who was laid off in 1973 and spent years documenting cancer cases in hopes of holding Monsanto liable, remains bitter about the experience.

"People were dying like flies," Wengstrom said.

In February 1979, the ***vinyl*** industry was presented with another potential crisis. OSHA had found a cluster of brain cancers at the Union Carbide plant in Texas City, and ***vinyl chloride*** was strongly suspected as the causative agent.

As was the case at Indian Orchard, concurrent studies yielded conflicting results. NIOSH and Union Carbide could not even agree on the number of brain cancer deaths; the former listed 23, the latter 12.

Even the Carbide number represented an excess. But the company attributed it to chance, not chemicals.

In a study published in 1982, federal investigators gave details of 25 brain cancer deaths among former employees of Dow's Texas Division in Freeport. The deaths occurred between 1951 and 1977, and most the cancers were of two strains: astrocytoma and glioblastoma.

The average age at death was 55, and eight of the victims were under 50. The conclusion - with which the company strenuously disagreed - was that there was "an increased risk of death due to brain tumor" among ex-Dow workers.

In the late 1980s and early '90s, cancer became an issue for Houston-based Vista, now known as Condea Vista. At least four workers - Dan Ross and another man at Vista's ***vinyl chloride*** monomer plant in Lake Charles, and two men at its PVC plant in Aberdeen, Miss. - had developed brain tumors, and there had been other cancers as well.

Vista management held several meetings with workers in an effort to quell fear and mistrust. These were some of the comments received during two sessions in Lake Charles in April 1991, according to a Vista memo:

"Previous explanation about cancer deaths was a snow job, bull----. Our questions were not answered. We believe these employees died because of exposure in the plant. We were told to shut up and not make trouble."

"We think our jobs are killing us. No one listens."

"If the real answer is that Vista doesn't know how much we're hurt by this exposure, then we deserve some kind of compensation for the agony of not knowing."

"EDC (ethylene dichloride, a suspected carcinogen) drips from the ceiling. When you flush the toilets in the plant and the water fills up again you're overcome with EDC fumes."

Ray Reynolds, Vista chairman of Oil, Chemical and Atomic Workers Local 4-555 and an operator at the Lake Charles plant, said in an interview that the company has been slow to respond to such concerns, despite evidence that chemical exposures have caused illness and death.

"It's all about money," said Reynolds, a gaunt man of 41 with a baffling - and, he thinks, work-related - condition of the nervous system that keeps him fatigued and in pain. "All these years, I believe, they've been killing people, but they've put a dollar figure on it."

Tom Grumbles, Vista's manager of product safety and occupational health in Houston, said that the 1991 meetings were tense but productive, part of a "fairly extensive effort to communicate with our employees.

"Obviously, personal medical issues are very emotional for people," Grumbles said. "There's little chance you're going to satisfy everyone."

Predictably, some of the cancers out of the chemical plants gave rise to workers' compensation claims and lawsuits.

Few of these actions, however, resulted in lucrative judgments or settlements; the burden of proof for occupational cancer was simply too great, and the industry was able and willing to play hardball.

After her husband, Joseph, died of angiosarcoma in January 1989, Dorothy Succi filed a claim against his employer, Gencorp Polymer Products, which operated a PVC plant in Ashtabula, Ohio.

Succi had spent 28 years at the plant (closed in 1983) as a laborer, a mechanic and an electrician. He was diagnosed with angiosarcoma - irrefutably tied to ***vinyl chloride*** exposure - in 1988, and was included in a worldwide, industry-maintained registry.

When his widow sought death benefits from the Ohio Bureau of Workers' Compensation, however, Gencorp fought her, saying "we do not believe (Succi's) condition is the result of his employment with us."

A hearing was held in Columbus in November 1989, and Dorothy Succi won. But Gencorp appealed.

In a Jan. 9, 1990, letter to Succi's attorney, Gencorp safety and workers' compensation manager Kenneth Breyley offered $37,500 to settle the case.

"I truly believe we can convince the Industrial Commission the angiosarcoma could not have been the result of Joseph's exposures to `chemicals' at the workplace," Breyley wrote.

In an interview, Succi said that she settled for $48,000 after being warned by her lawyer that the case could go on for years. "I just wanted a closing to it," she said.

Gencorp spokeswoman Rosemary Younts said that the claim was contested because Joseph Succi spent most of his career as an electrician and would have had minimal contact with ***vinyl chloride*** . A document from the angiosarcoma registry, however, indicated that Succi had high exposures during his first few years at the plant.

Lake Charles attorney Baggett maintains that the 5,000 or so workers in U.S. ***vinyl chloride*** , ethylene dichloride and PVC resin plants aren't the only ones vulnerable to cancer and other serious ailments.

An estimated 120,000 people work in PVC fabrication, turning the white powder

into flooring, siding, blood bags and other familiar products. Might they, too, be at risk?

"No one (in industry) is going to study fabricators," Baggett said. "It'll never happen. What if they found something?"

Quite by accident, a Swedish researcher did find something. Three years ago, Dr. Lennart Hardell, an associate professor of oncology and epidemiology at Orebro Medical Center, began distributing questionnaires to testicular cancer victims and a group of controls.

Hardell was searching for possible occupational causes of the disease, on the rise in Sweden and other industrialized countries. By the time he had compiled his data, only one line of work stood out: PVC fabrication.

"We hadn't expected anything on PVC," Hardell said in an interview. "We had no suspicions."

The study was published late last year. Considering the high risk he had observed for PVC exposure, Hardell called for further investigation.

The Brussels-based PVC Information Council responded swiftly and decisively, as its American counterparts had done many times before.

"We do not see a cancer threat for (PVC) workers," the council said.

Coming Monday

It's a crime

The husband of Natalina Fassina, right, and more than 150 other former employees of a ***vinyl*** plant near Venice have died of cancer since 1973. Italian prosecutors say that's a crime. Now 31 former chemical company executives are standing trial on manslaughter charges alleging they exposed plant employees to excessive amounts of ***vinyl chloride*** despite warnings of its danger.

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in strictest confidence / SECOND OPINION / In an `extremelyunusual' event, a doctor under industry contract reversed hisdamaging conclusions in a study of worker deaths involving *vinyl chloride*

By JIM MORRIS
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IN SEPTEMBER 1991, the American Journal of Industrial Medicine published what appeared to be yet another prosaic study linking ***vinyl chloride*** to cancer, another scrap of evidence in a seemingly endless inquiry.

The lead author was Dr. Otto Wong, a prominent California epidemiologist. Five years earlier, Wong and three associates had finished updating a study of worker deaths in the ***vinyl*** industry and had found significant excesses of liver and brain cancer, as well as emphysema.

Their findings were reported in the journal article and might have stirred only mild interest but for one thing:

Wong hadn't received permission from the study's sponsor, the Chemical Manufacturers Association, to publish his data - data that could be used against the industry in lawsuits, that might alarm workers and attract regulators.

The unauthorized publication provoked members of the CMA's ***vinyl chloride*** panel and touched off a months-long effort to persuade Wong to recant, documents show.

Although Wong denies that he was pressured, he changed his story on ***vinyl chloride***, declaring that the apparent excess of brain cancer deaths among workers might well be the result of "diagnostic bias" - better reporting and diagnosis of the disease in industry than in the general population.

Letters propounding this theory from Wong and one of his co-authors - as well as Dr. Hasmukh Shah, then manager of the CMA panel - appeared in the August 1993 issue of the Journal of Industrial Medicine.

"This is extremely unusual," said Dr. Philip Landrigan, the journal's editor and chairman of the Department of Community and Preventive Medicine at Mount. Sinai Medical Center in New York. "I've never seen a retraction of epidemiological findings like this with almost no defense (by the authors)."

Reprints of the Wong and Shah letters were distributed among the chemical companies and their attorneys. They are still cited by defendants in brain cancer cases, and are used to reassure workers about the safety of ***vinyl chloride*** and polyvinyl ***chloride*** . Frequent defense witness

Although he describes himself as an independent scientist, Wong has had a long relationship with trade groups like the CMA and the American Petroleum Institute, and frequently testifies as a defense witness.

Some believe that Wong's reversal on ***vinyl chloride*** was simply another episode in a decades-long history of unreliable, industry-sponsored research.

"The ultimate lesson is that you can't trust industry and its usual contractors to do this kind of work," said Herschel Hobson, an attorney in Beaumont who represents workers and has encountered Wong in several cases. "You must have some sort of independent oversight."

In a telephone interview, Wong, president of Applied Health Sciences of San Mateo, Calif., said that he wrote the "diagnostic bias" letter because he genuinely believed it could help explain the elevated brain cancer rate among ***vinyl chloride*** workers.

He had meant to raise the issue in the initial, 17-page article, he said, but "we didn't have the space to do it." He pointed out that he had stood by his 1991 finding on emphysema, although Shah had challenged it as well.

The CMA refused to make Shah available for an interview. Members of its ***vinyl chloride*** panel - representatives of manufacturers such as Dow Chemical - also declined interview requests.

In a prepared statement, the CMA said that the panel did not pressure Wong to retreat from his 1991 position.

"Our studies are conducted with world-class experts of the highest integrity . . . (who) have their results put in the public domain," the statement said. "The purpose of this research is to enable companies to take appropriate precautions to protect the health of workers and the environment." Study`s shortcomings

Documents show, however, that the CMA's epidemiological study of ***vinyl chloride*** workers, which began in 1973 and is being updated a third time, had major shortcomings from the start.

Older, highly exposed workers were left out, as were entire plants. Younger workers with little or no exposure were included. Exposures were misclassified.

These defects were recognized and discussed by the CMA and participating companies, but were not corrected. Wong said that they were not brought to his attention.

The late Dr. Joseph Wagoner, an epidemiologist with the National Institute for Occupational Safety and Health and the Occupational Safety and Health Administration in the 1970s, was one of the first outsiders to spot what he called "latency bias" in the study.

He noted, for example, that the oldest ***vinyl*** plant in the country - Union Carbide in South Charleston, W. Va., which opened in 1938 - gave the CMA's contract researchers only records of workers who were still on the payroll or had left the company during the last six years of the 30-year study period.

"As a result," Wagoner wrote in a 1974 memo, "many of those persons with the longest latency were not included."

Lake Charles, La., attorney William Baggett Jr. put it more bluntly: "They stacked the deck."

The irony is that the researchers found an abundance of cancer despite the study's inherent weakness, said Baggett, who has represented plaintiffs in several lawsuits against ***vinyl chloride*** manufacturers.

"They underestimated how potent a carcinogen they were dealing with," he said. "An extremely young population, including many workers who had barely been exposed, still had a significant amount of disease."

Angiosarcoma - which virtually everyone agrees can be caused by ***vinyl chloride*** exposure - was not the only cancer in excess. By the mid-1970s, some company officials seemed resigned to this unpleasant reality.

"At present, the epidemiological work has amply demonstrated an association between high exposures to VCM (***vinyl chloride*** monomer) and an increase in angiosarcoma of the liver, brain and lung tumors," Dr. Mitchell Zavon with the Ethyl Corp. wrote in an interoffice memo on June 18, 1976.

The news got worse. In 1981, an Italian research team led by Dr. Cesare Maltoni published 10 years' worth of animal data, concluding that ***vinyl chloride*** is a "multipotential carcinogen, affecting a variety of organs and tissues."

In 1987, the International Agency for Research on Cancer in Lyon, France, proclaimed that there was sufficient evidence to believe the chemical causes cancer of the liver, brain and lung, as well as leukemia and lymphoma.

And yet, when ***vinyl*** workers with cancers other than angiosarcoma - or their families - seek compensation, their claims almost invariably are contested. They are confronted with experts like Otto Wong.

At Baggett's request, Dr. Richard Lemen, a former NIOSH director and now a consultant in suburban Atlanta, has done an analysis of the CMA's 25-year ***vinyl chloride*** study, which in its later incarnations included 10,173 workers.

"This is probably the longest ongoing study I've ever seen," Lemen said. "***Vinyl chloride*** is such an important product that, I think, industry hopes to show it's not that big a problem, that the post-1974 controls (imposed by OSHA) have been effective."

In fact, he said, "We don't know what's going to happen to people who entered these plants after the levels went down, because there's such a long latency period for cancer. It's going to take another 25 or 30 years to get that answer."

At about the time the epidemiological study was begun, the ***vinyl*** industry subsidized animal research at Industrial Bio-Test Laboratories in Illinois. An unfortuate choice

IBT proved to be an unfortunate choice: conditions in the cages were wretched, data were fabricated and concealed, and the labs were closed in 1978. Three former executives were convicted of defrauding the federal government and drug and pesticide manufacturers.

"When IBT went down, they took a lot of work into the toilet, including ***vinyl chloride*** ," said Hobson, the Beaumont lawyer.

By the late 1980s, the chemical companies' political and public-relations worries about ***vinyl chloride*** had ebbed. Then they were blindsided by Wong.

In a letter to the director of the ***Vinyl*** Institute on Oct. 21, 1991, Dr. Robert K. Hinderer of B.F. Goodrich reported that he had just seen a copy of Wong's article in the Journal of Industrial Medicine and "quickly realized that this was the work that was sponsored by the CMA (***vinyl chloride***) Panel.

"Unfortunately, the authors failed to send a draft to the Panel for review prior to publication," Hinderer wrote. "When I discussed this with Dr. Shah at CMA, he indicated that CMA would notify them that they have violated their contract. The next step will be for the whole Panel to consider what corrective actions are necessary and / or appropriate. Hopefully, the authors will be agreeable to add some clarifying comments in a letter to the editor."

CMA memos indicate that Shah gave the matter his full attention and spent months trying to arrange a conference call between Wong and the panel members.

Wong said that he had discussions with them about the article, but that no one accused him of violating his contract. "If that's how they feel about it, that's too bad, because I insist on my right to publish," he said.

Wong's unusual self-critique in the journal was warmly received by the ***vinyl*** industry. Within days of its publication in 1993, Houston-based Condea Vista was using it to curb lingering worry and discontent among its workers.

In early 1995, the CMA contracted with Dr. Kenneth Mundt of Amherst, Mass., to update the study a third time; Wong had bid on the project and lost.

A Vista memo prepared in support of the update emphasized that manufacturers continued to face lawsuits alleging a connection between ***vinyl chloride*** and an assortment of cancers.

"This type of research is useful in defending such litigation," Vista said.

In an interview, Mundt said that he was never told of imperfections in the basic CMA data and had no reason to suspect any. He said that he expects to complete his update by October, and would not discuss his preliminary findings.

Mundt said that he saw nothing strange in Wong's about-face on brain cancer. Mundt doesn't believe, however, that the excess among ***vinyl*** workers is attributable to diagnostic bias.

"I don't think that that's a strong explanation for this," he said. "It's a possibility."

Mundt began a separate study for Vista in 1994, reviewing cancer deaths at the company's ***vinyl chloride*** plant in Lake Charles and its PVC plants in Oklahoma City and Aberdeen, Miss.

In his final report in 1996, Mundt explained that he had tracked 1,915 men who had worked at least a month at the three plants between 1963 and 1993, and had found elevations of brain, pancreatic and - for white workers only - lung cancer. None of the elevations was so striking that it pointed to a workplace problem, Mundt said.

In a brochure prepared for its employees, Vista conceded that a number of older workers were excluded from the study. It blamed Conoco, which owned the plants until 1984, for not turning over the workers' records, although Conoco says that it only failed to supply Social Security numbers for 75 people from Oklahoma City.

According to Vista, only one fatal brain cancer case from Aberdeen - that of Jim Stark - was left out of Mundt's analysis, and its inclusion "would not have significantly changed the results."

In fact, at least three cases - those of Willie Snow, who died in 1982; Gene Mayes, who died in 1984; and Stark, who died in 1993 - were excluded. (A handwritten Vista "cancer list" dated Sept. 16, 1993, includes Stark and Mayes but not Snow.)

A fourth Aberdeen worker - 47-year-old David Thompson - is suffering from the disease.

In its brochure, organized in question-and-answer format, Vista assured its employees that Mundt had found "no `epidemic' of cancer, or of any other cause of death" at the three plants. Ambiguous information

Upon closer examination, however, some of the information in the brochure is, at the least, ambiguous:

Question: "What about the excess of pancreatic cancers?"

Answer: "Pancreatic cancer is very uncommon and is not associated with any known specific cause."

(In fact, pancreatic cancer has been associated with PVC processing; a 1993 Vista memo made note of a cluster of cases at a Union Carbide plant in New Jersey).

Question: "Did Dr. Mundt have any specific recommendations?"

Answer: "Dr. Mundt stated that smoking is a known cause of lung cancer and should be avoided."

(Some researchers believe that ***vinyl chloride*** and PVC dust also can cause lung cancer; the possible connection was reported by the International Agency for Research on Cancer in 1987.)

Given Jim Stark's 18-year tenure at the Aberdeen plant and his prominence in the community, his omission from the study seems odd. Mundt said that he learned of Stark too late to add him, but Stark's daughters are skeptical.

"They don't want to mar their statistics by including these men," said Luanne Thompson (no relation to David), an attorney in Aberdeen.

"If they acknowledge Dad, they'll have to acknowledge a lot more," said Lynette Stark, who teaches at the town's junior high school.

Jim Stark began at the plant in 1966, advancing to become manager of transportation. As such, he responded to numerous tank-car derailments that resulted in ***vinyl chloride*** releases.

In 1984 - shortly after Vista had taken over from Conoco and just days before he resigned - Stark reported, and was caught in, a huge leak from the plant itself.

Stark was given a clean bill of health after a physical in March 1993, said his wife, Eileen. Two months later he was diagnosed with a type of brain cancer known as glioblastoma multiforme, which some studies associate with ***vinyl chloride*** exposure.

That summer, his weight dropped from 155 to 82 lbs. He died, at 62, on Aug. 20.

"Dad was such a fighter, with a very strong sense of justice," Luanne Thompson said. "Watching him languish like he did - it was like they took away his dignity."

Vista officials said that Stark and other former Conoco workers will be included in an expansion of the cancer study, which Mundt hopes to finish by early next year.

Even if Vista became convinced that certain cancer deaths were work-related, "it wouldn't change our practices," said Tom Grumbles, the company's occupational health manager. "Exposures have been controlled tightly."

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Low VOC (volatile organic compounds), dimethyl-2-piperidone solvent-based, PVC and CPVC pipe and component adhesives and primers containing minimal or no tetrahydrofuran

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Examiner Field of Search (US): 523218; 524099; 524356; 524527; 524567

Cited US Patents

Patent Number	Date(YYYYMM)	Main US Class	Assignee
US 4675354	198706	524099	Sperling
US 4687798	198708	524100	King
US 5384345	199501	523218	Naton
US 5422388	199506	524104	Patel
US 5470894	199511	523218	Patel
US 5817708	199810	524104	Congelio
US 5821289	199810	524104	Congelio

Cited non-Patent References:

- DuPont Nylon Intermediates and Specialties, Material Safety Data Sheet, H-16147-2.

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Action: SECURITY AGREEMENT

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Assignee: MADISON CAPITAL FUNDING LLC, AS AGENT, 30 S. WACKER DR., CHICAGO, ILLINOIS, 60606

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Frame: 0221

Contact: WINSTON & STRAWN LLP, LAURA KONRATH, 35 W. WACKER DR., 33RD FLOOR, CHICAGO, IL 60601
Parent Case Text:
CROSS-REFERENCE TO RELATED APPLICATION
The present application is a continuation-in-part application of Ser. No. 09/255,970, filed on Jan. 5, 1999; now abandoned.
Abstract: Novel low VOC solvent-based adhesives are provided, comprising a mixture of low vapor pressure, isomeric dimethyl-2-piperidones (DMPD) blended with (1) a non-solvent diluent, specifically, acetone (a VOC-exempt compound), or with mixtures of acetone and other known ketonic solvents such as methyl ethyl ketone (MEK), diethyl ketone (DEK), methyl propyl ketone (MPK), and methyl iso-butyl ketone (MIBK), cyclohexanone, and (2) thermoplastic PVC or CPVC resins. Omission of the resin provides a novel primer for pipes. The blended mixture yields PVC or CPVC pipe adhesives and primers that: (1) result in low VOC formulas (e.g., less than 510 g/l for PVC pipe and less than 490 g/l for CPVC pipe); (2) are very economical in the industry; (3) yield strong, quick setting, durable pipe joints that meet the required standards and performance criteria (e.g., ASTM D-2564 lap shear for PVC); (4) yield stable, low viscosity solutions that, in the case of adhesives, can be readily adjusted with thixotropes (e.g., Aerosil 200) to give desirable flow characteristics and body, as well as primers for solvent welding PVC and CPVC pipe and components; and (5) can be formulated with minimal (10 wt %) or no cyclic ethers such as THF.
Summary of the Invention:
TECHNICAL FIELD
The present invention relates generally to thermoplastic pipe adhesive and primer compositions, and, more particularly, to adhesives and primers used for joining PCV (polyvinyl chloride) and CPVC (chlorinated PVC) pipe. Specifically, the PVC and CPVC pipe adhesives and primers disclosed and claimed herein are solvent-based, having an environmentally-acceptable VOC (volatile organic compounds) content.
BACKGROUND ART
Solvent-based adhesives, or cements, have been in use for joining thermoplastic pipe for over 30 years. The development of these adhesives is largely responsible for growth of the thermoplastic pipe industry. Several billion pounds of plastic pipe are produced each year in North America. Rapid-setting, solvent-based adhesives weld the pipes together in a timely manner. These rapid-setting adhesives allow for the testing and trouble-shooting of piping systems in a matter of hours while maintaining the long-term durability of the pipe itself. These characteristics, rapid set, ease of use, long-term durability along with low-cost, have made the joining of plastic pipe by solvent-based adhesives a practical and economic system.
The solvent-based adhesives work primarily by two means of action. First, the solvent portion of the formulation softens the outer surfaces of the pipe through solvation of the plastic. Subsequently, the adhesive joint "cures" (hardens) by means of the solvents evaporating to the surrounding atmosphere from the pipe. Secondly, the resin dissolved in the adhesive dries through solvent evaporation and provides continuity between the welded pipe surfaces which aid in preserving the integrity of the entire pipe system. These adhesives cure rapidly (within a matter of hours), often allowing piping systems to be tested the same day as constructed. However, perhaps the most important benefit of

these solvent-based adhesives is the maintenance of the integrity of the pipe itself. The resin is the same as the plastic pipe and/or fitting material. This provides a high degree of long-term durability for the piping system, often up to 30 to 40 years of useful life. This is essential for these systems which are built into the structures of homes and buildings, or are buried underground.

Thousands of miles of thermoplastic piping systems are constructed each day throughout the world, primarily by the means previously described. These systems are used in the transfer of potable water for drinking; residential hot and cold water systems; drain, waste, and vent (DWV) applications in home and industry; turf and agricultural sprinkler systems; jacuzzi, spa and tub connections, residential and commercial fire sprinkler systems; etc. These systems are crucial to the maintenance of safe and healthy means of transport of water and other chemicals throughout the world.

Evaporation of solvents from adhesives is a concern to an environmentally-concerned world, along with all other potential sources of air pollution. Typical solids (non-volatile) contents of plastic pipe adhesives are 10 to 20% for both PVC and CPVC. The balance of the formulation is solvent. By definition, the solvents normally used, e.g., tetrahydrofuran (THF), methyl ethyl ketone (MEK), and acetone are considered to be VOCs. That is, they are volatile compounds which contain the element carbon excluding methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonates, ammonium carbonate, and exempt compounds, such as methylene chloride and 1,1,1-trichlorethane. While other solvents, such as cyclohexanone and dimethyl formamide (in the case of PVC) and cyclohexanone (in the case of CPVC), may also be used in such adhesives, the amount of such solvents are typically minor, considerably less than 15 wt % (in the case of PVC) and 10 wt % (in the case of CPVC) of the total adhesive concentration. Typical VOC values of present commercial PVC solvent adhesives range from 750 to 850 grams/liter and for CPVC solvent adhesives range from 775 to 850 g/l.

Regulations are being created throughout North America regarding allowable VOC levels in adhesive formulations. Federal, state, and local agencies are beginning to adopt strict measures to drastically reduce these levels. The South Coast Air Quality Management District (SCAQMD) in the Los Angeles area has been a leader of the establishment of rules governing VOCs, such as SCAQMD Rule 1168.

SCAQMD Rule 1168 specifies a VOC level for PVC adhesives of 510 g/l or less and for CPVC adhesives of 490 g/l or less, as determined by Method 316-A. All PVC and CPVC adhesives used after Jan. 24, 1994, are required to meet that maximum allowed level. More recently, acetone has been removed from the list of solvents and placed on the list of exempt solvents. Consequently, there is, at the present time, no legal limit to the amount of acetone that can be added to adhesive compositions.

Further, tetrahydrofuran (THF), which has been a major component of PVC and CPVC adhesive compositions (typically, 25 to 75 wt %), has been found by the National Toxicology Board to have a slight carcinogenicity in animal testing. As a result, THF is under extensive investigation, both with regard to worker health (exposure during pipe assembly) and potable water issues. Furthermore, THF is a high vapor pressure, fast-evaporating solvent that heavily contributes to the VOC level. It is highly desirable to reduce THF levels, but still maintain the adhesive-contributing properties that THF offers, i.e., fast-setting, durable pipe joints.

Also, many PVC and CPVC pipe adhesives are formulated with N-methyl pyrrolidone (NMP), a very effective solvent for PVC and CPVC resins. However, the hygroscopicity of this solvent results in milky white cured film joints, even in pigmented blue and gray formulas, and this is undesirable in many applications.

Other thermoplastic pipe adhesives are formulated with large amounts of low vapor pressure solvents blends, such as di-methyladipate (available from E. I. DuPont de Nemours as DBE-6) and NMP and/or alkyl-substituted naphthalene (U.S. Pat. No. 5,821,289, issued to C. D. Congelio et al) to reduce VOC levels, but generally these type of adhesives require longer set times before water pressure testing of the system can be made. Also, these slower setting adhesives are less effective in colder environments.

Still another method to formulate low VOC cements for thermoplastic pipe and other PVC and CPVC extruded articles is to incorporate higher amounts of resin(s). This does indeed reduces VOC levels, but is less cost effective and generally slower than cements containing lower weight percent of resin.

Thus, adhesives for joining PVC and CPVC pipes having a maximum VOC level of 510 g/l (for PVC) or 490 g/l (for CPVC) are required. Yet, such adhesive must also meet the required hydrostatic burst strength and other performance criteria set forth in ASTM F-493 and D-2846 and lap shear strength set forth in ASTM D-2564. (Test method 316A has been revised and the new acceptable VOC levels are shown above.)

DISCLOSURE OF INVENTION

In accordance with the present invention, novel low VOC solvent-based adhesives are provided, comprising a mixture of low vapor pressure isomeric dimethyl-2-piperidones (DMPD) blended with (1) a non-solvent diluent, specifically, acetone (a VOC-exempt compound), or with mixtures of acetone and other known ketonic solvents such as methyl ethyl ketone (MEK), diethyl ketone (DEK), methyl propyl ketone (MPK), and methyl iso-butyl ketone (MIBK), cyclohexanone, and (2) thermoplastic PVC or CPVC resins. Primers are also provided in accordance with the present invention by omitting the inclusion of the thermoplastic resin.

The novel adhesives described herein overcome the deficiencies described above for the prior art adhesives without compromising adhesive performance. The adhesives of the present invention comprise (for joining PVC pipes and components):

(a) about 5 to 25 wt % PVC resin and 0 to about 25 wt % acrylic resin, the total of PVC resin and acrylic resin ranging from about 10 to 35 wt %;

(b) about 5 to 80 wt % of low vapor pressure dimethyl-2-piperidone (DMPD);

(c) about 10 to 75 wt % of at least one ketone selected from the group consisting of (i) 0 to 75 wt % acetone, (i) 0 to about 75 wt % of at least one low boiling point ketone having a boiling point below 80[degree(s)], (iii) 0 to about 35 wt % of at least one medium boiling point ketone having a boiling point within a range of 80[degree(s)] to 130[degree(s)] C., (iv) 0 to about 35 wt % of at least one high boiling point ketone having a boiling point greater than 130[degree(s)] C., with the proviso that the total of the medium and high boiling point ketones is a maximum of 35 wt % of the adhesive or primer composition; and

(d) 0 to about 10 wt % tetrahydrofuran.

For joining CPVC pipes and components, the foregoing composition is modified only by replacing the resin component in (a) with about 5 to 25 wt % CPVC resin.

Inclusion of the resin component provides pipe adhesives, while omission of the resin component provides pipe primers.
DMPD, which is used in the novel adhesive of the present invention, is a true solvent for PVC and CPVC and exhibits a remarkable decrease in solution viscosity when blended with the non-solvent acetone or the other ketones (such as methyl ethyl ketone, diethyl ketone, methyl propyl ketone, cyclohexanone, methyl iso-butyl ketone, methyl amyl ketone, acetophenone, methyl iso-propyl ketone, methyl butyl ketone, methyl iso-amyl ketone, di-butyl ketone, ethyl amyl ketone, etc.), thereby allowing great latitude in formulation. Blends of DMPD can be adjusted for such parameters as set time, VOC content, cost, viscosity, flash point, solids content very readily with little effect on adhesive performance.
The adhesive in this invention may include filler, thixotropic agents, colorants, stabilizers, oligomeric and polymeric rheology additives, wetting agents and adhesion promoters.
The blended mixture yields PVC or CPVC pipe adhesives that:
(1) result in low VOC formulas (e.g., less than 510 g/l for PVC pipe and less than 490 g/l for CPVC pipe);
(2) are very economical in the industry;
(3) yield strong, quick setting, durable pipe joints that meet the required standards and performance criteria (e.g., ASTM D-2564 lap shear for PVC);
(4) yield stable, low viscosity solutions that can be readily adjusted with thixotropes (e.g., Aerosil 200) to give medium and high body adhesives, as well as low bodied adhesives and primers for solvent welding PVC and CPVC pipe and components; and
(5) can be formulated with minimal (10 wt % maximum) or no cyclic ethers such as THF.
Other objects, features, and advantages of the present invention will become apparent upon consideration of the following detailed description.

BEST MODES FOR CARRYING OUT THE INVENTION

Reference is now made in detail to a specific embodiment of the present invention, which illustrates the best mode presently contemplated by the inventors for practicing the invention. Alternative embodiments are also briefly described as applicable.
In accordance with the present invention, novel low VOC solvent-based adhesives are provided, comprising a mixture of low vapor pressure isomeric dimethyl-2-piperidones (DMPD) blended with (1) (a) a non-solvent diluent, specifically, acetone (a VOC-exempt compound), or (b) with mixtures of acetone and other known ketonic solvents such as methyl ethyl ketone (MEK), diethyl ketone (DEK), methyl propyl ketone (MPK), methyl iso-butyl ketone (MIBK), methyl amyl ketone (MAK), and cyclohexanone, or (c) with one or more of the foregoing ketonic solvents without acetone, and (2) thermoplastic PVC or CPVC resins.
The novel adhesives described herein overcome the deficiencies described above for the prior art adhesives without compromising adhesive performance. The adhesives of the present invention comprise (for joining PVC pipes and components):
(a) about 5 to 25 wt % PVC resin and 0 to about 25 wt % acrylic resin, the total of PVC resin and acrylic resin ranging from about 10 to 35 wt %;
(b) about 5 to 80 wt % of low vapor pressure dimethyl-2-piperidone (DMPD);
(c) about 10 to 75 wt % of at least one ketone selected from the group consisting of (i) 0 to 75 wt % acetone, (i) 0 to about 75 wt % of at least one low boiling point ketone having

a boiling point below 80[degree(s)] ,(iii) 0 to about 35 wt % of at least one medium boiling point ketone having a boiling point within a range of 80[degree(s)] to 130[degree(s)] C., (iv) 0 to about 35 wt % of at least one high boiling point ketone having a boiling point greater than 130[degree(s)] C., with the proviso that the total of the medium and high boiling point ketones is a maximum of 35 wt % of the adhesive or primer composition; and

(d) 0 to about 10 wt % tetrahydrofuran.

For joining CPVC pipes and components, the foregoing composition is modified only by replacing the resin component in (a) with about 5 to 25 wt % CPVC resin.

Inclusion of the resin component provides pipe adhesives, while omission of the resin component provides pipe primers.

Unless otherwise specified, the concentration of a particular component is with respect to the total adhesive or primer composition. The purity of all components is that employed in normal commercial practice in the field of PVC and CPVC adhesives and primers for joining pipes and other components together.

DMPD, which is used in the novel adhesive of the present invention, is a true solvent for PVC and CPVC and exhibits a remarkable decrease in solution viscosity when blended with the non-solvent acetone or the other ketones (such as methyl ethyl ketone, diethyl ketone, methyl propyl ketone, cyclohexanone, methyl iso-butyl ketone, methyl amyl ketone, acetophenone, methyl iso-propyl ketone, methyl butyl ketone, methyl iso-amyl ketone, di-butyl ketone, ethyl amyl ketone, etc.), thereby allowing great latitude in formulation. Blends of DMPD can be adjusted for such parameters as set time, VOC content, cost, viscosity, flash point, solids content very readily with little effect on adhesive performance. There are a number of isomers of DMPD, including 1,3-dimethyl piperidone, 1,4-dimethyl piperidone, 1,5-dimethyl piperidone, 2,3-dimethyl piperidone, 2,4-dimethyl piperidone, and 2,5-dimethyl piperidone, all of which alone or in any combination are useful in the practice of the present invention. One product that is commercially available comprises a mixture containing 64 to 71 wt % of 1,3-dimethyl piperidone and 29 to 36 wt % of 1,5-dimethyl piperidone and is available from E. I. du Pont de Nemours (Wilmington, Del.).

In general, acetone may be employed as the sole ketone in the range of about 15 to 75 wt % of the total adhesive or primer composition. Alternatively, a mixture of acetone and at least one of the other above-enumerated ketones may be employed, the total concentration falling within the same range. Finally, at least one of the enumerated ketones, other than acetone, may be used in the practice of the present invention.

In particular, the ketone component comprises about 10 to 75 wt % of the total adhesive or primer composition and is at least one ketone selected from the group consisting of (1) 0 to about 75 wt % acetone; (2) 0 to about 75 wt % of at least one low boiling ketone having a boiling point less than 80[degree(s)] C., such as methyl ethyl ketone (MEK); (3) 0 to 35 wt % of at least one medium boiling ketone having a boiling point within a range of about 80[degree(s)] to 130[degree(s)] C., such as diethyl ketone (DEK), methyl propyl ketone (MPK), methyl iso-propyl ketone (MIPK), methyl iso-butyl ketone (MIBK), and methyl n-butyl ketone (MBK); and (4) 0 to about 35 wt % of at least one high boiling ketone having a boiling point greater than 130[degree(s)] C., such as cyclohexanone, acetophenone, methyl amyl ketone, methyl iso-amyl ketone, di-iso-ketone, and ethyl amyl ketone, wherein the medium boiling ketone and the high boiling ketone have a total

maximum combined amount of 35 wt %. It will be evident to those skilled in this art that if, for example, no acetone is selected, then a suitable amount of another ketone or ketones must be added to provide at least 10 wt % ketone in the adhesive or primer composition, within the constraints listed above.

With regard to the PVC resin, its incorporation into the adhesive composition provides an adhesive for PVC pipe. In addition, acrylic resins may be included, as disclosed in U.S. Pat. No. 5,422,388, issued to Naresh D. Patel et al on Jun. 6, 1995. The acrylic resin, if employed, may comprise any combination of the known homopolymers, copolymers, and terpolymers commonly employed in adhesive compositions.

The concentration of PVC resin is in the range of about 5 to 25 wt % of the total adhesive composition.

The acrylic resin, if employed, is preferably in the range of about 2 to 25 wt %, with the concentration of the mixture of both PVC and acrylic resin ranging from about 10 to 35 wt % of the adhesive composition. (A minimum of 10 wt % resin is permitted under ASTM-2564.) A concentration of PVC beyond the maximum value of 25 wt % would not be shelf-stable. With regard to the acrylic resin, less than about 2 wt % does not result in the benefits provided to the adhesive by its presence in combination with the PVC resin, while greater than about 25 wt % is not soluble in the solvent system. Within the foregoing constraints, the total resin level in the PVC adhesive ranges from about 10 to 35 wt %, as indicated above. Less than about 10 wt % makes it difficult to achieve VOC levels (if formulated without acetone or significant levels of DMPD) less than the permitted maximum of 510 g/l, while greater than about 35 wt % is not shelf-stable.

Any of the PVC resins commonly employed in PVC adhesives may be used in the practice of the present invention. Particularly preferred are those PVC resins characterized by homopolymers as classified by inherent viscosity (I.V.) in the range of about 0.6 to 0.95. The inherent viscosity of a PVC resin is determined in accordance with ASTM D-1243. Inherent viscosity is a qualitative measure of molecular weight; that is, the higher the I.V., the higher the molecular weight. A non-limiting example of a suitable PVC resin employed in the practice of the present invention is Shintech SE-650, available from Shintech, Inc. (Freeport, Tex.).

The acrylic resins advantageously employed in the practice of the present invention are those homopolymers, copolymers, and terpolymers of methyl methacrylate. When characterized by inherent viscosity, as measured with a solution containing 0.25 g polymer in 50 ml methylene chloride at 20[degree(s)] C. using a No. 50 Cannon-Fenske Viscometer, the useful range in the practice of the present invention is 0.1 to 1.25. Alternatively, an acrylic resin having a melt flow rate as determined by ASTM D-1238 in the range of 1.6 to 24 is acceptable. Examples of acrylic resins suitably employed in the practice of the present invention include (1) the V series (VS, VM, VH) resins from Atohaas, (2) the Elvacite(R) and Lucite(R) acrylic resins, both available from ICI, and (3) Acriterm(R) HS resins from ICI.

With regard to the CPVC resin, its incorporation into the adhesive composition provides an adhesive for CPVC pipe. As indicated above, the CPVC resin is contained in the adhesive formulation in an amount ranging from about 5 to 25 wt %, preferably from about 5 to about 15 wt % of the total adhesive. If too small an amount of CPVC resin is used, it may not be possible to form an effective and durable pipe joint and VOC levels

will tend to increase, while, if the amount of CPVC resin too great, it may not all solubilize in the solvent(s) and thus tends to form an undesirable "gel" therewith.
CPVC resins useful in this invention may be prepared by chlorination of polyvinyl chloride homopolymers and copolymers starting materials by procedures known to those skilled in the art. Examples of useful polyvinyl chloride homopolymers and copolymers starting materials in this regard include those described in U.S. Pat. No. 5,384,345, which teachings are incorporated herein by reference. CPVC resins are typically supplied in powder form when obtained from commercial sources. The CPVC resins used in this invention may contain chlorine in any amount effective to impart adequate heat deflection resistance property to the adhesive composition for the intended use(s). The chlorine content of the CPVC resins used in the compositions of this invention will range from about 50 to about 80% by weight, and more specifically about 57 to about 70% by weight.
Particularly preferred are those CPVC resins characterized by an inherent viscosity (I.V.) ranging from about 0.60 to 0.95, and more preferably about 0.68 to about 0.92. A non-limiting example of a suitable CPVC resin employed in the practice of the present invention is BF Goodrich Temprite 677X670 with 67% chlorination, available from BF Goodrich (Cleveland, Ohio).
The adhesives of the present invention may include additional solids. Such additional solids that may be present include fillers, thixotropic agents, colorants, stabilizers, oligomeric and polymeric rheology additives, wetting agents, and adhesion promoters. Up to about 8 wt % of the adhesive may contain such additional additives and adjuvants. Any fillers, thixotropic agents, pigments, dyes, stabilizers oligomeric and polymeric rheology additives, wetting agents, and adhesion promoters that are commonly used in PVC and CPVC adhesives may be employed in the practice of the present invention.
Preferred fillers low specific gravity hollow spheres (glass, ceramic, or synthetic, e.g., PVC), and include solid particulate inorganic fillers such as calcium carbonate, aluminum trihydrate, calcium sulfate, and crystalline silica.
Preferred colorants include dyes and pigments, such as titanium dioxide, carbon black, aluminum Lake based-orange, and conventional red or yellow colorants.
Preferred thixotropic agents include fumed silica and precipitated silica (e.g., AEROSIL-200 available from Degussa Corporation, Cab-O-Sil MS available from Cabot Corporation, and HISIL T600) and treated bentonite clay (e.g., Bentone 27), and these may be used at low levels to obtain optimum flow properties, especially with regard to controlling spillage from the pipe upon application.
Preferred stabilizers include such additives as acid scavengers, antioxidants (e.g., hindered phenols) and tin stabilizers.
Preferred rheology additives include non-PVC or non-CPVC thermoplastic resins, such as one or more of thermoplastic PVC polymers (in the case of CPVC adhesives), acrylic polymers (in the case of CPVC adhesives), MBS polymers, ABS polymers, linear and core/shell polymers, and random and block polymers including elastomeric and rubber resins.
The blended mixture yields PVC or CPVC pipe adhesives that:
(1) result in low VOC formulas (e.g., less than 510 g/l for PVC pipe and less than 490 g/l for CPVC pipe);
(2) are very economical in the industry;

(3) yield strong, quick setting, durable pipe joints that meet the required standards and performance criteria (e.g., ASTM D-2564 lap shear for PVC);
(4) yield stable, low viscosity solutions that can be readily adjusted with thixotropes (e.g., Aerosil 200) to give desirable flow characteristics and body to adhesives, as well as primers for solvent welding PVC and CPVC pipe and components; and
(5) can be formulated with minimal (10 wt % maximum) or no (0 wt %) cyclic ethers such as THF.
A number of different, specific composition ranges are preferred. These include:
(a) about 5 to 25 wt % PVC resin;
about 5 to 50 wt % DMPD; and
about 10 to 68 wt % acetone.
(b) about 5 to 25 wt % PVC resin;
about 5 to 50 wt % DMPD;
about 10 to 68 wt % acetone; and
up to about 10 wt % tetrahydrofuran.
(c) about 5 to 25 wt % PVC resin;
about 5 to 50 wt % DMPD;
about 10 to 68 wt % acetone; and
up to about 50 wt % MEK, where acetone and MEK together total about 10 to 68 wt % of the adhesive.
(d) about 5 to 25 wt % PVC resin;
about 5 to 50 wt % DMPD;
about 10 to 68 wt % acetone; and
up to about 35 wt % cyclohexanone, where acetone and cyclohexanone together total about 10 to 68 wt % of the adhesive.
(e) about 5 to 25 wt % PVC resin;
about 5 to 50 wt % DMPD;
about 10 to 68 wt % acetone; and
up to about 35 wt % of at least one of MPK and DEK, where acetone, MPK, and DEK together total about 10 to 68 wt % of the adhesive.
(f) about 5 to 25 wt % PVC resin;
about 5 to 50 wt % DMPD;
about 10 to 68 wt % acetone; and
up to about 35% of at least one of cyclohexanone, MPK, and DEK, where acetone, MPK, DEK, and cyclohexanone together total about 10 to 68 wt % of the adhesive.
(g) about 5 to 25 wt % PVC resin or CPVC resin;
about 5 to 50 wt % DMPD; and
about 10 to 68 wt % methyl ethyl ketone.
(h) about 5 to 25 wt % PVC resin or CPVC resin;
about 5 to 50 wt % DMPD;
about 10 to 68 wt % methyl ethyl ketone; and
up to about 10 wt % THF.
(i) about 5 to 25 wt % PVC resin or CPVC resin;
about 5 to 50 wt % DMPD;

about 10 to 68 wt % methyl ethyl ketone; and up to about 35 wt % cyclohexanone, wherein methyl ethyl ketone and cyclohexanone together total about 10 to 68 wt % of the adhesive.
(j) about 5 to 25 wt % PVC resin or CPVC resin;
about 5 to 50 wt % DMPD;
about 10 to 68 wt % methyl ethyl ketone; and
up to about 35 wt % of at least one of MPK and DEK, wherein methyl ethyl ketone, MPK, and DEK together total about 10 to 68 wt % of the adhesive.
(k) about 5 to 25 wt % PVC resin or CPVC resin;
about 5 to 50 wt % DMPD;
about 10 to 68 wt % methyl ethyl ketone; and
up to about 35 wt % cyclohexanone, wherein methyl ethyl ketone, MPK, DEK, and cyclohexanone together total about 10 to 68 wt % of the adhesive.
It is noted that the PVC or CPVC resin may have a concentration as low as 5 wt %. Such a formulation is still an adhesive, but it falls below the minimum of 10 wt % required to satisfy ASTM compliance.
The formulations provided above, if the solids (PVC or CPVC resin and solid additives) are omitted, are primers, and may be used as such with both PVC and CPVC pipes. Primers may be employed as part of a two-step process, comprising applying the primer to one or both surfaces of the pipes (or other objects) being joined, followed by applying the adhesive. The primer for joining PVC pipes and components or CPVC pipes and components comprises:
(a) 15 to 85 wt % dimethyl-2-piperidone;
(b) 10 to 75 wt % of at least one ketone selected from the group consisting of (1) 0 to about 75 wt % acetone, (2) 0 to about 75 wt % of at least one low boiling ketone having a boiling point less than 80[degree(s)] C., (3) 0 to about 35 wt % of at least one medium boiling ketone having a boiling point within a range of about 80[degree(s)] to 130[degree(s)] C., and (4) 0 to about 35 wt % of at least one high boiling ketone having a boiling point greater than 130[degree(s)] C., wherein said medium boiling ketone and said high boiling ketone have a maximum amount of 35 wt %; and
(c) 0 to about 10 wt % tetrahydrofuran.
Description of the Invention:
EXAMPLES
Examples 1-6; Comparative Examples 1,2
The compositions listed in Table I below exemplify some typical preferred compositions with low VOC values. SCAQMD Rule 1168 specifies a VOC level for PVC adhesives of 510 g/l or less. In Examples 1-3, DMND and MEK adhesives result in acceptable VOC levels; in Examples 4-6, the DMPD and acetone formulas evidence much lower VOC levels as a result of acetone being an exempt compound. Comparative Examples 1 and 2 in Table II show VOC levels exceeding 500 g/l for a typical THF/resin adhesive (Comparative Example 1) and for a typical commercial cement Weld-On 711 (Comparative Example 2). The viscosity for Examples 1-6 in Table I also exemplify the low values of these DMPD base adhesives, which are commercially desirable, since they can be readily increased using thixotropic agents such as fumed silica or rheology additives such as homo-, co-, or ter-polymeric methacrylate, MBS (methyl methacrylate-

butadiene-styrene), ABS (acrylonitrile-butadiene-stryene), etc. to give desirable flow characteristics and body to the adhesives.
(table - see patent image)
(table - see patent image)
Examples 7-15
The compositions listed in Table III exemplify the wide latitude in formulation with based adhesives with respect to adhesive performance. Formulas of DMPD with acetone (Examples 7, 8, 11, 13); DMPD with acetone, MEK, and cyclohexanone (Example 9); DMPD with MEK and cyclohexanone (Example 12); and DMPD and MEK (Example 15) all satisfy the minimum lap shear values for 2, 16, and 72 hours as required in ASTM D-2564 for PVC.
(table - see patent image)
Examples 7-15 clearly demonstrate to one skilled in the art that various changes and modifications may be used to adjust set-time, viscosity, VOC levels, bond strength and formulations costs and such changes and modifications are considered to fall within the scope of the invention. Likewise, one skilled in the art easily recognizes that these DMPD formulations can be made to include other known PVC and CPVC solvents such as THF, NMP, aliphatic and aromatic ketones to further adjust desired adhesive properties. Likewise, formulation comprising various molecular weight thermoplastic PVC and CPVC with DMPD blends would be obvious to one skilled in the art as exemplified in Example 13.
Examples 16-19
Table IV below lists the solution properties of adhesives containing PVC resins having I.V. values ranging from 0.68 to 0.90.
(table - see patent image)
Table IV illustrates that DMPD readily dissolves various PVC resins (of different I.V.) to give 10 wt % solutions with low viscosities. This is meant to show that cements can be formulated with a range of PVC molecular weights (based on I.V. value). While the DMPD concentration is higher than discussed earlier, it is listed here to show that although such compositions are very slow drying, nevertheless, the compositions are still good adhesives.
ASTM F-656 requires that a solvent/solvent blend is a primer if it can dissolve 10 wt % resin.
Examples 20-23
Table V below lists the hydrostatic burst strength of adhesives containing CPVC resins. The hydrostatic burst strengths were measured in accordance with ASTM-F493.
(table - see patent image)
Table V lists some specific examples of CPVC low VOC cement formulations containing DMPD, MEK, and acetone. These formulations show the solvency of DMPD/MEK/acetone combinations and their effectiveness as CPVC cements. It would be obvious to one skilled in this art that other solvent blends of DMPD/MEK/acetone and other ketones such as DEK, cyclohexanone, etc., as well as formulas with minimal amounts of THF, lend themselves as cements for CPVC articles such as pipes, fittings, etc.
INDUSTRIAL APPLICABILITY

The adhesives and primers disclosed herein are expected to find use in joining PVC and CPVC pipes and other such articles together.
Thus, there have been disclosed PVC and CPVC adhesives and primers. It will be readily apparent to those skilled in this art that various changes and modifications of an obvious nature may be made, and all such changes and modifications are considered to fall within the scope of the present invention, as defined by the appended claims.
What is claimed is:
1. An adhesive for joining PVC pipes and components or CPVC pipes and components comprising either:
(a1) about 5 to 25 wt % PVC resin and 0 to about 25 wt % acrylic resin, the total of said PVC resin and acrylic resin ranging from 10 to 35 wt %; or
(a2) about 5 to 25 wt % CPVC resin; and
(b) 5 to 80 wt % dimethyl-2-piperidone;
(c) 10 to 75 wt % of at least one ketone selected from the group consisting of (1) 0 to about 75 wt % acetone, (2) 0 to about 75 wt % of at least one low boiling ketone having a boiling point less than 80[degree(s)] C., (3) 0 to about 35 wt % of at least one medium boiling ketone having a boiling point within a range of about 80[degree(s)] to 130[degree(s)] C., and (4) 0 to about 35 wt % of at least one high boiling ketone having a boiling point greater than 130[degree(s)] C., wherein said medium boiling ketone and said high boiling ketone have a maximum amount of 35 wt %; and
(d) 0 to about 10 wt % tetrahydrofuran. (Main Claim)
2. The adhesive of claim 1 comprising said PVC resin, wherein said PVC resin has an inherent viscosity within a range of 0.6 to 0.95.
3. The adhesive of claim 1 comprising said PVC resin, wherein said acrylic resin comprises a homopolymer, a copolymer or a terpolymer of methyl methacrylate having an inherent viscosity ranging from 0.1 to 1.25 or a melt flow index ranging from 1.6 to 24.

4. The adhesive of claim 1 comprising said CPVC resin, wherein said CPVC resin has an inherent viscosity within a range of 0.6 to 0.85 and a chlorination within a range of 50 to 80 wt %.
5. The adhesive of claim 1 further comprising a filler selected from the group consisting of hollow ceramic spheres, hollow glass spheres, hollow synthetic spheres, calcium carbonate, alumina trihydrate, calcium sulfate, and crystalline silica.
6. The adhesive of claim 1 further comprising a thixotropic agent selected the group consisting of fumed silica, precipitated silica, and treated bentonite clay.
7. The adhesive of claim 1 wherein said low boiling ketone consists essentially of methyl ethyl ketone.
8. The adhesive of claim 1 wherein said at least one medium boiling ketone is selected from the group consisting of diethyl ketone, methyl propyl ketone, methyl iso-propyl ketone, methyl iso-butyl ketone, and methyl n-butyl ketone.
9. The adhesive of claim 1 wherein said at least one high boiling ketone is selected from the group consisting of cyclohexanone, acetophenone, methyl amyl ketone, methyl iso-amyl ketone, di-iso-butyl ketone, and ethyl amyl ketone.
10. The adhesive of claim 1 comprising:
(a) about 5 to 25 wt % PVC resin;

(b) about 5 to 50 wt % dimethyl-2-piperidone; and
(c) about 10 to 68 wt % acetone.
11. The adhesive of claim 10 further comprising up to about 10 wt % tetrahydrofuran.
12. The adhesive of claim 10 further comprising up to 50 wt % methyl ethyl ketone, where acetone and methyl ethyl ketone together total about 10 to 68 wt % of said adhesive.
13. The adhesive of claim 10 further comprising up to about 35 wt % cyclohexanone, where acetone and cyclohexanone together total about 10 to 68 wt % of said adhesive.
14. The adhesive of claim 10 further comprising up to about 35 wt % of at least one of methyl propyl ketone and diethyl ketone, where acetone, methyl propyl ketone, and diethyl ketone together total about 10 to 68 wt % of said adhesive.
15. The adhesive of claim 14 further comprising up to about 35% cyclohexanone, where acetone, methyl propyl ketone, diethyl ketone, and cyclohexanone together total about 10 to 68 wt % of said adhesive.
16. The adhesive of claim 1 comprising:
(a) about 5 to 25 wt % PVC resin or CPVC resin;
(b) about 5 to 50 wt % dimethyl-2-piperidone; and
(c) about 10 to 68 wt % methyl ethyl ketone.
17. The adhesive of claim 16 further comprising up to about 10 wt % tetrahydrofuran.
18. The adhesive of claim 16 further comprising up to about 35 wt % cyclohexanone, wherein methyl ethyl ketone and cyclohexanone together total about 10 to 68 wt % of said adhesive.
19. The adhesive of claim 16 further comprising up to about 35 wt % of at least one of methyl propyl ketone and diethyl ketone, wherein methyl ethyl ketone, methyl propyl ketone, and diethyl ketone together total about 10 to 68 wt % of said adhesive.
20. The adhesive of claim 19 further comprising up to about 35 wt % cyclohexanone, wherein methyl ethyl ketone, methyl propyl ketone, diethyl ketone, and cyclohexanone together total about 10 to 68 wt % of said adhesive.
21. A primer for joining PVC pipes and components or CPVC pipes and components comprising:
(a) 15 to 85 wt % dimethyl-2-piperidone;
(b) 10 to 75 wt % of at least one ketone selected from the group consisting of (1) 0 to about 75 wt % acetone, (2) 0 to about 75 wt % of at least one low boiling ketone having a boiling point less than 80[degree(s)] C., (3) 0 to about 35 wt % of at least one medium boiling ketone having a boiling point within a range of about 80[degree(s)] to 130[degree(s)] C., and (4) 0 to about 35 wt % of at least one high boiling ketone having a boiling point greater than 130[degree(s)] C., wherein said medium boiling ketone and said high boiling ketone have a maximum amount of 35 wt %; and
(c) 0 to about 10 wt % tetrahydrofuran.
22. The primer of claim 21 wherein said at least one low boiling ketone consists essentially of methyl ethyl ketone.
23. The primer of claim 21 wherein said at least one medium boiling ketone is selected from the group consisting of diethyl ketone, methyl propyl ketone, methyl iso-propyl ketone, methyl butyl ketone, and methyl iso-butyl ketone.

24. The primer of claim 21 wherein said at least one high boiling ketone is selected from the group consisting of cyclohexanone, acetophenone, methyl amyl ketone, methyl iso-amyl ketone, di-iso-butyl ketone, and ethyl amyl ketone.

25. A method for reducing VOC emissions in adhesives for joining PVC pipes and components or CPVC pipes and components, said method comprising mixing together either (a) about 5 to 25 wt % PVC resin and 0 to about 25 wt % acrylic resin, the total of said PVC resin and acrylic resin ranging from 10 to 35 wt %, or (b) about 5 to 25 wt % CPVC resin; plus 5 to 80 wt % dimethyl-2-piperidone; 10 to 75 wt % of at least one ketone selected from the group consisting of (1) 0 to 75 wt % acetone, (2) 0 to 75 wt % of at least one low boiling ketone having a boiling point less than 80[degree(s)] C., (3) 0 to 35 wt % of at least one medium boiling ketone having a boiling point within a range of about 80[degree(s)] to 130[degree(s)] C., and (4) 0 to 35 wt % of at least one high boiling ketone having a boiling point greater than 130[degree(s)] C., wherein said medium boiling ketone and said high boiling ketone have a maximum amount of 35 wt %; and 0 to about 10 wt % tetrahydrofuran.

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SOLVA-GARD® NITRILE GLOVES

Chemical Performance Data

This guide provides an indication of Solva-Gard nitrile glove performance upon exposure to specific chemicals. The breakthrough time indicated is the elapsed time between initial contact of the liquid chemical with the outside surface of the glove and the time at which the chemical can be detected at the inside surface of the glove with analytical equipment. The permeation rate is measured in milligrams per square meter per second. The indication of degradation resistance is determined by significant change(s) in one or more of a glove's physical properties such as swelling, texture, etc. This data was collected in a laboratory using glove materials meeting the product specifications for Solva-Gard style SG-133 (unlined) nitrile gloves. Glove thickness plays an important role in resistance to permeation and degradation. In addition, no laboratory environment can duplicate the conditions of actual use so the purchaser and user are cautioned to test all products in the appropriate application.

Key to Ratings:
E = Excellent, fluid has no effect
G = Good, fluid has minor effect
F = Fair, fluid has moderate effect
P = Poor, fluid has severe effect
ND = None detected
ID = Insufficient data

Physical characteristics of Solva-Gard Nitrile Gloves:
EXCELLENT abrasion resistance
EXCELLENT cut resistance
EXCELLENT puncture/snag resistance
EXCELLENT flexibility
GOOD heat resistance
EXCELLENT tensile strength

Chemical Name	CAS Number	Degradation Rating	Breakthrough Time	Permeation Rate
1,1, Dichloroethane	75-34-3	P	ID	ID
1,1,1 Trichloroethane (Methyl Chloroform)	71-55-6	P	41 min	76.4
1,1,1,2-Tetrachloroethane	630-20-6	ID	ID	ID
1,1,2,-Trichloroethane	79-00-5	P	ID	ID
1,1,2,2-Tetrachloroethane	79-34-5	ID	ID	ID
1,1-Dichloroethylene	75-35-4	ID	ID	ID
1,1-Difluoroethylene	75-38-7	ID	ID	ID
1,2-Dichloroethane (Ethylene Dichloride)	107-06-2	P	8 min	311
1,2-Dichloropropane	78-87-5	ID	ID	ID
1,2-Epoxy-3-Chloropropane	106-89-8	ID	ID	ID
1,2-Epoxybutane	106-88-7	ID	ID	ID
1,2-Epoxypropane	75-56-9	ID	ID	ID
1,3-Butadiene	106-99-0	ID	ID	ID
1,3-Diaminopropane	109-76-2	ID	ID	ID
1,3-Dichloropropene	542-75-6	ID	ID	ID
1,3-Dimethyl butylamine	108-09-8	ID	ID	ID
1,3-Propylene Oxide	503-30-0	ID	ID	ID
1,4-Diethylene Dioxide (1,4-Dioxane)	123-91-1	P	28 min	77.1
1,4-Dioxane (Diethylene Oxide)	123-91-1	P	28 min	77.1
1,6-Hexadiamine		ID	ID	ID
1-Bromo-2-Propanol (70%)	19686-73-8	ID	ID	ID
1-Chloro-2-Propanol	127-00-4	ID	ID	ID

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Chemical Name	CAS Number	Degradation Rating	Breakthrough Time	Permeation Rate
1-Methyl-4-tert-butylbenzene (p-t Butyltoluene)	27138-21-2	P	ID	ID
1-Nitropropane	108-03-2	ID	16 min	29.5
1-Pentanol	71-41-0	ID	ID	ID
2,3-Dichloro-1-Propene	78-88-6	ID	ID	ID
2-Bromoethanol (95%)	540-51-2	ID	ID	ID
2-Butanone Peroxide (50%)	1338-23-4	ID	ID	ID
2-Chloro-2-Nitropropane	594-71-8	ID	ID	ID
2-Chloroethanol	107-07-3	ID	ID	ID
2-Ethoxyethanol (2-Ethylhexyl Alcohol)	110-80-5	ID	ID	ID
2-Nitropropane	79-46-9	P	ID	ID
2-Phenyl-APB-144		ID	ID	ID
2-Propanone (Acetone)	67-64-1	P	5 min	172
3-Bromo-1-Propanol (95%)	627-18-9	ID	ID	ID
3-Chloro-1-Propanol	627-30-5	ID	ID	ID
3-Chloro-2-Methylpropene (90%)	563-47-3	ID	ID	ID
3-Chloroprene (Allyl Chloride)	107-05-1	ID	ID	ID
3-Methylaminopropylamine	6291-84-5	ID	ID	ID
4-Methoxy-4-Methyl-2-Pentanone	107-70-0	ID	ID	ID
4-Vinyl-1-Cyclohexene	100-40-3	ID	ID	ID
9-Aminoacridine HC1	134-50-9	ID	ID	ID
Acetaldehyde (Ethanal)	75-07-0	P	4 min	161
Acetic Acid, Glacial	64-19-7	F	38 min	1.9
Acetic Aldehyde (Acetaldehyde)	75-07-0	P	4 min	161
Acetic Anhydride (Acetic Oxide)	108-24-7	ID	ID	ID
Acetic Ester (Ethyl Acetate)	141-78-6	P	8 min	145
Acetic Ether (Ethyl Acetate)	141-78-6	P	8 min	145
Acetone (Dimethyl Ketone)	67-64-1	P	5 min	172
Acetonitrile (Methyl Cyanide)	75-05-8	ID	ID	ID
Acetyl Chloride	75-36-5	ID	ID	ID
Acrolein (82%)	107-02-8	ID	ID	ID
Acrylic Acid	79-10-7	F	ID	ID
Acrylonitrile	107-13-1	P	3 min	176
Allylamine	107-11-9	ID	ID	ID
Ammonia (gas)	7664-41-7	ID	ID	ID
Ammonium Fluoride (40%)	12125-01-8	G	>8 hrs	ND
Ammonium Hydroxide (29%)	1336-21-6	E	2.1 hrs	0.05
Aniline (Aminobenzene)	62-53-3	F	1.1 hrs	45.0
Aniline Oil	62-53-3	F	1.1 hrs	45
Aqua Regia		ID	ID	ID
b-Ionone	14901-07-6	ID	ID	ID
Battery Acid (25%) (Sulfuric Acid)	7664-93-9	P	ID	ID
Benzaldehyde	100-52-7	P	ID	ID
Benzene	71-43-2	P	ID	ID
Benzonitrile	100-47-0	ID	ID	ID
Benzoyl Chloride	98-88-4	P	ID	ID
Bis(2-methoxyethyl) Ether	111-96-6	ID	ID	ID
Boric Acid	10043-35-3	ID	ID	ID
Bromoacetonitrile	590-17-0	ID	ID	ID

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Chemical Name	CAS Number	Degradation Rating	Breakthrough Time	Permeation Rate
Bromobenzene	108-86-1	P	13 min	9.1
Bromodichloromethane	75-27-4	ID	ID	ID
Bromoform	72-25-2	ID	ID	ID
Butyl Acetate	123-86-4	F	29 min	54.4
Butyl Cellosolve	111-76-2	ID	ID	ID
Butyraldehyde	123-72-8	P	ID	ID
Carbon Bisulfide (Carbon Disulfide)	75-15-0	P	13 min	51
Carbon Tetrachloride (Tetrachloromethane)	56-23-5	G	3.4 hrs	5
Caustic Soda (50%) (Sodium Hydroxide)	1310-73-2	E	>6 hrs	ND
Cellosolve	110-80-5	P	ID	ID
Cellosolve Acetate	111-15-9	ID	ID	ID
Chloral	75-87-6	ID	ID	ID
Chlorine	7782-50-5	ID	ID	ID
Chloroacetic Acid	79-11-8	ID	ID	ID
Chloroacetonitrile	107-14-2	ID	ID	ID
Chlorobenzene	108-90-7	P	ID	ID
Chlorodibromomethane	124-48-1	ID	ID	ID
Chloroethene (Vinyl Chloride)	75-01-4	ID	5.7 hrs	0.14
Chloroethylene (Vinyl Chloride)	75-01-4	ID	5.7 hrs	0.14
Chloroform (Methenyl Trichloride)	67-66-3	P	4 min	352
Chloronaphthalene	90-13-1	P	2.9 hrs	>1.32
Chloroprene (2-Chlorobutadiene-1,3)	126-99-8	ID	ID	ID
Chlorotrimethylsilane	75-77-4	ID	ID	ID
cis,trans-1,2-Dichloroethylene	540-59-0	ID	ID	ID
cis-Dichloroethylene	156-59-2	ID	ID	ID
Crotonaldehyde (83%)	4170-30-3	ID	ID	ID
Cyclohexane (Hexahydorbenzene)	110-82-7	P	ID	ID
Cyclohexanol (Hexahydrophenol)	108-93-0	E	>16 hrs	ND
Cyclohexanone (Ketohexamethylene)	108-94-1	P	ID	ID
Cyclohexylamine	108-91-8	ID	ID	ID
d-Limonene	5989-27-5	ID	ID	ID
Di(2-ethylhexyl)phthalate (dioctyl phthalate)	117-81-7	ID	>8 hrs	ND
Di-n-Amylamine	2050-92-2	ID	ID	ID
Di-n-Butylamine	111-92-2	ID	ID	ID
Diallylamine	124-02-7	ID	ID	ID
Dibasic Ester	53-60-5	ID	ID	ID
Dibutylphthalate	1719-53-5	E	>16 hrs	ND
Dichloroacetylchloride	79-36-7	ID	ID	ID
Dichloromethane (Methylene Chloride)	75-09-2	P	4 min	766
Diethanolamine	111-42-2	ID	ID	ID
Diethyl Ether (Ethyl Ether)	60-29-7	P	14 min	21.8
Diethyl Oxide (Ethyl Ether)	60-29-7	P	14 min	21.8
Diethylamine	109-89-7	F	ID	ID
Diethylaminoethanol	100-37-8	E	>8 hrs	ND
Diethylene Ether (1,4-Dioxane)	123-91-1	P	28 min	77.1
Diethylene Oxide (1,4-Dioxane)	123-91-1	P	28 min	77.1
Diethylenetriamine	111-40-1	P	ID	ID
Diglycidyl Ether of Bisphenol A (DGEBA)	391-46-9	ID	ID	ID

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Chemical Name	CAS Number	Degradation Rating	Breakthrough Time	Permeation Rate
Diisobutyl Ketone (80%)	108-83-8	F	3 hrs	48.9
Diisobutylamine	110-96-3	ID	ID	ID
Diisopropylamine	108-18-9	ID	ID	ID
Dimethyl Acetamide	127-19-5	ID	ID	ID
Dimethyl Formamide (DMF)	68-12-2	F	13 min	>15
Dimethyl Sulfoxide	67-68-5	F	40 min	5.2
Dimethylamine	124-40-3	ID	ID	ID
Dimethylaminopropylamine	109-55-7	ID	ID	ID
Dimethylethanolamine	108-01-0	ID	ID	ID
Dimethylketone (Acetone)	67-64-1	P	5 min	172
Dimethylvinylchloride	513-37-1	ID	ID	ID
Dioctyl Phthalate	117-81-7	E	>8 hrs	ND
Dioxyethylene Ether (1,4-Dioxane)	123-91-1	P	28 min	77.1
Divinyl Benzene (Vinylstyrene)	1321-74-0	P	ID	ID
Epibromohydrin	3132-64-7	ID	ID	ID
Epichlorohydrin	106-89-8	P	ID	ID
EREM Solvent		ID	ID	ID
Ethanal (Acethaldehyde)	75-07-0	P	4 min	161
Ethanol (Ethyl Alcohol)	64-17-5	ID	ID	ID
Ether		P	14 min	21.8
Ethyl Acetate (Acetic Ester)	141-78-6	P	8 min	145
Ethyl Acrylate	140-88-5	ID	ID	ID
Ethyl Alcohol (Ethanol)	64-17-5	ID	ID	ID
Ethyl Aldehyde (Acetaldehyde)	75-07-0	P	4 min	161
Ethyl Ether (Ethyl Oxide)	60-29-7	P	14 min	21.8
Ethyl-n-Butylamine	13360-63-9	ID	ID	ID
Ethylamine (70% in water) (Aminoethane)	75-04-7	F	1.1 hrs	30.1
Ethylbromide	74-96-4	ID	ID	ID
Ethylene Dibromide	106-93-4	P	ID	ID
Ethylene Dichloride (1,2-Dichloroethane)	107-06-2	P	8 min	311
Ethylene Glycol Monoethyl Ether	110-80-5	ID	ID	ID
Ethylene Glycol Monoethyl Ether Acetate	111-15-9	ID	ID	ID
Ethylene Oxide	75-21-8	ID	ID	ID
Ethylenediamine	107-15-3	ID	ID	ID
Ethylmethacrylate	97-63-2	ID	ID	ID
Formaldehyde (37% in water) (Formic Aldehyde)	50-00-0	E	>21 hrs	ND
Freon TF	76-13-1	ID	>6 hrs	ND
Freon TMC		ID	ID	ID
Furan	110-00-9	P	ID	ID
Furfural (Furfuraldehyde)	98-01-1	P	28 min	265
Glutaraldehyde (25%)	111-30-8	P	ID	ID
Glutaraldehyde (7%)	111-30-8	P	4 min	0.44
Glycol Ether (Dowanol)		ID	ID	ID
Halothane	151-67-7	ID	ID	ID
Hexachlorocyclopentadiene	77-47-4	ID	ID	ID
Hexahydrobenzene (Cyclohexane)	110-82-7	P	ID	ID
Hexahydrophenol (Cyclohexanol)	108-93-0	E	>16 hrs	ND
Hexamethyldisilazane	999-97-3	ID	ID	ID

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Chemical Name	CAS Number	Degradation Rating	Breakthrough Time	Permeation Rate
Hexamethylene (Cyclohexane)	110-82-7	P	ID	ID
Hexanaphthene (Cyclohexane)	110-82-7	P	ID	ID
Hydrazine (70% in water)	302-01-2	E	>8 hrs	ND
Hydrazine Hydrate	10217-52-4	ID	ID	ID
Hydrochloric Acid (37%)	7647-01-0	G	>6 hrs	ND
Hydrofluoric Acid (48%)	7664-39-3	F	1 hr	0.49
Hydrogen Chloride (gas)	7647-01-0	ID	ID	ID
Hydrogen Peroxide (30%)	7722-84-1	ID	ID	ID
Iminobispropylamine	56-18-8	ID	ID	ID
Iodomethane (Methyl Iodide)	74-88-4	ID	ID	ID
Isoamylnitrile	110-46-3	ID	ID	ID
Isobutyl Acrylate	106-63-8	ID	ID	ID
Isobutyl Alcohol	78-83-1	G	>8 hrs	ND
Isobutyl Nitrite	542-56-3	ID	ID	ID
Isobutylamine	78-81-9	ID	ID	ID
Isobutyraldehyde	78-84-2	P	ID	ID
Isoprene	78-95-5	ID	ID	ID
Isopropyl Alcohol	67-63-0	E	>6 hrs	ND
Isopropylmethacrylate	4655-34-9	ID	ID	ID
Ketohexamethylene (Cyclohexanone)	108-94-1	P	ID	ID
m-Xylene	108-38-3	ID	ID	ID
Methacrylic Acid	79-41-4	P	1.7 hrs	23
Methacrylonitrile	126-98-7	P	7 min	560
Methanol	67-56-1	ID	32 min	11.8
Methenyl Trichloride (Chloroform)	67-66-3	P	4 min	352.0
Methyl Alcohol	67-56-1	ID	32 min	11.8
Methyl Cellosolve	109-86-4	F	55 min	13.2
Methyl Chloride	74-87-3	ID	ID	ID
Methyl Chloroform	71-55-6	P	41 min	76.4
Methyl Cyanide (Acetonitrile)	107-13-1	ID	ID	ID
Methyl Ethyl Ketone	78-93-3	P	ID	ID
Methyl Eugenol	93-15-2	ID	ID	ID
Methyl Iodide	74-88-4	ID	ID	ID
Methyl Isocyanate	624-83-9	P	ID	ID
Methylacetate	79-20-9	ID	ID	ID
Methylacrylate	96-33-3	ID	ID	ID
Methylamine (40% in water) (Aminomethane)	74-89-5	E	>8 hrs	ND
Methylbenzene (Toluene)	108-88-3	P	11 min	68.1
Methylene Chloride (Dichloromethane)	75-09-2	P	4 min	766
Methylmethacrylate	80-62-6	ID	ID	ID
Monoethanolamine	141-43-5	ID	ID	ID
Monoisopropaxidamine (95%)		ID	ID	ID
Monoisopropylamine	78-96-6	ID	ID	ID
Morpholine	110-91-8	P	48 min	206
n,n,n,n-Tetramethylenediamine	110-18-9	ID	ID	ID
n-Butylamine	109-73-9	ID	ID	ID
n-Butylchloride	109-69-3	ID	ID	ID
n-Hexane	110-54-3	E	ID	ID

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Chemical Name	CAS Number	Degradation Rating	Breakthrough Time	Permeation Rate
n-Methyl-2-Pyrrolidone	872-50-4	ID	ID	ID
n-Methylethanolamine	109-83-1	ID	ID	ID
n-Pentane (Alpha-n-Amylene)	109-66-0	E	ID	ID
n-Propyl Acetate	109-60-4	P	17 min	72.5
n-Propylmethacrylate	2210-28-8	ID	ID	ID
Nicotine	54-11-5	ID	ID	ID
Nitric Acid (17.5%) (Aqua Fortis)	7697-37-2	P	ID	ID
Nitric Acid (40%)	7697-37-2	F	>6 hrs	ND
Nitrobenzene	98-95-3	F	33 min	1.7
Nitroethane	79-24-3	ID	ID	ID
Nitromethane	75-52-5	ID	ID	ID
O-Xylene	95-47-6	ID	ID	ID
Octanoic Acid	127-07-2	ID	ID	ID
Oleic Acid	112-80-1	ID	ID	ID
Ortho Toluidine	95-53-4	ID	ID	ID
Oxalic Acid	144-62-7	G	ID	ID
Oxide Etch		ID	ID	ID
p-Dioxane (1,4-Dioxane)	123-91-1	ID	ID	ID
p-t Butyltoluene (1-Methyl-4-tert-Butylbenzene)	98-51-1	P	ID	ID
p-Xylene	106-42-3	ID	ID	ID
PCB (Aroclor 1254 50%) enyl)	11097-69-1	F	32 min	ID
Pentachlorophenol (1% in kerosene)	87-86-5	E	>13 hrs	ND
Peracetic Acid (40% in water)	79-21-0	ID	ID	ID
Perchloric Acid (70%)	7601-90-3	P	>8 hrs	ND
Perchloroethylene (Tetrachloroethylene)	127-18-4	F	1.3 hrs	5.5
Perchloromethane (Carbon Tetrachloride)	56-23-5	F	3.4 hrs	5.0
Phenol (85% in water)	108-95-2	P	39 min	>1500
Phenylamine (Aniline)	62-53-3	F	1.1 hrs	45
Phosphoric Acid (85%)	7664-38-2	G	>8 hrs	ND
Pimelic Ketone (Cyclohexanone)	108-94-1	P	ID	ID
Potassium Hydroxide (50%)	1310-58-3	E	>6 hrs	ND
Propionaldehyde	123-38-6	ID	ID	ID
Propionitrile	107-12-0	ID	ID	ID
Propyl Acetate	109-60-4	P	17 min	72.5
Propyl Alcohol	71-23-8	G	4.4 hrs	1.1
Propylene Dichloride	78-87-5	ID	ID	ID
Propylenediamine	78-90-0	F	ID	ID
Pyridine	110-86-1	P	ID	ID
Red Fuming Nitric Acid (RFNA)	52583-42-3	P	ID	ID
sec-Butylamine	13952-84-6	ID	ID	ID
Slope Etch		ID	ID	ID
Sodium Hydroxide 50% (Caustic Soda)	1310-73-2	E	>6 hrs	ND
Stoddard Solvent	8052-41-3	E	>6 hrs	ND
Styrene	100-42-5	P	ID	ID
Sulfuric Acid (25%) (Hydrogen Sulfate)	7664-93-9	P	ID	ID
Sulfuric Acid (50%)	7664-93-9	E	>6 hrs	ND
Sulfuric Ether (Ethyl Ether)	60-29-7	P	14 min	21.8
t-Butylamine	75-64-9	ID	ID	ID

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Chemical Name	CAS Number	Degradation Rating	Breakthrough Time	Permeation Rate
tert-Butyl Alcohol	75-65-0	ID	ID	ID
tert-Butyl Methyl Ether	1634-04-4	ID	ID	ID
Tetrachloroethylene	127-18-4	F	1.3 hrs	5.5
Tetrachloromethane (Carbon Tetrachloride)	56-23-5	F	3.4 hrs	5.0
Tetraethylenepentamine	112-57-2	F	ID	ID
Tetrafluoroethylene	116-14-3	ID	ID	ID
Tetrahydrofuran (THF)	109-99-9	P	4 min	167
Thioglycolic Acid	68-11-1	ID	ID	ID
Thiophene	110-02-1	P	ID	ID
Toluene (Methylbenzene)	108-88-3	P	11 min	68.1
Toluene Diisocyanate (TDI)	26471-62-5	G	3.7 hrs	1.8
trans-1,2-Dichloroethylene	156-60-5	ID	ID	ID
tri-n-propylamine	102-69-2	ID	ID	ID
Triallyamine	102-70-5	ID	ID	ID
Trichloroacetaldehyde		ID	ID	ID
Trichloroacetonitrile	545-06-2	ID	ID	ID
Trichloroethylene (TRI)	79-01-6	P	8 min	283
Trichloromethane (Chloroform)	67-66-3	P	4 min	352.0
Triethanolamine	102-71-6	ID	ID	ID
Triethylamine	121-44-8	E	>8 hrs	ND
Triethylenetetramine	112-24-3	ID	ID	ID
Tritolyl Phosphate	1330-78-5	ID	ID	ID
Valeronitrile	110-59-8	ID	ID	ID
Vinegar Naphtha (Ethyl Acetate)	141-78-6	P	8 min	145
Vinyl Acetate	108-05-4	ID	ID	ID
Vinyl Chloride (Chloroethene)	75-01-4	G	5.7 hrs	0.14
Vinylidene Fluoride	75-38-7	ID	ID	ID
Vinylstyrene (Divinyl Benzene)	1321-74-0	P	ID	ID
Witch Hazel	68916-39-2	ID	ID	ID
Xylene (mixed)	1330-20-7	F	21 min	18.5

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Department of Housing & Community Development
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Sacramento, CA 95814

Re: Public Records Act Request for All Documents Related to CPVC, PEX and PEX-AL-PEX

Dear Ms. Nevis:

I am writing to request that the Department of Housing and Community Development ("HCD") provide us with immediate access to, and copies of, all documents, writings and recordings in its possession or control referring to, or relating to: (1) chlorinated polyvinyl chloride ("CPVC"); (2) cross-linked polyethylene ("PEX"); (3) PEX-AL-PEX plastic pipe; or (4) HCD's consideration of the authorization of CPVC, PEX or PEX-AL-PEX in building standards proposed to the California Building Standards Commission. A response to this request shall include, but not be limited to, any and all correspondence, memorandums, notes, writings, reports, studies, internal Department communications, recordings, memos, e-mails and other documents.

This request is limited to such documents, materials, writings and recordings created, sent, received, obtained or modified by HCD on or after our previous June 10, 2005 public record request. In addition, this request excludes any comment letters or correspondence submitted by this office on behalf of the Coalition for Safe Building Materials.

This request is made pursuant to the California Public Records Act, Government Code section 6250 *et seq*. I request immediate access to the above

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documents and copies of the requested documents pursuant to Section 6253 of the Public Records Act.

This request is also made pursuant to Article I, Section 3(b) of the California Constitution, which provides a constitutional right of access to information concerning the conduct of government. Article I, Section 3(b) provides that any statutory right to information shall be broadly construed to provide the greatest access to government information and further requires that any statute that limits the right of access to information shall be narrowly construed.

We request a written response to this request within ten (10) days and access to the requested documents immediately. (Gov. Code § 6253; Pub. Resources Code § 21092(b)(1).) We also request an estimate of the costs of production prior to your making any copies.

Please call me at (916) 444-6201 if you have any questions. Thank you for your assistance with this matter.

Sincerely,

Thomas A. Enslow

TAE:cnh

cc: Dennis Beddard, Acting General Counsel
Kim Strange, Deputy Director, Codes and Standards

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May 8, 2006

VIA FACSIMILE& U.S. MAIL

Lynn L. Jacobs
Director
Department of Housing & Community Development
1800 Third Street
Sacramento, CA 95814

Dennis Beddard
Acting General Counsel
Department of Housing & Community Development
1800 Third Street, Suite 440
Sacramento, CA 95814

Re: Response to March 1, 2006 Public Records Request for All Documents Related to CPVC, PEX and PEX-AL-PEX

Dear Ms. Jacobs and Mr. Beddard:

I am writing to object to the Department of Housing and Community Development ("HCD")'s response to our March 1, 2006 public records request. It has come to our attention that the response to our request improperly withheld public documents, including, but not limited to, correspondence between HCD and manufacturers of chlorinated polyvinyl chloride ("CPVC"). We hereby request that HCD provide us immediate access to, and copies of, these documents. In addition, we request that HCD again review all of the documents responsive to our request to ensure that no other documents have been improperly withheld.

Our March 1, 2006 request asked for immediate access to, and copies of, all documents, writings and recordings in HCD's possession or control referring to, or relating to: (1) chlorinated polyvinyl chloride ("CPVC"); (2) cross-linked polyethylene ("PEX"); (3) PEX-AL-PEX plastic pipe; or (4) HCD's consideration of the authorization

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of CPVC, PEX or PEX-AL-PEX in building standards proposed to the California Building Standards Commission. This request was limited to documents created, sent, received, obtained or modified by HCD on or after our previous June 10, 2005 public record request. In addition, this request excluded any comment letters or correspondence submitted by this office on behalf of the Coalition for Safe Building Materials.

On March 30, 2006, HCD sent us documents purporting to fully respond to our March 1, 2006 request. The March 30, 2006 response included an October 4, 2005 letter from the CPVC manufacturer's attorney, Michael Zischke, along with an accompanying "white paper," dated September 28, 2005. No other correspondence, meeting notes, e-mails, reports, studies or other documents from or to CPVC, PEX or PEX-AL-PEX industry groups were provided.

On April 14, 2006, I spoke with Robin Gilb, the HCD staff counsel who is currently preparing an Environmental Impact Report ("EIR") on CPVC. She informed me that she has had additional correspondence with representatives of the CPVC industry that were not provided in response to our document request. The failure to provide us these records is a violation of the California Public Records Act and Article I, Section 3(b) of the California Constitution.

The California Public Records Act, Government Code section 6250 *et seq.*, requires the disclosure of any writing containing information relating to the conduct of the public's business prepared, owned, used, or retained by any state or local agency regardless of physical form or characteristics. A constitutional right of access to information concerning the conduct of government is also provided for by Article I, Section 3(b) of the California Constitution.

I spoke with HCD staff counsel, Lisa Kan Yu, by telephone on April 17, 2006 and again on May 3, 2006. She confirmed that HCD had withheld documents related to CPVC, PEX and PEX-AL-PEX under the attorney client privilege and deliberative process privileges. She further stated that correspondence and documents sent to or from representatives of the CPVC industry had been withheld under the "catch-all" exemption of Government Code section 6255.

Ms. Kan Yu stated that the catch-all exemption applied because releasing correspondence or documents sent to or from representatives of the CPVC

industry would confuse the public by providing a "snapshot" of the EIR process. Ms. Kan Yu stated that HCD would provide us these documents after releasing the EIR. As I will discuss in more detail below, this "snapshot" argument is merely a restatement of the deliberative process privilege and is inadequate to justify the withholding of documents from interested parties participating in administrative proceedings.

HCD's concern over providing a snapshot of the EIR process is already adequately addressed by the deliberative process privilege. The deliberative process privilege applies to "[p]reliminary drafts, notes, or interagency or intra-agency memoranda that are not retained by the public agency in the ordinary course of business, provided that the public interest in withholding those records clearly outweighs the public interest in disclosure." (Gov. Code § 6254, subd. (a).) The deliberative process privilege thus exempts documents that would provide the public with a misleading "snapshot" of HCD's policy deliberations or analysis.

The Public Records Act is modeled on its federal predecessor, the Freedom of Information Act ("FOIA") (5 U.S.C. § 552, *et seq.*) The legislative history and federal judicial construction of the FOIA "serve to illuminate the interpretation of its California counterpart." (*Times Mirror Company v. Superior Court* (1991) 53 Cal.3d 1325, 1338; *American Civil Liberties Union Foundation v. Deukmejian* (1982) 32 Cal.3d. 440, 447.) The deliberative process exemption contained in the California Public Records Act is modeled on Exemption 5 of the FOIA, as interpreted by the courts over the years.[1]

The Federal courts have held that the deliberative process privilege has three policy bases:

> First it protects creative debate and candid consideration of alternatives within an agency, and, thereby, improves the quality of agency policy decisions. Second, it protects the public from the

---

[1] Exemption 5 is an exemption for "inter-agency or intra-agency memorandums or letters which would not be available by law to a party other than an agency in litigation with the agency." (5 U.S.C. § 552(b)(5).) In the years since the FOIA's enactment, courts have made clear that Exemption 5 encompasses a "deliberative process privilege" that exempts draft reports, handwritten comments on those reports and memoranda commenting on the drafts. (*N.L.R.B. v. Sears, Roebuck & Co.* (1975) 421 U.S. 132, 149-150, 95 S.Ct. 1504, 44 L.Ed.2d 29.)

> confusion that would result from premature exposure to discussions occurring before the policies affecting it had actually been settled upon. And third, it protects the integrity of the decision-making process itself by confirming that "officials should be judged by what they decided[,] not for matters they considered before making up their minds."

(*Jordan v. United States Dept. of Justice* (D.C.Cir.1978) 591 F.2d 753, 772-773; see also *Times Mirror Company v. Superior Court* (1991) 53 Cal.3d 1325, 1351-1352 (discussed in dis. opn. of Kennard, J.).)

The concern over providing a snapshot of the EIR process appears to arise from the second of these policy bases: protecting the public from "the confusion that would result from premature exposure to discussions occurring before the policies affecting it had actually been settled upon." Because this concern is addressed by the deliberative process privilege of Government Code section 6254, subdivision (a), application of this "snapshot" exemption is subject to the same limitations as the broader deliberative process privilege.[2]

By statute, the deliberative process privilege does not exempt "final" documents, documents that are retained in the ordinary course of business, or documents that are factual, rather than "deliberative," in nature. (Gov. Code § 6254, subd. (a).) Moreover, documents or advice submitted to an agency by persons outside the government as part of an administrative proceeding are not internal agency documents exempt from disclosure. (*Klamath Water Users Protective Association v. United States Dep't of the Interior* (9th Cir. 1999) 189 F.3d 1034, 1038; *Van Bourg, Allen, Weinberg & Roger v. N.L.R.B.* (9th Cir. 1985) 751 F.2d 982, 985.)

This is true even if the documents were requested from the interested party by the government agency. (*Klamath Water Users Protective Association v. United States Dep't of the Interior* (9th Cir. 1999) 189 F.3d 1034, 1038.) In the *Klamath Water Users Protective Association* case, documents submitted by Indian Tribes at

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[2] Article I, Section 3(b) of the California Constitution, which provides a constitutional right of access to information concerning the conduct of government, provides that any statutory right to information shall be broadly construed to provide the greatest access to government information and further requires that any statute that limits the right of access to information shall be narrowly construed. This provision requires the narrow construction of both the deliberative process privilege and the "catch-all" privilege. Such a construction would limit the "catch-all" privilege to situations not already contemplated and limited by express statutory provisions.

the request of the Department of the Interior in the course of proceedings involving water rights were found not exempt under the deliberative process privilege.

In limiting the deliberative process privilege to inter-agency or inter-agency documents, the courts have distinguished between communications to or from outside consultants and communications by interested parties seeking to influence government decisions. Generally, outside consultants retained or consulted by agencies may be considered part of the internal deliberative process. The Federal courts, however, have held that "interested parties," "past or potential adversaries," or "self-seeking petitioners" do not qualify as outside consultants and their communications are not considered part of the internal deliberative process. (*Klamath Water Users Protective Association v. United States Dep't of the Interior* (9th Cir. 1999) 189 F.3d 1034, 1038; *County of Madison v. United States Dep't of Justice* (1st Cir. 1981) 641 F.2d 1036, 1040.) Communications with such entities are considered final documents, rather than drafts or memorandum meant only for internal use.

In the case at hand, CPVC manufacturers, sellers and trade groups are interested parties who seek to influence HCD's review of plastic pipe. They are also both past and potential adversaries in regard to HCD's review of CPVC. Accordingly, correspondence, meeting notes, e-mails, reports, studies or other documents from or to CPVC manufacturers, sellers or trade groups, their agents, lobbyists, experts or attorneys may not be withheld. Such documents are "final" documents, not "inter-agency or intra-agency" memoranda or internal preliminary drafts or notes.

HCD's invocation of the "catch-all" exemption of Government Code section 6255 also fails because the public interest in nondisclosure of these documents does not clearly outweigh the public interest in disclosure. The "catch-all" exemption authorizes the withholding of records if "on the facts of the particular case the public interest served by not disclosing the record clearly outweighs the public interest served by disclosure of the record." (Gov. Code § 6255.)

The burden of proof in invoking this exemption is on the proponent of nondisclosure, "who must demonstrate a clear 'overbalance' on the side of confidentiality." (*City of San Jose v. Superior Court* (1999) 74 Cal.App.4th 1008, 1018.) Simply stating that there is a public interest in avoiding potential confusion is not sufficient. In the case at hand, HCD has not and cannot, fulfill its ultimate

burden to demonstrate a clear overbalance on the side of confidentiality rather than disclosure.

In support of non-disclosure, HCD relies upon a vague assertion that the public would be confused by the release of correspondence and documents to and from CPVC manufacturers. This argument would hold some weight if preliminary drafts of the EIR were being sought. But correspondence to and from interested stakeholders, such as CPVC manufacturers, is unlikely to cause the same kind of confusion that could result from release of HCD's preliminary work product. Accordingly, the public interest in their non-disclosure is comparatively minimal.

On the other hand, the public has a strong interest in monitoring the activities of those who seek to gain private advantage by influencing government decisions. This interest is reflected in the many decisions under the FOIA holding that the deliberative process privilege does not protect communications by such interested parties. (See *Klamath Water Users Protective Association v. United States Dep't of the Interior* (9th Cir. 1999) 189 F.3d 1034, 1038; *County of Madison v. United States Dep't of Justice* (1st Cir. 1981) 641 F.2d 1036, 1040-1041; *Van Bourg, Allen, Weinberg & Roger v. N.L.R.B.* (9th Cir. 1985) 751 F.2d 982, 985; see also Weaver & Jones, The Deliberative Process Privilege (1989) 54 Mo.L.Rev. 279, 300.) Moreover, failure to share such documents with all interested parties provides an unfair advantage to certain stakeholders over the public at large. At least one court has compared this to ex parte communications that must be disclosed to all participants. (*Klamath Water Users Protective Association v. United States Dep't of the Interior* (9th Cir. 1999) 189 F.3d 1034, 1038.)

In addition, the public has a strong interest in the disclosure of documents related to CPVC due to the fact that CPVC has been linked to worker health issues, the potential contamination of drinking water, increased air and solid waste pollution and other potential performance, safety and environmental issues. It is incontestable that these are grave public matters in which the public has a substantial and immediate interest in disclosure. (See *Citizens for a Better Environment v. Dep't of Food and Agriculture* (1985) 171 Cal.App.3d 704 (holding that *preliminary documents* concerning the conduct of county officials in investigating and enforcing pesticide use laws were not subject to the deliberative process privilege because the public interest in these "grave matters" outweighed the interest in nondisclosure).)

A strong public interest exists in making public any correspondence or studies that may shed light on the safety and performance of these materials. Furthermore, because CPVC is currently approved for use on a limited basis in California, the public interest in documents related to CPVC is immediate and independent of the EIR itself.

An analogous situation was recently examined in a February 2006 California Attorney General Opinion. (89 Ops. Cal. Atty. Gen. 39 (2006).) This opinion held that interim grading documents, including preliminary geology reports, compaction reports, and soil reports, submitted by a property owner to a city's building department in conjunction with an application for a building permit are subject to public inspection and copying under the California Public Records Act *at the time the documents are first received* by the building department. The Attorney General held that the deliberative process privilege of Section 6245 did not apply to these documents even though the reports were preliminary in nature in the sense that they do not become "final" until approved by the city's staff.

The opinion further held that these documents are subject to disclosure *at the time they are first received* by the building department. In other words, the Attorney General rejected the argument that reports submitted by private parties could be withheld until such time as they were approved by the agency itself.

The Attorney General rejected the application of the deliberative process exemption to interim grading documents for several reasons. First, these documents are retained "in the ordinary course of business," as they are carefully reviewed by the department's professional staff and remain on file until the approval process is completed. Second, this privilege is inapplicable to factual materials that are prepared by private parties. Third, the public interest in withholding the preliminary documents submitted by project applicants would not clearly outweigh the public interest in disclosure, thus rendering inapplicable the "catch-all" exemption of Section 6255.

As with the preliminary grading documents discussed in the Attorney General opinion, documents received from CPVC, PEX or PEX-AL-PEX manufacturers, sellers or trade groups are similarly not exempt under either the deliberative process exemption or the "catch-all" exemption.

Ms. Kan Yu has stated that documents related to CPVC, PEX and PEX-AL-PEX have also been withheld pursuant to the attorney work product and the attorney-client communications privileges. This privilege is inapplicable to documents from or communications with plastic pipe manufacturers, their agents or their attorneys. HCD does not have an attorney-client relationship with plastic pipe manufacturers, their agents or their attorneys. Letters to HCD from CPVC, PEX or PEX-AL-PEX manufacturers, their agents, lobbyists or attorneys are not the work product of HCD counsel. Furthermore, any attorney work-product provided by HCD to CPVC, PEX or PEX-AL-PEX industry representatives are also not protected since the provision of work-product to third parties waives the privilege. (*OXY Resources California v. Superior Court* (2004) 115 Cal.App.4th 874, 891.) Any documents improperly withheld under this exemption must be disclosed.

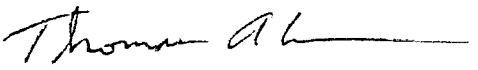
We also wish to confirm that no "intra-agency or inter-agency" memoranda, correspondence or reports regarding CPVC, PEX or PEX-AL-PEX have been improperly withheld under the deliberative process privilege. Intra-agency and inter-agency memoranda are only exempt from disclosure if they expose the internal deliberative process. However, intra-agency and inter-agency memoranda that solely consist of "compiled factual material or purely factual material contained in deliberative memoranda and severable from its context" are not exempt from disclosure. (*Citizens for a Better Environment v. Dept. of Food and Agriculture* (1985) 171 Cal.App.3d 704, 713.) Moreover, any memorandum or reports that will be retained as part of the administrative record supporting the EIR must also be disclosed. (Gov. Code § 6254 (the deliberative process privilege applies only to preliminary deliberative documents that "are not retained ... in the ordinary course of business").) If factual documents, reports or memorandum have been withheld that are severable from the deliberative process, these documents must be disclosed.

Finally, we wish to confirm Ms. Kan Yu's statement that no communications with or documents from PEX or PEX-AL-PEX industry groups have been withheld. (Telephone conversation with Lisa Kan Yu (May 3, 2006).) If such documents do exist, we object to their nondisclosure for the reasons expressed above in regards to communications with CPVC industry groups.

We request immediate access to and copies of any improperly withheld documents. (Gov. Code § 6253.) We also request an estimate of the costs of production prior to your making any copies.

Please call me at (916) 444-6201 if you have any questions. Thank you for your assistance with this matter.

Sincerely,



Thomas A. Enslow

TAE:cnh

cc: Lisa Kan Yu, Staff Counsel
Lenora Frazier, Legal Affairs Division

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August 10, 2006

VIA FACSIMILE& U.S. MAIL

Lynn L. Jacobs
Director
Department of Housing & Community Development
P.O. Box 952051
Sacramento, CA 94252-2051

Dennis Beddard
Acting General Counsel
Department of Housing & Community Development
P.O. Box 952052
Sacramento, CA 94252-2052

Re: Public Records Act Request for Names, Resumes and Curricula Vitas of all Persons Who Prepared the CPVC Draft EIR or Who Made the Determinations of Significance Contained in the CPVC Draft EIR

Dear Ms. Jacobs and Mr. Beddard:

I am writing to request that the Department of Housing and Community Development ("HCD") provide us with immediate access to, and copies of, the names, resumes and curricula vitas of all persons who prepared the CPVC Draft Environmental Impact Report ("DEIR") or who made the determinations contained in the DEIR regarding thresholds of significance and findings of significance, including, but not limited to, Robin Gilb, Dennis Beddard and Suzanne Moser.

This request is made pursuant to the California Public Records Act, Government Code section 6250 *et seq.* I request immediate access to the above documents and copies of the requested documents pursuant to Section 6253 of the Public Records Act.

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This request is also made pursuant to Article I, Section 3(b) of the California Constitution, which provides a constitutional right of access to information concerning the conduct of government. Article I, Section 3(b) provides that any statutory right to information shall be broadly construed to provide the greatest access to government information and further requires that any statute that limits the right of access to information shall be narrowly construed.

We request a written response to this request within ten (10) days and access to the requested documents immediately. (Gov. Code § 6253; Pub. Resources Code § 21092(b)(1).) We also request an estimate of the costs of production prior to your making any copies.

Please call me at (916) 444-6201 if you have any questions. Thank you for your assistance with this matter.

Sincerely,

Thomas A. Enslow

TAE:cnh

FILE

ADAMS BROADWELL JOSEPH & CARDOZO

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August 30, 2006

VIA FACSIMILE AND U.S. MAIL

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P.O. Box 952051
Sacramento, CA 94252-2051

Dennis Beddard
Acting General Counsel
Department of Housing &
Community Development
P.O. Box 952052
Sacramento, CA 94252-2052

Re: Public Records Act Request for All Documents
Related to CPVC, PEX and PEX-AL-PEX not Provided in Prior Requests

Dear Ms. Jacobs and Mr. Beddard:

I am writing to request that the Department of Housing and Community Development ("HCD") provide us with immediate access to, and copies of, all documents, writings and recordings in its possession or control referring to, or relating to chlorinated polyvinyl chloride ("CPVC") in building standards proposed to the California Building Standards Commission. A response to this request shall include, but not be limited to, any and all correspondence, memorandums, notes, writings, reports, studies, internal Department communications, recordings, memos, emails and other documents.

This request excludes any documents previously provided to this office in response to our March 1, 2006 Public Record Request, our August 1, 2006 Request for Documents Referenced in the Draft Environmental Impact Report on the Statewide Approval of CPVC or any other prior public records requests sent by this office.

1626-138d

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We ask that special attention be given to producing any emails between Robin Gilb and the California Air Resources Board. It is our understanding that there exists a May 1, 2006 email between Judy Yee of the California Air Resources Board and Robin Gilb, staff attorney for HCD, that relates to the appropriate thresholds of significance for determining air quality impacts from the approval of CPVC. For some unknown reason, this email was not provided to us in response to any of our earlier requests.

This request is made pursuant to the California Public Records Act, Government Code section 6250 *et seq*. I request immediate access to the above documents and copies of the requested documents pursuant to Section 6253 of the Public Records Act.

This request is also made pursuant to Article I, Section 3(b) of the California Constitution, which provides a constitutional right of access to information concerning the conduct of government. Article I, Section 3(b) provides that any statutory right to information shall be broadly construed to provide the greatest access to government information and further requires that any statute that limits the right of access to information shall be narrowly construed.

We request a written response to this request within ten (10) days and access to the requested documents immediately. (Gov. Code § 6253; Pub. Resources Code § 21092(b)(1).) We also request an estimate of the costs of production prior to your making any copies.

Please call me at (916) 444-6201 if you have any questions. Thank you for your assistance with this matter.

Sincerely,

Thomas A. Enslow

TAE:cnh

cc: Robin Gilb
Staff Counsel

1626-138d

BAAQMD CEQA GUIDELINES
Assessing the Air Quality Impacts of Projects and Plans

Prepared by the Planning and Research Division of the
Bay Area Air Quality Management District
939 Ellis Street
San Francisco, CA 94109

December, 1999

This document is intended to serve as a guide for those who prepare or evaluate air quality impact analyses for projects and plans in the San Francisco Bay Area. The GUIDELINES include information on legal requirements, BAAQMD rules, plans and procedures, methods of analyzing air quality impacts, thresholds of significance, mitigation measures, and background air quality information. Copies and updates are available from the BAAQMD Public Information Office at (415) 749-4900. Questions on content may be addressed to the BAAQMD's Planning and Transportation Section at (415) 749-4995.

Ellen Garvey - Air Pollution Control Officer
Peter Hess - Deputy Air Pollution Control Officer
Thomas Perardi - Director, Planning & Research Division
Jean Roggenkamp - Manager, Planning and Transportation Section

project or plan can be identified in the Initial Study (i.e., none of the significance thresholds are exceeded), the District recommends the Lead Agency either prepare a Negative Declaration or include in an EIR a statement indicating the reasons why potential air quality impacts were determined not to be significant.

Sources of air pollutant emissions complying with all applicable District regulations generally will not be considered to have a significant air quality impact.[2] Stationary sources that are exempt from District permit requirements because they fall below emission thresholds for permitting will not be considered to have a significant air quality impact (unless it is demonstrated that they may have a significant cumulative impact). The Lead Agency can and should make exception to this determination if special circumstances suggest that the emissions from the permitted or exempt source may cause a significant air quality impact. For example, if a permitted or exempt source may emit objectionable odors, then odor impacts on nearby receptors should be considered a potentially significant air quality impact.

2.3 Thresholds of Significance

This section describes the District's recommended thresholds of significance to be used by a Lead Agency when preparing an Initial Study. If, during the preparation of the Initial Study, the Lead Agency finds that any of the following thresholds may be exceeded, then an EIR should be prepared in order to more accurately evaluate project impacts and identify mitigation measures. These thresholds also may be used when preparing an EIR. If the more detailed analysis in an EIR indicates that any of these thresholds would be exceeded, the document should identify the impact as a significant air quality impact and propose mitigation measures. Chapter 3 explains how to calculate emissions to determine whether the thresholds have been exceeded. The following thresholds address impacts associated with: 1) project construction, 2) project operations, and 3) plans.

Threshold of Significance for Construction Impacts

Construction-related emissions are generally short-term in duration, but may still cause adverse air quality impacts. Fine particulate matter (PM_{10}) is the pollutant of greatest concern with respect to construction activities.[3] PM_{10} emissions can result from a variety of construction activities, including excavation, grading, demolition, vehicle travel on paved and unpaved surfaces, and vehicle and equipment exhaust. Construction-related emissions can cause substantial increases in localized concentrations of PM_{10}. Particulate emissions from construction activities can lead to adverse health effects as well as nuisance concerns such as reduced visibility and soiling of exposed surfaces.

Construction emissions of PM_{10} can vary greatly depending on the level of activity, the specific operations taking place, the equipment being operated, local soils, weather conditions and other factors. Despite this variability in emissions, experience has shown that there are a number of

[2]CEQA Guidelines, Section 15064(i).

[3] Construction equipment emits carbon monoxide and ozone precursors. However, these emissions are included in the emission inventory that is the basis for regional air quality plans, and are not expected to impede attainment or maintenance of ozone and carbon monoxide standards in the Bay Area.

Thresholds of Significance for Impacts From Project Operations

For many types of land use development, such as office parks, shopping centers, residential subdivisions and other "indirect sources", motor vehicles traveling to and from the projects represent the primary source of air pollutant emissions associated with project operations. Significance thresholds discussed below address the impacts of these indirect source emissions on local and regional air quality. Thresholds are also provided for other potential impacts related to project operations, such as odors and toxic air contaminants.

(Lead Agencies may refer to Section 2.4, Project Screening, for guidance on determining whether significance thresholds for project operations may be exceeded, and thus whether more detailed air quality analysis may be needed.)

1. **Local Carbon Monoxide Concentrations.** Localized carbon monoxide concentrations should be estimated for projects in which: 1) vehicle emissions of CO would exceed 550 lb./day, 2) project traffic would impact intersections or roadway links operating at Level of Service (LOS) D, E or F or would cause LOS to decline to D, E or F, or 3) project traffic would increase traffic volumes on nearby roadways by 10% or more.[4] A project contributing to CO concentrations exceeding the State Ambient Air Quality Standard of 9 parts per million (ppm) averaged over 8 hours and 20 ppm for 1 hour would be considered to have a significant impact.

2. **Total Emissions.** Total emissions from project operations should be compared to the thresholds provided in Table 3.[5] Total operational emissions evaluated under this threshold should include all emissions from motor vehicle use associated with the project. A project that generates criteria air pollutant emissions in excess of the annual *or* daily thresholds in Table 3 would be considered to have a significant air quality impact.

TABLE 3
THRESHOLDS OF SIGNIFICANCE
FOR PROJECT OPERATIONS

Pollutant	ton/yr	lb/day	kgm/day
ROG	15	80	36
NO_X	15	80	36
PM_{10}	15	80	36

3. **Odors.** While offensive odors rarely cause any physical harm, they still can be very unpleasant, leading to considerable distress among the public and often generating citizen complaints to local governments and the District. Any project with the potential to frequently expose members of the public to objectionable odors would be deemed to have a significant

[4] Unless the increase in traffic volume is less than 100 vehicles per hour.

[5] The thresholds for ROG and NOx are equivalent to the District offset requirement threshold (15 tons per year) for stationary sources (Regulation 2-2-302). The threshold for PM_{10} is based on the District's definition of a major modification to a major facility (Regulation 2-2-221).

The District recommends, at a minimum, that the Lead Agency, in consultation with the administering agency of the RMPP, find that any project resulting in receptors being within the Emergency Response Planning Guidelines (ERPG) exposure level 2 for a facility has a significant air quality impact. ERPG exposure level 2 is defined as "the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action".[7]

6. Cumulative Impacts. Any proposed project that would individually have a significant air quality impact (see Thresholds of Significance for Impacts from Project Operations, above) would also be considered to have a significant cumulative air quality impact.

For any project that does not individually have significant operational air quality impacts, the determination of significant cumulative impact should be based on an evaluation of the consistency of the project with the local general plan *and* of the general plan with the regional air quality plan. (The appropriate regional air quality plan for the Bay Area is the most recently adopted Clean Air Plan.) See Thresholds of Significance for Plan Impacts, below, for guidance on evaluating the consistency of a local general plan with the Clean Air Plan. Figure 2 provides a flow chart depicting the process for evaluating cumulative impacts.

Projects in Jurisdictions with Local Plans Consistent with the Clean Air Plan

If a project is proposed in a city or county with a general plan that is consistent with the Clean Air Plan (see below) *and* the project is consistent with that general plan (i.e., it does not require a general plan amendment), then the project will not have a significant cumulative impact (provided, of course, the project does not individually have any significant impacts). No further analysis regarding cumulative impacts is necessary.

In a jurisdiction with a general plan consistent with the Clean Air Plan, a project may be proposed that is not consistent with that general plan because it requires a general plan amendment (GPA). In such instances, the cumulative impact analysis should consider the difference(s) between the project and the original (pre-GPA) land use designation for the site with respect to motor vehicle use and potential land use conflicts. A project would not have a significant cumulative impact if: VMT from the project would not be greater than the VMT that would be anticipated under the original land use designation, and 2) the project would not result in sensitive receptors being in close proximity to sources of objectionable odors, toxics or accidental releases of hazardous materials.

[7] State of California Guidance for the Preparation of a Risk Management and Prevention Program, California Office of Emergency Services, November 1989, pg. D-2.

CEQA air quality handbook

Prepared by:

South
Coast
Air
Quality
Management
District

April, 1993

South Coast
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MESSAGE FROM THE CHAIRMAN

April, 1993

The federal Clean Air Act, the California Clean Air Act, and the 1991 AQMP revision have set forth an attainment program for this region to achieve the federal and state ambient air quality standards. Success in achieving our goal lies in the cooperative efforts of all levels of government as well as public support. Together, we have made the last three years the cleanest on record. But we have a long way to go to regain healthful air in this region. Our efforts will be challenged along the way by increases in population growth, the need to obtain emission reductions from more and smaller sources, and the need for technological breakthroughs.

However, there are actions that local government planners and project proponents can take to be proactive members of the clean air team. One of those actions involves the California Environmental Quality Act (CEQA) process. Only local governments have the ability to assess and mitigate the air quality impacts of land development or redevelopment. This fifth edition of the District's CEQA Air Quality Handbook is intended to assist you in carrying out this objective.

Without this extra effort by local government, new development could account for 43% of reactive organic compounds and oxides of nitrogen generated by mobile sources in the year 2010. It is critical that we reduce these pollutants, as they are precursors to the smoggy haze we see so frequently in our region.

If past experience is any indication of our potential to solve this problem, then I am confident that our continued partnership will succeed and the residents of this region will breathe healthful air by the year 2010.

Henry W. Wedaa

Henry W. Wedaa, Chairman
SCAQMD

DETERMINING THE AIR QUALITY SIGNIFICANCE OF A PROJECT

CHAPTER 6

Section 15002(g) of the state CEQA Guidelines defines a significant effect on the environment as "a substantial adverse change in the physical condition which exists in the area affected by the proposed project." Further, the project is considered to be of statewide, regional, or area-wide significance if it, for example, interferes with attaining the federal or state air quality standards (CEQA Guidelines Section 15206(b)(2)). To determine the significance of a project, CEQA requires the preparation of an Initial Study by the project proponent or lead agency. The Initial Study will evaluate the impact of the proposed project upon the environment, including air quality. From an air quality perspective, the impact of the project is determined by examining the types and levels of emissions generated by the project and its impact on factors that affect air quality. As such, projects should be evaluated in terms of air pollution thresholds established by the District. The thresholds of significance differ for the SCAB and the Coachella Valley. The scope of the evaluation and the extent of the required CEQA review will depend upon the estimated extent of the impact as determined by the lead agency in the Initial Study.

6.1 Preparing the Initial Study

To assist local planners and project proponents in answering the questions in the Initial Study, and thereby determining the air quality significance of a project, the key air quality issues to consider in each Initial Study category are summarized in Table 6-1.

Beyond the obvious primary impact of specific emissions arising from the operation and construction of a project, there is the potential for secondary effects. Secondary effects include such things as: impacts on the earth, water, population, transportation/circulation, energy/utilities, human health, and public services, that affect air quality indirectly. Among these secondary effects are, for example, high CO emissions from degradation in roadway level of service and NOx from power plants producing energy. All of those emissions contribute to air pollution, and need to be included in the project's emissions calculations. CEQA requires that in evaluating the significance of the environmental effect of a project, the lead agency shall consider both primary or direct and secondary or indirect consequences (CEQA Guidelines Section 15064 (d)). The impact of a project needs to be evaluated in terms of emisssion thresholds and other indicators of potential air quality impacts.

6.2 SCAB Air Pollution Thresholds for Operations

As seen above, new and modified projects will affect regional air quality both directly and indirectly. To determine the extent of a proposed project's environmental impact and the significance of such impact the project should be compared to established levels of significance. The District has established two types of air pollution thresholds to assist lead agencies in determining whether or not the operation phase of a project is significant. These can be found in the following sections under: 1) emission thresholds; and 2) additional indicators. If the lead agency finds that the operational phase of a project has the potential to exceed either of the air pollution thresholds, the project should be considered significant.

- **Emission Significance Thresholds (Primary Effects)**

The District has established these thresholds, in part, based on Section 182 (e) of the federal Clean Air Act which identifies ten tons a year of volatile organic gases as the significance level for stationary sources of emissions in extreme non-attainment areas for ozone. The South Coast Air Basin is the only extreme non-attainment area in the United States. This emission threshold has been converted to a pounds per day threshold for the operational phase of a project. The District staff also evaluated the thresholds established by other air quality management agencies in California and has taken into account the effect the thresholds would have on local governments' work load.

While Section 15064 (b) of CEQA Guidelines states that an ironclad definition of a significant effect is not possible because the significance of an activity may vary with the setting, the District believes that the setting as referred to in CEQA can be defined in this case. Under California state law (Health and Safety Code Section 40402), the South Coast Air Basin is defined as a distinct geographic area with a critical air pollution problem for which ambient air quality standards have been promulgated to protect public health. As such, the District believes that significance thresholds can be established based on scientific and factual data that is contained in the federal and state Clean Air Acts. Therefore, the District recommends that these thresholds be used by lead agencies in making a determination of significance. However, the final determination of whether or not a project is significant is within the purview of the lead agency pursuant to Section 15064 (b) of the CEQA Guidelines.

Both direct and indirect emissions should be included when determining whether the project exceeds these thresholds. The following significance thresholds for air quality have been established by the District for project operations:

55 pounds per day of ROC

55 pounds per day of NOx

550 pounds per day of CO

150 pounds per day of PM10

150 pounds per day of SOx

Ca. state 1-hour or 8-hour CO standard

Projects in the South Coast Air Basin (SCAB) with daily operation-related emissions that exceed any of the above emission thresholds should be considered to be significant.

Planners and project proponents may determine if a project is likely to be significant by screening the project using Table 6-2. The land uses listed therein are based on the mobile source emissions from projects that have the potential to exceed the emission thresholds. Table 6-2 does not cover all proposed projects or situations. If site-specific information is available, the MAAQI model or emission calculation procedures discussed in Chapter 9 of this Handbook can be used to estimate emissions totals to determine significance. Any emission reductions resulting from existing rules and ordinances should be calculated as the project's non-mitigated emissions and discussed in the project description.

In addition, level of service can be used as a screening method for determining when vehicle trips will impact a roadway, thus violating the state 1-hour or 8-hour standard, and creating a CO hotspot. Refer to Section 9.4.

- **Additional Indicators of Potential Air Quality Impacts (Secondary Effects)**

Additional indicators should be used as screening criteria indicating the need for further analysis with respect to air quality. Whenever possible, the project should be evaluated in a quantitative analysis; otherwise a qualitative analysis is appropriate. The additional indicators are as follows:

- Project could interfere with the attainment of the federal or state ambient air quality standards by either violating or contributing to an existing or projected air quality violation (refer to Chapter 12 and Appendix G, Significant Effects, State CEQA Guidelines);
- Project could result in population increases within the regional statistical area which would be in excess of that projected in the AQMP and in other than planned locations for the project's build-out year (refer to Chapter 12);
- Project could generate vehicle trips that cause a CO hot spot (refer to Section 9.4);

- Project will have the potential to create or be subjected to an objectionable odor over 10 dilution to thresholds (D/T) (refer to Chapter 5) that could impact sensitive receptors;

- Project will have hazardous materials on site (Table 10-4 and 10-5) and could result in an accidental release of air toxic emissions or acutely hazardous materials posing a threat to public health and safety (refer to Chapter 10);

- Project could emit an air toxic contaminant regulated by District rules or that is on a federal or state air toxic list (refer to Appendix 10);

- Projects could involve burning of hazardous, medical, or municipal waste as waste-to-energy facilities (refer to Chapters 10 and 13);

- Projects could be occupied by sensitive receptors within a quarter mile of an existing facility that emits air toxics identified in District Rule 1401 (New Source Review of carcinogenic air contaminants) or near CO hot spots (refer to Chapters 5 and 10);

- Project could emit carcinogenic or toxic air contaminants that individually or cumulatively exceed the maximum individual cancer risk of 10 in 1 million.

If the project has significant air quality impacts, an EIR should be prepared. If the impact of the project can be reduced below significant by the application of mitigation measures, then a Mitigated Negative Declaration (MND) can be prepared. The MND or EIR should quantify the level of emissions using the standards in this Handbook, and identify mitigation measures to lessen the project's impact to the greatest extent possible. The District recommends that all projects apply feasible mitigation measures to reduce individually and cumulatively significant air quality impacts to less than significant. Refer to Chapter 11 for an identification of mitigation measures, and the potential for emission reductions.

6.3 SEDAB (Under District Jurisdiction) Air Pollution Thresholds for Operations

The Coachella Valley and Antelope Valley, which are under the jurisdiction of the District, are in the SEDAB which has a distinctly different air pollution problem than the SCAB. The SEDAB is not classified as an extreme non-attainment area for ozone and therefore, the District has not changed the significance thresholds for the Coachella Valley and Antelope Valley from the 1987 version of this Handbook. In determining whether or not a project exceeds these thresholds, the project emissions should be calculated in the same manner as that for the SCAB (e.g. utilizing the highest daily emissions). These thresholds are as follows:

75 pounds per day of ROC

100 pounds per day of NOx

550 pounds per day of CO

150 pounds per day of PM10

150 pounds per day of SOx

Ca. state 1-hour and 8-hour CO standard

Projects in the Coachella Valley and Antelope Valley portion of the SEDAB with peak operation-related emissions that exceed any of the above emission thresholds should be considered significant.

As with the significance thresholds defined for the SCAB, planners and project proponents may determine if a project is significant by screening the project using Table 6-2 or the alternatives mentioned in Section 6.2. Level of service can also be used for determining a likely violation of the state 1-hour or 8-hour CO standard for the Coachella Valley and Antelope Valley.

The additional indicators of potential air quality impacts identified in Section 6.2 should also be used in determining if a project is significant in the Coachella Valley and Antelope Valley.

6.4 Construction Emission Thresholds for SCAB and Coachella Valley

Both the SCAB and SEDAB (that portion under the jurisdiction of the District) exceed the federal and state PM10 standards. The problem in these areas results from fugitive dust distributed during construction, from transport of disturbed dust on roadways by vehicles and wind. However, since a project's impact is limited to the construction phase, and level of mitigation, the procedure for determining significance is different than that for a project's operational impacts. When estimating a project's construction-related emissions, the emissions can be averaged over a 3-month period to include only actual working days.

The following significance thresholds for air quality have been established by the District on a quarterly basis:

2.5 tons per quarter of ROC

2.5 tons per quarter of NO_x

24.75 tons per quarter of CO

6.75 tons per quarter of PM10

6.75 tons per quarter of SO_x

However, if emissions on an individual day exceed 75 lbs a day for ROC, or 100 lbs a day for NOx, or 550 lbs a day for CO, or 150 lbs a day for PM10 and SO_x, the project should be considered significant.

Projects in the SCAB or SEDAB with construction-related emissions in a quarterly period that exceed any of the emission thresholds should be considered to be significant.

Table 6-3 provides a screening table for determining when a project's construction emissions could exceed the threshold of significance.

6.5 Selecting the Appropriate Document

Upon completion of the Initial Study, the lead agency in consultation with responsible agencies determines the most appropriate type of environmental documentation, (i.e., a Negative Declaration (ND), a Mitigated Negative Declaration (MND), or an Environmental Impact Report (EIR)). Specific criteria for determining the appropriate environmental document with respect to air quality are described below. Table 6-4 provides a quick reference for planners to determine the appropriate environmental documents for particular types of land use projects.

- **Negative Declarations**

A Negative Declaration (ND) is prepared if the Initial Study identifies no significant environmental impacts from the project. Before the release of the ND for the project, the lead agency must determine that there is no substantial evidence that the project without mitigation may have a

CEQA Project Analysis Levels

The SJVAPCD recommends a three-tiered approach to analysis based on project size to allow quick screening of most projects for significant impacts.

- Small Project Analysis Level
- Cursory Analysis Level
- Full Analysis Level
- Recommended Thresholds of Significant Impact

Small Project Analysis Level (SPAL)

The Small Project Analysis Level (SPAL) is the screening level. Projects under this level require no further analysis in order to make a finding of less than significant air quality impacts.

- Verify project size or trip volume is less than pre-calculated amounts in GAMAQI Table 5-2 or 5-3
- Verify that project is not a source or near a source of hazardous air pollutants or odors
- If demolition or renovation of existing buildings, contact the District for asbestos requirements.
- Mitigate cumulative impacts with measures appropriate for the site.

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Cursory Analysis Level (CAL)

The CAL is used to determine if significance thresholds have been exceeded on projects not meeting the SPAL criteria.

- Estimate mobile and area source emissions using URBEMIS 7G
- Screen for CO impact/use CO Protocol or CALINE4 dispersion model if needed.
- If source of hazardous air pollutants or odors or is near such a source, contact

the SJVUAPCD.

- If demolition or renovation of existing buildings, contact the District for asbestos requirements.
- Identify feasible mitigation measures and quantify benefit using URBEMIS 7G
- If impacts are identified as significant and cannot be mitigated to less than significant prepare an EIR with full analysis.

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Full Analysis Level (FAL)

The Full Analysis Level (FAL) is the level of analysis usually required for an EIR. It requires all the elements of the previous two levels and an air quality report that fully describes the air quality impacts to the public.

- Estimate mobile and area source emissions with URBEMIS 7G. For general plans and large specific/community plans use DTIM2 if transportation demand model available, otherwise use MVEI7G (BURDEN7G).
- Screen project for CO impacts, use CO Protocol or CALINE 4 if needed.
- If source of hazardous air pollutants or odors, or is near such a source, contact the SJVUAPCD.
- If SJVUAPCD identifies as potentially significant source of hazardous air pollutants, a health risk assessment will be required.
- Prepare an air quality report containing:
    - existing air quality conditions;
    - analysis of project air quality impacts;
    - mitigation measures; and
    - results of modeling as technical appendices.

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Recommended Thresholds of Significant Impact

- Ozone Precursor Emissions

  Reactive Organic Gases (ROG) 10 tons/year

  Oxides of Nitrogen (NOx) 10 tons/year

- PM-10 Emissions

  Complying with SJVAPCD Regulation VIII reduces to less than significant. Large or high intensity construction projects near sensitive receptors may require mitigation beyond Regulation VIII. (See GAMAQI Table 6-3.)

- CO Emissions

  Project causes or contributes to an exceedance of state or federal ambient CO standards. Determined by screening or modeling.

- Hazardous Air Pollutant Emissions

  Based on potential to increase cancer risk for the person with maximum exposure potential by 10 in one million. Non-cancer Hazard Index > 1. Determined by screening or modeling.

- Odor Impacts

  Based on distance of odor source from people and complaint record for facility or similar facility. More than one confirmed complaint per year averaged over a three-year period, or three unconfirmed complaints per year averaged over a three-year period. (See GAMAQI Table 4-2)

- Construction Emissions

  Same thresholds as above, but apply only during construction period. Ozone precursors calculated on an annual basis.

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SACRAMENTO METROPOLITAN
AIR QUALITY
MANAGEMENT DISTRICT

Norm Covell
AIR POLLUTION CONTROL OFFICER

April 12, 2002

To: Lead and Responsible Agencies, Consultants and Interested Persons

From: Norm Covell, Air Pollution Control Officer

Subject: **California Environmental Quality Act (CEQA)**
Revised Significance Criteria for Air Quality

On March 28, 2002 the Board of Directors of the Sacramento Metropolitan Air Quality Management District (SMAQMD) approved the following revised significance criteria/thresholds for pollutants emitted into the air.

Mass Emission Thresholds

Project Type	Ozone Precursor Emissions (Pounds/Day)	
	ROG	NOx
Short-Term Effects (Construction)	None	85
Long-Term Effects (Operation)	65	65

Emission Concentration Thresholds

California Ambient Air Quality Standards (CAAQS) *(see reverse)*.
The CAAQS significance criteria are applied to all phases of a project in addition to the above mass emission thresholds.

Substantial Contribution Threshold

A project is considered to contribute substantially to an existing or projected violation of a CAAQS if it emits pollutants at a level equal to or greater than five (5) percent of the CAAQS.

The revised criteria/thresholds became effective on March 28, 2002. To allow a reasonable transition to the revised criteria/thresholds, agencies may apply either the previous or revised criteria/thresholds for CEQA determinations made prior to May 17, 2002.

Please contact Matt Jones, 916-874-4835, or Greg Tholen, 916-874-4832, if you have any questions regarding this notice.

Sincerely,

Norm Covell
Air Pollution Control Officer

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GUIDE FOR ASSESSING AND MITIGATING AIR QUALITY IMPACTS

Prepared by
the Mobile Source/CEQA Section
of the Planning Division
of the San Joaquin Valley Air Pollution Control District
1990 E. Gettysburg Avenue
Fresno, CA 93726

January 10, 2002 revision
Adopted August 20, 1998

This document is an advisory document, that provides Lead Agencies, consultants, and project applicants with uniform procedures for addressing air quality in environmental documents. Copies and updates are available from the SJVAPCD Planning Division at (559) 230-5800. Questions on content should be addressed to either the Mobile Source/ CEQA Section at (559) 230-5800 or the SJVAPCD CEQA representative at the regional office that covers the county in which the project is located.

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ACKNOWLEDGEMENTS

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GUIDE FOR ASSESSING AND MITIGATING AIR QUALITY IMPACTS

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SECTION 4 – THRESHOLDS OF SIGNIFICANCE

4.1 INTRODUCTION

This section provides SJVAPCD recommended thresholds for determining whether projects have significant adverse air quality impacts as defined by CEQA. Projects demonstrated to have significant adverse impacts are required to mitigate impacts to levels considered less than significant or to prepare an EIR. The thresholds are advisory, but may be adopted administratively or formally by a governing body as recommended by the Governor's Office of Planning and Research (OPR) document *Thresholds of Significance: Criteria for Determining Environmental Significance*. The following gives the basis for the thresholds for all different types of air quality impacts.

4.2 BASIS FOR THRESHOLDS OF SIGNIFICANCE

The SJVAPCD used the OPR definitions of significant environmental effect as a basis to establish air quality Thresholds of Significance for the San Joaquin Valley. Section 15382 of the CEQA Guidelines defines "significant effect on the environment" as "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including ... air."

The Air Quality Section of Appendix G of the CEQA Guidelines (Environmental Checklist Form) contains a list of effects that may be deemed potentially significant. These are:

a) Conflict with or obstruct implementation of the applicable air quality plan;

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation;

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project is non-attainment under applicable federal or state ambient air quality standards (including releasing emissions which exceed quantitative thresholds for ozone precursors);

d) Expose sensitive receptors to substantial pollutant concentrations; or

e) Create objectionable odors affecting a substantial number of people.

For some types of impacts, the criteria listed above are straight forward, but in other cases, they require interpretation. A violation of air quality standards can be predicted for pollutants that can be modeled for atmospheric concentration. This is the case for carbon monoxide for which violations can be predicted using a dispersion model. Ozone, however, is the product of a photochemical reaction that may occur many miles away from the

source of emissions. Although atmospheric ozone models exist, they are only sensitive enough to register changes caused by the largest projects. What is more important for determining ozone impacts is a project's contribution to existing violations of the ozone standard in the SJV. By comparing a project's ozone precursor emissions with emission levels considered important under state law, this impact can be evaluated. One such level is the stationary source emissions offset threshold required by the CCAA. Additionally, the most common measure of significance for toxic air contaminants is an increase in cancer risk based on exposure levels for the nearest sensitive receptor, while odor impacts can be judged significant based on the number of complaints expected for each type of odor producing process. These criteria are described in greater detail below.

While CEQA Guidelines[26] state that an ironclad definition of a significant effect is not possible because the significance of an effect may vary with the setting, the SJVAPCD has determined that the setting, as referred to in CEQA, can be defined for air quality. Under California state law[27], the SJVAB is defined as a distinct geographic area with a critical air pollution problem for which ambient air quality standards have been promulgated to protect public health. As such, the SJVAPCD resolves that significance thresholds established herein are based on scientific and factual data. Therefore, the SJVAPCD recommends that these thresholds be used by Lead Agencies in making a determination of significance. However, it is still recognized that the final determination of whether or not a project has a significant effect is ultimately within the purview of the Lead Agency pursuant to CEQA Guidelines[28].

Basis for Ozone Precursor Thresholds. The entire SJVAB often violates state and federal ozone ambient air quality standards. Therefore, emissions related to an individual project, if substantial, will contribute to the existing violations of the ozone standards. The SJVAPCD defines "substantial contribution" for ozone precursor emissions in terms of CCAA requirements[29]. The SJVAPCD's New and Modified Stationary Source Review Rule - Offset Requirements for nitrogen oxides (NOx) and volatile organic compounds (VOCs) (in this document, equivalent to reactive organic gases [ROG])[30] reflects the CCAA requirements. Rule 2201 sets emissions thresholds above which stationary pollution sources must offset all emissions down to the thresholds. The offset thresholds vary depending on the severity of the pollution problem in each air basin and the type of pollutant. Areas categorized as severe ozone nonattainment areas such as the SJVAB have lower thresholds than areas categorized as having only a moderate ozone problem. The SJVAPCD staff also researched and evaluated many significance thresholds established by other air quality management agencies in California and found that most agencies use the same approach. Although it may be argued that any increase in pollutant emissions in an area with a severe pollution problem may be significant, a reasonable threshold is still

[26] CCR §15064(b)
[27] California Health and Safety Codes (CH&SC) §41100
[28] CCR §15064 (c)
[29] CH&SC §40920
[30] SJVAPCD Rule 2201, §4.2.3

needed to avoid unnecessarily burdening every project with a requirement to prepare an EIR, which is clearly not intended by CEQA nor desired by the SJVAPCD.

CEQA requires that in evaluating the significance of a project's potential air quality impacts, the Lead Agency shall consider both primary (direct) and secondary (indirect) consequences[31]. Primary impacts include emissions from project construction and emissions from motor vehicles traveling to and from the facility once it is operational. An example of a secondary impact would be the emissions associated with growth that may be facilitated by the expansion of a wastewater treatment plant.

Basis for PM-10 Thresholds. The entire SJVAB is a serious nonattainment area for PM-10 and any addition to the current PM-10 problem could be considered significant. However, the SJVAPCD has established regulations governing various activities that contribute to the overall PM-10 problem. The SJVAPCD has adopted a set of PM-10 Fugitive Dust Rules collectively called Regulation VIII. Several components of Regulation VIII specifically address fugitive dust generated by construction related activities. Therefore, the SJVAPCD has determined that any determination of significance with respect to construction emissions should be based on a consideration of the control measures to be implemented. From the perspective of the SJVAPCD, compliance with Regulation VIII for all sites and implementation of all other control measures indicated in Tables 6-2 and 6-3 (as appropriate, depending on the size and location of the project site) will constitute sufficient mitigation to reduce PM-10 impacts to a level considered less-than-significant.

4.3 THRESHOLDS OF SIGNIFICANCE

This section describes and establishes the SJVAPCD's Thresholds of Significance. These thresholds are recommended for use by Lead Agencies when preparing Initial Studies. If, during the preparation of the Initial Study, the Lead Agency finds that any of the following thresholds may be exceeded and cannot be mitigated, then a determination of significant air quality impact must be made and an EIR is required.

The SJVAPCD identifies thresholds that separate a project's short-term emissions from its long-term emissions. The short-term emissions are mainly related to the construction phase of a project and are recognized to be short in duration. The long-term emissions are mainly related to the activities that will occur indefinitely as a result of project operations. In addition, CEQA[32] states that another condition that could establish a project as having a significant effect on the environment is effects that are considered "cumulatively considerable." Thresholds for project construction impacts, project operations, and cumulative impacts are discussed below.

[31] CCR §15064 (d)
[32] PRC §21083(b)

4.3.1 Threshold of Significance for Project Construction Impacts

Pollutants of Concern. A project's construction phase produces many types of emissions, but PM-10 is the pollutant of greatest concern.[33] PM-10 emissions can result from a variety of construction activities, including excavation, grading, demolition, vehicle travel on paved and unpaved surfaces, and vehicle exhaust. Construction-related emissions can cause substantial increases in localized concentrations of PM-10, as well as affecting PM-10 compliance with ambient air quality standards on a regional basis. Particulate emissions from construction activities can lead to adverse health effects as well as nuisance concerns such as reduced visibility and soiling of exposed surfaces. Asbestos can also be of concern during demolition activity associated with construction. The use of diesel powered construction equipment produces ozone precursor emissions and combustion related particulate emissions. Large construction projects lasting many months may exceed the District's annual threshold for NOx emissions and could expose area residents to diesel particulate. Contact the SJVAPCD for analysis recommendations for large construction projects.

Qualitative Approach. The SJVAPCD's approach to CEQA analyses of construction PM-10 impacts is to require implementation of effective and comprehensive control measures rather than to require detailed quantification of emissions (although a Lead Agency may elect to do so - see Section 5 of this document for guidance). PM-10 emitted during construction can vary greatly depending on the level of activity, the specific operations taking place, the equipment being operated, local soils, weather conditions, and other factors, making quantification difficult. Despite this variability in emissions, experience has shown that there are a number of feasible control measures that can be reasonably implemented to significantly reduce PM-10 emissions from construction. The SJVAPCD has determined that compliance with Regulation VIII for all sites and implementation of all other control measures indicated in Tables 6-2 and 6-3 (as appropriate, depending on the size and location of the project site) will constitute sufficient mitigation to reduce PM-10 impacts to a level considered less-than-significant.

Common Measures. All control measures listed in Table 6-2 (Regulation VIII Control Measures) are required for all construction sites by regulation. Table 6-3 lists additional measures that may be required due to sheer project size or proximity of the project to sensitive receptors. If all appropriate "enhanced control measures" in Table 6-3 will not be implemented for these very large or sensitive projects, then construction impacts would be considered significant (unless the Lead Agency provides a satisfactory detailed explanation as to why a specific measure is unnecessary). Table 6-3 also lists additional control measures (Optional Measures) that may be implemented if further emission reductions are deemed necessary by the Lead Agency.

[33] The SJVAPCD recognizes that construction equipment also emits carbon monoxide and ozone precursor emissions. However, the SJVAPCD has determined that these emissions may cause a significant air quality impact only in the cases of very large or very intense construction projects. The SJVAPCD will advise Lead Agencies on quantification procedures and significance on a case by case basis.

Demolition Asbestos Impacts. Project construction sometimes requires the demolition of existing buildings at the project site. Buildings often include materials containing asbestos. Airborne asbestos fibers pose a serious health threat if adequate control techniques are not carried out when the material is disturbed. The demolition, renovation, or removal of asbestos-containing materials is subject to the limitations of the National Emissions Standards for Hazardous Air Pollutants (NESHAP) regulations as listed in the Code of Federal Regulations[34] requiring notification and inspection. Most demolitions and many renovations are subject to an asbestos inspection prior to start of activity. The SJVAPCD's Compliance Division in the appropriate region should be consulted prior to commencing any demolition or renovation of any building to determine inspection and compliance requirements. Strict compliance with existing asbestos regulations will normally prevent asbestos from being considered a significant adverse impact.

4.3.2 Thresholds of Significance for Impacts from Project Operations

The term "project operations" refers to the full range of activities that can or may generate pollutant emissions when the development is functioning in its intended use. For projects such as office parks, shopping centers, residential subdivisions, and other indirect sources, motor vehicles traveling to and from the projects represent the primary source of air pollutant emissions. For industrial projects and some commercial projects, equipment operation and manufacturing processes can be of greatest concern from an emissions standpoint. Significance thresholds discussed below address the impacts of these emission sources on local and regional air quality. Thresholds are also provided for other potential impacts related to project operations, such as odors and toxic air contaminants.

(Lead Agencies may refer to Section 5, for guidance on calculating emissions and determining whether significance thresholds for project operations may be exceeded, and thus whether more detailed air quality analysis may be needed.)

Ozone Precursor Emissions Threshold. Ozone precursor emissions from project operations should be compared to the thresholds provided in Table 4-1. Projects that emit ozone precursor air pollutants in excess of the levels in Table 4-1 will be considered to have a significant air quality impact.

Both direct and indirect emissions should be included when determining whether the project exceeds these thresholds. The following total emissions thresholds for air quality have been established by the SJVAPCD for project operations. Projects in the SJVAB with operation-related emissions that exceed these emission thresholds will be considered to have significant air quality impacts.

[34] 40CFR Part 61, Subpart M

Table 4-1
Ozone Precursor Emissions Thresholds
For Project Operations

Pollutant	Tons/yr.
ROG	10
NOx	10

Local Carbon Monoxide Concentrations Threshold. Estimated CO concentrations, as determined by an appropriate model, exceeding the California Ambient Air Quality Standard (CAAQS) of 9 parts per million (ppm) averaged over 8 hours and 20 ppm for 1 hour will be considered a significant impact.

Odor Impacts Threshold. While offensive odors rarely cause any physical harm, they can be very unpleasant, leading to considerable distress among the public and often generating citizen complaints to local governments and the SJVAPCD. Any project with the potential to frequently expose members of the public to objectionable odors will be deemed to have a significant impact. Odor impacts on residential areas and other sensitive receptors, such as hospitals, day-care centers, schools, etc., warrant the closest scrutiny, but consideration should also be given to other land uses where people may congregate, such as recreational facilities, worksites, and commercial areas. Analysis of potential odor impacts should be conducted for the following two situations:

- **Generators** – projects that would potentially generate odorous emissions proposed to locate near existing sensitive receptors or other land uses where people may congregate, *and*

- **Receivers** – residential or other sensitive receptor projects or other projects built for the intent of attracting people locating near existing odor sources.

The SJVAPCD has determined some common types of facilities that have been known to produce odors in the SJV. These are presented in Table 4-2 along with a reasonable distance from the source where the degree of odors could possibly be significant.

A Lead Agency should use Table 4-2 to determine whether the proposed project, either as a generator or a receiver, would result in sensitive receptors being within the distances indicated in Table 4-2. In addition, recognizing that this list of facilities is not meant to be all-inclusive, the Lead Agency should evaluate facilities not included in the table or projects separated by greater distances than indicated in Table 4-2 if warranted by local conditions or special circumstances. If the proposed project would result in sensitive receptors being located closer than the screening level distances indicated in Table 4-2, a more detailed analysis, as described in Section 5, should be conducted.

Table 4-2
Project Screening Trigger Levels
For Potential Odor Sources

Type of Facility	Distance
Wastewater Treatment Facilities	2 miles
Sanitary Landfill	1 mile
Transfer Station	1 mile
Composting Facility	1 mile
Petroleum Refinery	2 miles
Asphalt Batch Plant	1 mile
Chemical Manufacturing	1 mile
Fiberglass Manufacturing	1 mile
Painting/Coating Operations (e.g. auto body shops)	1 mile
Food Processing Facility	1 mile
Feed Lot/Dairy	1 mile
Rendering Plant	1 mile

Because offensive odors rarely cause any physical harm and no requirements for their control are included in state or federal air quality regulations, the SJVAPCD has no rules or standards related to odor emissions, other than its nuisance rule[35]. Any actions related to odors are based on citizen complaints to local governments and the SJVAPCD. Lead Agencies can make a determination of significance based on a review of District complaint records as described in Section 5. For a project locating near an existing source of odors, the impact is potentially significant when the project site is at least as close as any other site that has already experienced significant odor problems related to the odor source. Significant odor problems are defined as:

- more than one confirmed complaint per year averaged over a three year period, or
- three unconfirmed complaints per year averaged over a three-year period.

For projects locating near a source of odors where there is currently no nearby development *and* for odor sources locating near existing receptors, the determination of significance should be based on the distance and frequency at which odor complaints from the public have occurred in the vicinity of a similar facility.

If a proposed project is determined to be a potentially significant odor source, mitigation measures should be required. For some projects, operational changes, add-on controls, or process changes, such as carbon absorption, incineration, or relocation of stacks/vents can reduce odorous emissions. In many cases, however, the most effective mitigation strategy

[35] Rule 4102 of the SJVAPCD's Rules and Regulations and the California Health and Safety Codes Section 41700.

is to provide a sufficient distance, or buffer zone, between the source and the receptor(s). Recent experience has shown that locating upwind from an odor source does not necessarily eliminate potential problems. Even places with reliable prevailing winds experience days with light and variable winds and days with winds opposite prevailing winds related to the passage of storms. Residents in these upwind areas while exposed less frequently may be more sensitive to the odors.

Hazardous Air Pollutants (HAPs). Any project with the potential to expose sensitive receptors (including residential areas) or the general public to substantial levels of toxic air contaminants would be deemed to have a potentially significant impact. This applies to receptors locating near existing sources of toxic air contaminants, as well as sources of toxic air contaminants locating near existing receptors.

Particular attention should be placed on either the location of a facility that has the potential to emit hazardous air pollutants near an existing school or the location of a new school site near facilities that have the potential to emit HAPs. Both scenarios have specific regulations that govern agency actions, as discussed in Section 3.

Proposed development projects that have the potential to expose the public to toxic air contaminants in excess of the following thresholds in Table 4-3 would be considered to have a significant air quality impact. These thresholds are based on the SJVAPCD's Risk Management Policy.

Table 4-3
Thresholds of Significance for Toxic Air Contaminants

- Probability of contracting cancer for the Maximally Exposed Individual (MEI) exceeds 10 in one million.
- Ground-level concentrations of non-carcinogenic toxic air contaminants would result in a Hazard Index greater than 1 for the MEI.

There are currently more than 900 substances classified as hazardous air pollutants by the ARB and USEPA. All projects requiring air quality permits from the SJVAPCD are evaluated for HAP emissions. Examples of projects requiring permits are provided in Figure 1-2. All such projects should be referred to the SJVAPCD as part of the CEQA review process.

Accidental Releases/Acutely Hazardous Air Emissions. The determination of significance for potential impacts from accidental releases of acutely hazardous air pollutants should be made in consultation with the local administering agency of the Risk Management Prevention Program. The county health department, Office of Emergency Services, or local fire department is usually the administering agency.

Cumulative Impacts. Any proposed project that would individually have a significant air quality impact (see Section 4.3.2 – Thresholds of Significance for Impacts from Project Operations) would also be considered to have a significant cumulative air quality impact. Impacts of local pollutants (CO, HAPs) are cumulatively significant when modeling shows that the combined emissions from the project and other existing and planned projects will exceed air quality standards. See also Section 5.9.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Final Subsequent Environmental Assessment for:

Proposed Amended Rule 1168 – Adhesive and Sealant Applications

December 22, 2004

SCAQMD No. 041104JKK

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PREFACE

This document constitutes the Final Subsequent Environmental Assessment (EA) for Proposed Rule 1168 – Adhesive and Sealant Applications. A Draft SEA was released for a 45-day public review and comment period from October 13, 2004, to November 30, 2004. One comment letter was received from the public and is included for completeness in Appendix C. During the review and comment period for the Draft SEA, PAR 1168 was modified to delay the VOC content limit requirement of 250 grams of VOC per liter for two years from January 1, 2005, to January 1, 2007. This delay was estimated to forego 414 pounds of VOC per day. This modification was determined to be significant and require recirculation pursuant to CEQA Guidelines §15088.5. Therefore, the Draft SEA was modified and released as a Revised Draft SEA. The Revised Draft SEA included a clear statement that the Governing Board may choose all or part of any of the alternatives even if the alternative or portion of the alternative may generate environmental impacts that are significantly worse than those proposed in the project, as long as the impact is evaluated as part of the alternative analysis. The Revised Draft SEA was released for a 45-day public review and comment period from November 5, 2004, to December 21, 2004. No comment letters were received from the public on the Revised Draft SEA.

After to the release of the revised draft subsequent EA, PAR 1168 was modified to delay the implementation of the 550 gram per liter final VOC content limit requirement for PVC and CPVC primer and the 325 gram per liter final VOC content limit requirement for ABS Welding from January 1, 2005, to July 1, 2005. The delay will allow manufactures to obtain National Sanitation Foundation (NSF) commercial approval. By delaying the new VOC content limit requirements for PVC/CPVC, 0.51 ton (1,024 pounds) per day of VOC emission reductions would be foregone between January 1, 2005 and July 1, 2005. The 0.52 ton (1,024 pounds) per day of VOC emission reductions foregone between January 1, 2005 and July 1, 2005 are greater than the SCAQMD significance threshold of 55 pounds of VOC per day; therefore, the delay is a significant change.

The delay of the PVC and CPVC primer and ABS welding VOC content limit requirements from January 1, 2005, to July 1, 2005 is considered to be within the scope of the analysis of the environmental impacts resulting from implementing Alternative C. The Revised Draft SEA clearly presented Alternative C and the adverse environmental impacts from choosing Alternative C. Therefore, it was not necessary to recirculate Revised Draft SEA, in this situation, since the adverse environmental impacts of Alternative C were fully disclosed to the public in the Revised Draft SEA.

The Revised Draft EA contained the November 4, 2004 version of PAR 1168. Modifications have been made to the proposed Draft EA in accordance with changes to the Staff Report and Proposed Rule for clarity and continuity.

Aside from the modifications to delay PVC and CPVC primer and ABS welding compliance date discussed in the previous paragraph, no modifications alter any conclusions reached in the Draft EA, nor provide new information of substantial importance relative to environmental impacts in the draft document. For this reason and the fact that modifiying the compliance date for PVC and CPVC primers and ABS welding adhesives was addressed as part of the analysis of Alternative C, recirculation of the Draft EA pursuant to California Environmental Quality Act (CEQA) Guidelines §15088.5 is not required.

To facilitate identifying modifications to the document, modifications to the document are included as underlined text and text removed from the document is indicated by ~~strikethrough~~.

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CHAPTER 1

EXECUTIVE SUMMARY

Introduction
California Environmental Quality Act
CEQA Documentation for Rule 1168 – Adhesive and Sealant Applications
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Executive Summary

INTRODUCTION

The California Legislature created the South Coast Air Quality Management District (SCAQMD) in 1977[1] as the agency responsible for developing and enforcing air pollution control rules and regulations in the South Coast Air Basin and portions of the Salton Sea Air Basin and Mojave Desert Air Basin. By statute, the SCAQMD is required to adopt an air quality management plan (AQMP) demonstrating compliance with all federal and state ambient air quality standards for the district[2]. Furthermore, the SCAQMD must adopt rules and regulations that carry out the AQMP[3]. The 2003 AQMP concluded that major reductions in emissions of volatile organic compounds (VOCs) and oxides of nitrogen (NOx) are necessary to attain the air quality standards for ozone and particulate matter (PM10).

With stationary and mobile sources being the major producers of VOC emissions, which contribute to ozone formation, reducing the quantity of VOC emissions within the jurisdiction of the SCAQMD has been an on-going priority and effort by the SCAQMD. Because materials used in adhesive and sealant operations are considered by SCAQMD as one potential source where VOC emission reductions can be achieved, in April 1989, Rule 1168 – Adhesive and Sealant Applications, was adopted. Since its adoption, Rule 1168 has been amended twelve times, with the most recent amendments occurring in 2003.

Under the current version of Rule 1168, emissions are controlled by limiting the VOC content, measured in grams per liter, of the adhesives and sealants used and applied within the SCAQMD's jurisdiction. Rule 1168 also prohibits the use of certain toxic chemicals in adhesives and sealants.

A draft Subsequent Environmental Assessment (SEA) for the proposed project was released for a 45-day public review period on October 13, 2004. During the 45-day public review period, it was determined that the final VOC limit for the top and trim adhesive category could not be met by the existing January 1, 2005 effective date. PAR 1168 was modified to delay the VOC content requirement for top and trim adhesives for two years, effective January 1, 2007. This modification ~~would make~~ made an existing significant adverse impact substantially worse; therefore, requiring recirculation of the 2004 Draft SEA as a Revised Draft SEA. ~~The following describes the amendments proposed to the Rule evaluated by the 2004 Draft SEA and a revised evaluation that includes a two-year extension for the final VOC content limit for top and trim adhesives~~:

After the release of the Revised Draft SEA, PAR 1168 was modified to delay the implementation of a proposed VOC content limit requirements of 550 grams per liter for PVC/CPVC and 325 grams per liter for ABS welding from January 1, 2005 to July 1, 2005. By delaying the new VOC content limit requirements for PVC/CPVC, 0.51 ton (1,024 pounds) per day of VOC emission reductions would be foregone between January 1, 2005 and July 1, 2005.

[1] The Lewis-Presley Air Quality Management Act, 1976 Cal. Stats., ch 324 (codified at Health & Safety Code, §§40400-40540).
[2] Health & Safety Code, §40460 (a).
[3] Health & Safety Code, §40440 (a).

The delay of the PVC and CPVC primer and ABS welding VOC content limit requirements from January 1, 2005, to July 1, 2005 is considered to be within the scope of the analysis of the environmental impacts resulting from implementing Alternative C. The Revised Draft SEA clearly presented Alternative C and the adverse environmental impacts from choosing Alternative C. The Revised Draft SEA also clearly states that the Governing Board can choose all or part of any of the alternative even if the alternative or portion of the alternative may generate environmental impacts that are significantly worse than those proposed in the project as long as these impacts were disclosed in the CEQA document circulated for public review. Therefore, since the modifications to PAR 1168 made subsequent to the release of the Revised Draft EA are considered to be within the scope of the analysise of the project alternatives, the Governing Board may adopt this modification or any other alternative or portion of an alternative that may generate environmental impacts that are significantly worst than those proposed in the project.

One comment letter was received on the Draft SEA. In the comment letter, the Southern California Association of Governments (SCAG) states that it has determined that PAR 1168 is not regionally significant per SCAG's Intergovernmental Review (IGR) Criteria and CEQA Guidelines. This letter and a response is included in Appendix C for completeness. No comment letters were received on the Revised Draft SEA.

~~Draft Subsequent Environmental Assessment~~ Proposed Project

The following summarizes the main components of PAR 1168~~On October 13, 2004, a Draft SEA was released that proposed to amend Rule 1168 with the following~~:

- Delay the January 1, 2005 Final VOC limit of 250 grams of VOC per liter compliance date for two years from January 1, 2005, to January 1, 2007. Consequently, the interim VOC limit of 540 grams of VOC per liter for top and trim adhesives would be extended until January 1, 2007.
- Rescind the January 1, 2005, prohibition of methylene chloride used to bond hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications. The proposed amended rule would allow the use of solvent welding formulations containing methylene chloride used to bond hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications provided the concentration of methylene chloride does not exceed 60 percent by weight and the purchase of all methylene chloride welding products for hard sheet plastic does not exceed 20 gallons per calendar year at a single facility.
- Rescind the January 1, 2005, 285 grams per liter VOC content limit requirement for solvent cements used to weld polyvinyl chloride (PVC) plastic pipes and fittings, and instead keep the PVC welding VOC content limit requirement at the interim 510 grams per liter.
- Rescind the January 1, 2005, 270 grams per liter VOC content limit requirement for solvent cements used to weld chlorinated polyvinyl chloride (CPVC) plastic pipes and fittings, and instead keep the CPVC welding VOC content limit requirement at the interim 490 grams per liter.
- Rescind the January 1, 2005 VOC content limit requirement of 250 grams per liter, and extend the interim VOC content limit requirement for adhesive primers for plastic of 650 grams per liter from the January 1, 2005 effective date to July 1, 2005. On July, 1, 2005,

reduce the VOC content limit requirement for these primers from 650 grams per liter to 550 grams per liter. ~~Replace the January 1, 2005 VOC content limit requirement for PVC/CPVC primers of 250 grams per liter with a VOC content limit requirement of 550 grams per liter. This new 550 gram per liter VOC content limit is lower that the existing PVC/CPVC primers VOC content limit of 600 grams per liter.~~

- Lower the acrylonitrile-butadiene-styrene (ABS) welding VOC content limit requirement to 325 grams per liter which is currently at 400 grams per liter on July 1, 2005.

~~Based on the volume of affected adhesives currently used, the amount of VOC emission reductions permanently foregone presented in the 2004 Draft SEA was 0.61 ton (1,220 pounds) per day. These reductions permanently foregone exceed the SCAQMD's daily VOC significance threshold of 55 pounds per day.~~

~~**Revision to the Draft Subsequent Environmental Assessment**~~

~~Subsequent to the release of the 2004 Draft SEA, top and trim adhesive manufacturers presented evidence that the 250 grams of VOC per liter top and trim adhesives do not meet performance standards required by the industry. Therefore, PAR 1168 was modified to delay the Final VOC limit of 250 grams of VOC per liter compliance date for two years from January 1, 2005, to January 1, 2007. Consequently, the interim VOC limit of 540 grams of VOC per liter for top and trim adhesives would be extended until January 1, 2007.~~

~~The 2003 Final SEA estimated that 0.21 ton per day (414 pounds per day) of VOC emissions reductions were delayed by replacing the Final VOC limit of 250 gram of VOC per liter with the interim VOC limit of 540 grams of VOC per liter. Therefore, extending the interim VOC limits until January 1, 2007 would delay an additional 0.21 ton per day (414 pounds per day) of VOC emissions reductions until January 1, 2007.~~

~~The additional 0.21 ton per day (414 pounds per day) of VOC emissions reductions delayed is considered to be substantial increase in the severity of an existing significant adverse air quality impact because it exceeds the SCAQMD's daily VOC significance threshold of 55 pounds per day. Therefore, the revision to delay the top and trim adhesive final VOC limit until January 1, 2007 is determined to be a significant change requiring recirculation, because it is a substantial increase in the severity of an environmental impact (CEQA Guidelines §15088.5(a)(2).~~

Emissions Reductions Delayed and Foregone

~~The amount of VOC emission reductions permanently foregone from the 2004 Draft SEA and the revised VOC emission reductions delayed from extending the interim VOC limit for top and trim until January 1, 2007 would be 1,640 pounds (0.82 ton) per day, which would exceed the SCAQMD's daily VOC significance threshold of 55 pounds per day. After January 1, 2007, the final VOC content limit for top and trip adhesive would become effective and the amount of VOC emission reductions permanently foregone would be 0.61 ton (1,220 pounds) per day.~~

Based on the volume of affected adhesives currently used, the amount of VOC emission reductions foregone on January 1, 2005 would be 1.05 ton (2,096 pounds) per day on January 1, 2005. On July 1, 2005, the amount of VOC emission reductions foregone would be 0.81 ton (2,096 pounds) per day, when the new VOC content limit requirements for PVC/CPVC primers and ABS welding become effective. On January 1, 2007, the VOC emission reductions foregone would be 0.61 ton (1,206 pounds) per day, when the Final VOC content limit requirement for top and trim adhesives becomes effective. These reductions foregone exceed the SCAQMD's daily VOC significance threshold of 55 pounds per day.

~~Pursuant to the California Environmental Quality Act (CEQA) (California Public Resources Code §§21000 et seq.), this Revised Draft~~ Final ~~SEA was prepared because the currently proposed project is considered to be a modification of the amendments to Rule 1168 approved by the Governing Board on June 7, 2002 and October 3, 2003, respectively. A Draft SEA is~~ was ~~appropriate because the project is a modification of a previously adopted project. A Revised Draft SEA is~~ was ~~appropriate to evaluate modifications to the previously proposed project, which is expected to generate additional adverse environmental impacts from extending the interim VOC limits for top and trim adhesives until January 1, 2007, since the proposed changes are considered a significant change requiring recirculation.~~'

CALIFORNIA ENVIRONMENTAL QUALITY ACT

The proposed amendments to Rule 1168 are a "project" as defined by CEQA (California Public Resources Code §21080.5). SCAQMD is the lead agency for the proposed project and has prepared appropriate an environmental analysis pursuant to its certified regulatory program (SCAQMD Rule 110). California Public Resources Code §21080.5 allows public agencies with regulatory programs to prepare a plan or other written document in lieu of an environmental impact report once the Secretary of the Resources Agency has certified the regulatory program. The SCAQMD's regulatory program was certified by the Secretary of the Resources Agency on March 1, 1989, and is codified as SCAQMD Rule 110.

CEQA requires that the potential adverse environmental impacts of proposed projects be evaluated and that feasible methods to reduce or avoid significant adverse environmental impacts of these projects be identified. To fulfill the purpose and intent of CEQA, the SCAQMD has prepared a ~~Revised Draft~~ Final SEA to address the potential environmental impacts associated with the currently proposed amendments to Rule 1168. The preparation of a Draft SEA ~~is~~ was necessary because the proposed project is a modification to previously approved projects, the June 2002 and October 2003 amendments to Rule 1168, for which a 2002 Final EA and 2003 Final SEA were prepared and certified by the Governing Board on June 7, 2002 and October 3, 2004, respectively.

Further, in accordance with CEQA Guidelines §15162 a Draft SEA was prepared because the modifications to the previously approved project consist of substantial changes which will require major revisions to the previously certified 2002 Final EA and 2003 Final SEA due to a substantial increase in the severity of previously identified significant effects.

Subsequent to the release of the 2004 Draft SEA, PAR 1168 was revised to include a provision to delay the January 1, 2005 VOC content limit requirement for top and trim adhesives for two years until January 1, 2007. The revision would delay an additional 414 pounds of VOC emission reductions per day, which exceeds the VOC significance threshold of 55 pounds of VOC per day. This modification and associated air quality impacts constitutes substantial new information requiring recirculation of the 2004 Draft SEA as a Revised Draft SEA pursuant to CEQA Guidelines §15088.5(a)(2). ~~This~~ The Revised Draft SEA ~~is~~ was intended to: (a) provide the lead agency, responsible agencies, decision makers and the general public with detailed information on the environmental effects of the proposed project; and, (b) to be used as a tool by decision makers to facilitate decision making on the proposed project.

After the release of the Revised Draft SEA, PAR 1168 was modified to delay the implementation of a proposed VOC content limit requirements of 550 grams per liter for PVC/CPVC and 400 grams per liter from January 1, 2005 to July 1, 2005. By delaying the proposed VOC content limit requirements for PVC/CPVC, 0.51 ton (1,024 pounds) per day of VOC emission reductions would be foregone between January 1, 2005 and July 1, 2005. These VOC emissions are considered foregone, because the existing Rule 1168 VOC content limit requirement of 250 grams per liter for PVC/CPVC primers was expected to become effective on January 1, 2005. In addition, 0.11 ton (220 pounds) per day of VOC emissions reductions would begin on July 1, 2005, instead of on January 1, 2005, as proposed in the Revised Draft SEA. The 0.11 ton (220 pounds) per day of VOC emissions reductions are not considered foregone, because the proposed VOC content limit is not a current requirement, as it had not previously been presented to, or adopted by the Governing.

While the emissions reductions foregone from the delay of PVC and CPVC primer and ABS welding VOC content limit requirements from January 1, 2005, to July 1, 2005 is a modification to the previously proposed project, this modification is considered to be within the scope of the analysis of the environmental impacts resulting from implementing Alternative C. The Revised Draft SEA clearly presented Alternative C and the adverse environmental impacts from choosing Alternative C. The Revised Draft SEA also clearly states that the Governing Board can choose all or part of any of the alternative even if the alternative or portion of the alternative may generate environmental impacts that are significantly worst than those proposed in the project as long as these impacts were disclosed in the CEQA document circulated for public review. Therefore, the Governing Board may adopt this modification or any other alternative or portion of an alternative that may generate environmental impacts that are significantly worst than those proposed in the project.

CEQA DOCUMENTATION FOR RULE 1168 – ADHESIVE AND SEALANT APPLICATIONS

This ~~Revised Draft~~ Final SEA is a comprehensive environmental document that analyzes the environmental impacts from the currently proposed amendments to Rule 1168. SCAQMD rules, as ongoing regulatory programs, have the potential to be revised over time due to a variety of factors (e.g., regulatory decisions by other agencies, new data, and lack of

progress in advancing the effectiveness of control technologies to comply with requirements in technology forcing rules, etc.). The other documents which comprise the CEQA record for the currently proposed amendments to Rule 1168, include the 2004 Revised Draft Subsequent Environmental Assessment (October 2004), the 2003 Final Subsequent Environmental Assessment for Proposed Amended Rule 1168 (September 2003), the 2002 Final Environmental Assessment for Proposed Amended Rule 1168 (May 2002), and the Notice of Preparation/Initial Study (December 2001). The following is a summary of the contents of these documents.

Revised Draft Subsequent Environmental Assessment (SEA) for the Proposed Amendments to Rule 1168, November 4, 2004 (SCAQMD No. 0041404JKK): A Revised Draft SEA was prepared to address VOC emission reductions foregone from postponing the final VOC content limit for top and trim adhesives until January 1, 2007. In addition, the Revised Draft SEA clearly states that the Governing Board can choose all or part of any of the alternative even if the alternative or portion of the alternative may generate environmental impacts that are significantly worst than those proposed in the project as long as these impacts were disclosed in the document circulated for public review.. The Revised Draft SEA was released for a 45-day public review period from November 5, 2004 to December 21, 2004.

Draft Subsequent Environmental Assessment (SEA) for the Proposed Amendments to Rule 1168, October 13, 2004 (SCAQMD No. 0041012JKK): A Draft SEA for the proposed amendments to Rule 1168 was released for a 45-day public review period from October 13, 2004, to November 30, 2004. The analysis showed that there were potential adverse environmental effects that may result from implementing the proposed amendments. The Draft SEA identified "air quality" as the only area that may be adversely affected by the proposed project. One comment letter was received on the Draft SEA. After circulation of the Draft SEA, it was determined that the top and trim adhesives would not be able to meet the January 1, 2005 VOC content limits. Therefore, ~~this~~ a Revised Draft SEA was prepared, which includes VOC emission reductions delayed from postponing the final VOC content limit for top and trim adhesives until January 1, 2007, and recirculated for public review.

Final Subsequent Environmental Assessment (SEA) for the Proposed Amendments to Rule 1168, September 2003 (SCAQMD No. 080703BAR): A Draft EA for the proposed amendments to Rule 1168 was released for a 45-day public review period from August 8, 2003, to September 23, 2003. The analysis showed that there were potential adverse environmental effects that may result from implementing the proposed amendments. The Draft EA identified "air quality" as the only area that may be adversely affected by the proposed project. After circulation of the Draft SEA, a Final SEA was prepared and certified by the SCAQMD Governing Board on October 3, 2003.

Final Environmental Assessment (EA) for the Proposed Amendments to Rule 1168, May 2002 (SCAQMD No. 121101BAR): A Draft EA for the proposed amendments to Rule 1168 was released for a 45-day public review period from March 5, 2002, to April 19, 2002. The analysis showed that there were potential adverse environmental effects that may result from implementing the proposed amendments. The Draft EA identified "air quality"

as the only area that may be adversely affected by the proposed project. After circulation of the Draft EA, a Final EA was prepared and certified by the SCAQMD Governing Board on June 7, 2002.

Notice of Preparation/Initial Study (NOP/IS) of an Environmental Assessment (EA) for the Proposed Amendments to Rule 1168, December 2001 (SCAQMD No. 121101BAR): The NOP/IS of an EA for the proposed amendments to Rule 1168 was released for a 30-day public review period from December 11, 2001, to January 9, 2002. The NOP was released with an Initial Study, which contained a brief project description and the environmental checklist, as required by CEQA Guidelines. The environmental checklist contained a preliminary analysis of potential adverse environmental effects that may result from implementing the proposed amendments. The NOP/IS identified "air quality" as the only area that may be adversely affected by the proposed project.

Other CEQA Documents for Rule 1168

Several previous environmental analyses have been prepared to analyze past amendments to Rule 1168 and are summarized in the following paragraphs. The following summaries of previous CEQA documents are included for informational purposes only. The current SEA focuses on the currently proposed amendments to Rule 1168 and does not rely on these previously prepared EAs. These documents can still be obtained by contacting the SCAQMD's Public Information Center at (909) 396-2039 or the following e-mail address: ceqa_admin@aqmd.gov.

Final Environmental Impact Report (EIR) for Proposed Rule 1168 – Adhesive Applications, March 1989 (SCH No. 88092110 for Rule 1168, Adopted April 1989): Proposed Rule 1168 was considered a "technology forcing" rule that established interim and final VOC content limits for a variety of adhesive products. The EIR was circulated for a 30-day public review and comment period. The EIR analyzed potential adverse impacts from the proposed project in the following environmental areas: air quality, water quality, energy, risk of upset, public health, indirect environmental effects from economic impacts, solid waste impacts, public service impacts, and transportation. Air quality impacts (indirect emissions from add on air pollution control equipment), energy impacts, and solid waste impacts were concluded to be significant as a result of implementing the proposed project.

Final Environmental Impact Report (EIR) for Proposed Rule 1168 – Adhesive Applications, March 1989 (SCH No. 88092110 for Rule 1168, Amended March 1990): The proposed amendments extended the final compliance for one year for several categories of adhesive products. The SCAQMD concluded that impacts from the proposed project were essentially identical to those identified for Rule 1168 when it was originally adopted. Therefore, the previously prepared Final EIR served as the CEQA document for the proposed project. The previously prepared Final EIR was recertified on March 2, 1990.

Notice of Exemption (NOE) From CEQA for Proposed Amended Rule 1168 – Control of VOC Emissions From Adhesive Applications, June 1991 (for Rule 1168, Amended July 1991): The proposed amendments exempted aerosol spray can adhesives from the transfer efficiency requirements in the rule. The SCAQMD concluded that the proposed

amendments had no significant affect on air quality or emission limitations. Therefore, pursuant to the categorical exemption in CEQA Guidelines §15308 (Class 8 – Actions by Regulatory Agency for Protection of the Environment), a Notice of Exemption was prepared for the proposed project.

Final Staff Report for Proposed Rule 1168 – Solvent Cleaning Operations, Consisting of the Rule Development Assessment, the Environmental Assessment (EA), and the Socioeconomic Impact Assessment, July 1991 (SCAQMD No. 910626MG for Rule 1168, Amended August 1991): The Draft Staff Report, which included the Draft EA, was made available for a 30-day public review and comment period beginning June 26, 1991 and ending July 26, 1991. Though the Draft Staff Report was primarily focused on the adoption of Proposed Rule 1171, the solvent cleaning requirements for the use, storage and disposal of VOC-containing materials in Rule 1168 were also proposed to be superceded by the new requirements in Rule 1171. As a result, the document concluded that the most prevalent type of environmental impacts from adopting Proposed Rule 1171 and amending Rule 1168 were secondary cross-media impacts such as solid waste and disposal of aqueous wastes. However, the potential impacts were reduced to insignificance by requiring implementation of mitigation measures. No other impacts were identified.

Final Staff Report for Proposed Amended Rule 1168 – Adhesive Applications, Consisting of the Rule Development Assessment, the Supplemental Environmental Assessment (EA), and Socioeconomic Impact Assessment November 1992 (SCAQMD No. 921021MG for Rule 1168, Amended December 1992): The Draft Staff Report, which included the Draft Supplemental EA, was made available for a 30-day public review and comment period beginning October 22, 1992, and ending November 22, 1992. The proposed amendments to Rule 1168 delayed implementation of some interim and final VOC content requirement reductions for specified adhesive products. The amount of VOC emission reductions delayed as a result of implementing the proposed amendments exceeded the applicable SCAQMD VOC significance threshold. As a result, the document concluded that the proposed project would generate significant adverse air quality impacts. No other significant adverse impacts were identified.

Notice of Exemption (NOE) From CEQA for Proposed Amended Rule 1168 – Control of VOC Emissions From Adhesive Applications, November 1993 (for Rule 1168, Amended December 1993): The proposed amendments clarified the definition in the previous amendments regarding subfloor roofing adhesives. The SCAQMD concluded that the proposed amendments were administrative in nature and had no significant affect on air quality or emission limitations. Therefore, pursuant to the general rule exemption §15061(b)(3) of the CEQA Guidelines, a Notice of Exemption was prepared for the proposed project.

Final Supplemental Environmental Assessment (EA) for Proposed Amended Rule 1168 – Control of VOC Emissions From Adhesive Applications, 1997 (SCAQMD No. 961215JN for Rule 1168, Amended April 1997): The Draft Supplemental EA was made available for a 45-day review period starting December 16, 1996, and ending January 31, 1997. The proposed amendments extended final compliance dates and exemptions for

certain categories of adhesives. Air quality impacts were considered to be significant because the proposed amendments delayed previously anticipated future emission reductions from certain adhesive applications. No other significant adverse impacts from implementing the proposed project were identified.

Final Supplemental Environmental Assessment (EA) for Proposed Amended Rule 1168 – Adhesive Applications, January 16, 1998 (SCAQMD No. 981202JDN for Rule 1168, Amended February 1998): The Draft Supplemental EA was released for a 45-day review period (December 2, 1997 to January 15, 1998). The proposed amendments to Rule 1168 addressed both the EPA's comments on Rule 1168 and the SCAQMD Governing Board's direction to evaluate Rule 1168 exemptions (j)(12) through (j)(17) (scheduled to sunset on January 1, 1998). It was concluded in the Supplemental EA that, if exemption (j)(17) is used to the fullest degree, the amended rule would result in a loss of future VOC emission reductions in an amount that exceeds the SCAQMD VOC significance threshold. Therefore, potential project-specific air quality impacts of proposed amended Rule 1168 were considered significant. No other significant adverse environmental impacts were identified.

Final Environmental Assessment (EA) for Proposed Amended Rule 1168 – Adhesive and Sealant Applications, August 2000 (SCAQMD No. 2507001168JDN for Rule 1168, Amended September 2000): The amendments to Rule 1168 implemented AQMP control measure CTS-02E to obtain additional VOC emission reductions from specified categories of adhesives. The amendments were expected to reduce VOC emissions from applicable sources by approximately five tons per day. No significant adverse environmental impacts were identified for the proposed project. The Draft EA was released for a 30-day public review and comment period.

INTENDED USES OF THIS DOCUMENT

In general, a CEQA document is an informational document that informs a public agency's decision-makers and the public generally of potentially significant adverse environmental effects of a project, identifies possible ways to avoid or minimize the significant effects, and describes reasonable alternatives to the project (CEQA Guidelines §15121). A public agency's decision-makers must consider the information in a CEQA document prior to making a decision on the project. Accordingly, this ~~Revised Draft~~ Final SEA is intended to: (a) provide the SCAQMD Governing Board and the public with information on the environmental effects of the proposed project; and, (b) be used as a tool by the SCAQMD Governing Board to facilitate decision making on the proposed project.

Additionally, CEQA Guidelines §15124(d)(1) requires a public agency to identify the following specific types of intended uses of a CEQA document:

1. A list of the agencies that are expected to use the SEA in their decision-making;
2. A list of permits and other approvals required to implement the project; and
3. A list of related environmental review and consultation requirements required by federal, state, or local laws, regulations, or policies.

To the extent that local public agencies, such as cities, county planning commissions, et cetera, are responsible for making land use and planning decisions related to projects that

must comply with the proposed amendments to Rule 1168, they could possibly rely on this SEA during their decision-making process. Similarly, other single purpose public agencies approving projects at facilities complying with the proposed amendments to Rule 1168 may rely on this SEA.

EXECUTIVE SUMMARY

CEQA Guidelines §15123 requires a CEQA document to include a brief summary of the proposed actions and their consequences. In addition, areas of controversy including issues raised by the public must also be included in the executive summary. This Revised Draft SEA consists of the following chapters: Chapter 1 – Executive Summary; Chapter 2 – Project Description; Chapter 3 – Existing Setting, Chapter 4 – Potential Environmental Impacts and Mitigation Measures; Chapter 5 – Project Alternatives; Chapter 6 - Other CEQA Topics and various appendices. The following subsections briefly summarize the contents of each chapter.

Summary of Chapter 1 – Executive Summary

Chapter 1 includes a discussion of the legislative authority that allows the SCAQMD to amend and adopt air pollution control rules, identifies general CEQA requirements and the intended uses of this CEQA document, and summarizes the remaining five chapters that comprise this ~~Revised Draft~~ Final SEA.

Summary of Chapter 2 - Project Description

The following summarizes the main components of PAR 1168:

- Extend the 540 grams per liter interim VOC content limit for top and trim adhesives to January 1, 2007. The effective date for the final VOC content limit of 250 grams per liter for top and trim adhesives under the current rule is January 1, 2005. Therefore, the effective date for the final VOC content limit of 250 grams per liter for top and trim adhesives would be delayed until January 1, 2007.
- Rescind the January 1, 2005, prohibition of methylene chloride used to bond hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications. The proposed rule would allow the use of solvent welding formulations containing methylene chloride used to bond hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications provided the concentration of methylene chloride does not exceed 60 percent by weight and the purchase of all methylene chloride welding products for hard sheet plastic does not exceed 20 gallons per calendar year at a single facility.
- Rescind the January 1, 2005, 285 grams per liter VOC content limit requirement for solvent cements used to weld polyvinyl chloride (PVC) plastic pipes and fittings, and instead keep the PVC weld solvent VOC content limit requirement at the interim 510 grams per liter.
- Rescind the January 1, 2005, 270 grams per liter VOC content limit requirement for solvent cements used to weld chlorinated polyvinyl chloride (CPVC) plastic pipes and fittings, and instead keep the CPVC weld solvent VOC content limit requirement at the interim 490 grams per liter.
- Rescind the January 1, 2005 VOC content limit requirement for PVC/CPVC primers of 250 grams per liter, and extend the interim VOC content limit requirement for PVC/CPVC primers of 650 grams per liter from the January 1, 2005 effective date to

July 1, 2005. On July 1, 2005, reduce the VOC content limit requirement for PVC/CPVC primers from 650 grams per liter to 550 grams per liter. ~~Replace the January 1, 2005, VOC content limit requirement for PVC/CPVC primers of 250 grams per liter with a VOC content limit requirement of 550 grams per liter. This new 550 gram per liter VOC content limit is lower that the existing PVC/CPVC primers VOC content limit of 600 grams per liter.~~

- Lower the acrylonitrile-butadiene-styrene (ABS) welding VOC content limit requirement to 325 grams per liter which is currently at 400 grams per liter on July 1, 2005.

Summary of Chapter 3 - Existing Setting

Pursuant to the CEQA Guidelines §15125, Chapter 3 – Existing Setting, includes descriptions of those environmental areas that could be adversely affected by PAR 1168 as identified in the NOP/IS, Final EA prepared for the 2002 amendments, and Final SEA prepared of the 2003 amendments, upon which this ~~Revised Draft~~ Final SEA is based, where the only the environmental topic of "air quality" was identified and analyzed as having the potential to be adversely affected. The following subsection briefly highlights the existing setting for air quality, which, again, was the only environmental area identified that could potentially be adversely affected by implementing PAR 1168.

Air Quality

Air quality in the area of the SCAQMD's jurisdiction has shown substantial improvement over the last two decades. Nevertheless, some federal and state air quality standards are still exceeded frequently and by a wide margin. Of the National Ambient Air Quality Standards (NAAQS) established for six criteria pollutants (ozone, lead, sulfur dioxide, nitrogen dioxide, carbon monoxide and PM10), the area within the SCAQMD's jurisdiction is only in attainment with sulfur dioxide, nitrogen dioxide and lead standards. Chapter 3 provides a brief description of the existing air quality setting for each criteria pollutant, as well as the human health effects resulting from exposure to each criteria pollutant.

Summary of Chapter 4 - Environmental Impacts

CEQA Guidelines §§15126(a) and 15126.2 require that a CEQA document, "shall identify and focus on the significant environmental effects of the proposed project. Direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects."

The following subsection briefly summarizes the analysis of potential adverse environmental impacts from the adoption and implementation of PAR 1168.

Air Quality

The 2003 Final SEA included an extension for complying with the 250 gram per liter VOC content limit for top and trim adhesives as proposed in the existing Rule 1168 until January 1, 2005. Originally in the 2004 Draft SEA, staff expected that facilities would be able to meet these limits so no change is proposed for these limits. During the 45-day public review period, staff found that top and trim adhesives that comply with the final VOC content limit of 250 grams per liter do not satisfy industry performance requirements. Therefore, the

proposed project was revised to delay the effective date of the 250 gram per liter final VOC content limit for top and trim adhesives from January 1, 2005, to January 1, 2007. The delay would allow top and trim adhesives manufactures time to develop a VOC compliant adhesive that would satisfy industry performance requirements.

The 2002 FEA provided manufacturers additional time to develop compliant products for PVC and CPVC welding; and a provision to eliminate methylene chloride use in solvent welding formulations used to bond hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrication by January 1, 2005.

It was also determined that products formulated with the January 1, 2005 VOC content limits for PVC and CPVC welding and primers, and methylene chloride replacement in hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrication produced inferior performance and could not satisfy industry standards. Therefore, the PAR 1168 would rescind the VOC and methylene chloride limits for the previously mentioned categories. No measures available to mitigate the significant adverse air quality impacts were found. The results of rescinding the above requirements are VOC and methylene chloride emissions reductions foregone.

Staff also proposed~~s~~ in the Revised Draft SEA to establish VOC content limits for ABS welding from 650 grams per liter to 550 grams per liter and for PVC/CPVC primers from 400 grams per liter to 325 grams per liter effective January 1, 2007. The final version of PAR 1168, delays the implementation of the new VOC content limit requirements from January 1, 2005, to July 1, 2005. The direct consequence of this modification would rescind the January 1, 2005 VOC content limit requirement of 250 grams per liter for PVC/CPVC primers, and retain the existing interim VOC content limit requirement of 650 grams per liter until July 1, 2005.

In addition, it was determined that eliminating methylene chloride from acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications could not meet performance and industry standards. PAR 1168 would replace the prohibition of methylene chloride from the previously mentioned formulations with a concentration limit of 60 percent methylene chloride and a single facility limit of 20 gallons per year of methylene chloride containing products used to solvent weld acrylic, polycarbonate, and polyethylene terephalate glycol plastics. Formulations with 60 percent methylene chloride have been developed to meet performance and industry standards.

Owners/operators of affected facilities would not be required to install control equipment or other structures that could generate construction emissions. Therefore, no construction and construction air quality impacts are anticipated for implementing PAR 1168.

The overall result of delaying/rescinding the above mentioned VOC content requirements would be 1.05 tons (2,096 pounds) per day of VOC emission reductions foregone after January 1, 2005. ~~and~~ After implementing the additional proposed limits for PVC/CPVC primers and ABS welding, the VOC emission reductions foregone would be ~~0.82~~ 0.81 ton (~~1,640~~ 1,620 pounds) per day ~~of VOC emission reductions forgone~~ ~~until~~ from July 1, 2005

to January 1, 2007. After January 1, 2007, when the top and trim final VOC content limit would become effective, 0.60 ton (~~1,220~~ 1,206 pounds) of VOC reductions per day would be foregone. After January 1, 2005, the project would generate a maximum carcinogenic risk of three in a million for residential receptors and two in a million for worker receptors, and noncarcinogenic health indices (acute and chronic) below 1.0 from allowing continued methylene chloride use in hard plastic sheet welding.

The VOC emission reductions foregone would exceed the SCAQMD's VOC significance threshold of 55 pounds per day. Allowing limited use of methylene chloride is expected to result in a carcinogenic risk that would be less than the significant criterion of ten in one million. The noncarcinogenic acute and chronic risks would be less than the hazard indices significance criterion of 1.0. Therefore, it is concluded that PAR 1168 has the potential to generate significant adverse air quality impacts from VOC emission reductions foregone during operation.

Cumulative air quality impacts from the proposed amendments and all other AQMP control measures considered together are not expected to be significant because implementation of all AQMP control measures is expected to result in net emission reductions and overall air quality improvement. Indeed, the 2003 AQMP indicated that, based on future anticipated overall reduction in VOC emissions, the district would achieve all federal ambient air quality standards by the year 2010 (SCAQMD, 2003), except for the new eight-hour ozone standard.

Potential Environmental Impacts Found Not To Be Significant

The Initial Study prepared for the 2002 amendments to Rule 1168 (released December 11, 2001) ~~is being~~ was relied upon for the preparation of this ~~Revised Draft~~ Final SEA and includes an environmental checklist of approximately 17 environmental topics to be evaluated for potential adverse impacts from the 2002 amendments. Review of the project at that time showed that the NOP/IS stage identified two topics, air quality and hazards, for further review in the 2002 Draft EA. It was later concluded in the 2002 Final EA that only air quality could be significantly adversely affected by amending Rule 1168. Where the NOP/IS and 2002 Final EA concluded that the project would have no significant direct or indirect adverse effects on the remaining environmental topics, no comments were received on the NOP/IS, 2002 Draft EA, or at the public meetings that changed this conclusion. A Draft SEA for the October 2003 amendments which relied upon the previous NOP/IS and 2002 Final EA was released for a 45-day public review and comment period from August 8, 2003 to September 23, 2003. No comments were received from the public on the 2003 Draft SEA or at public meetings. A 2004 Draft SEA was released for a 45-day public review period on October 13, 2004, which contained the current proposed project without the two year delay the final VOC content limit for top and trim adhesives. During the public review period, the proposed project was revised to delay the final VOC content limit for top and trim adhesives; therefore, the 2004 Draft SEA was revised and recirculated for public review pursuant to CEQA Guidelines §15088.5(a)(2) as a Revised Draft SEA. Further, the conclusions reached in the NOP/IS, 2002 Final EA, 2003 Final SEA, and 2004 Draft Revised SEA regarding environmental topics not expected to be adversely effected are not expected to be altered further by the proposed changes to PAR 1168. Thus, the screening

analysis conclusion that the following environmental areas would not be significantly adversely affected by the 2002 amendments continues to apply to the currently proposed project for PAR 1168:

- aesthetics
- agriculture resources
- biological resources
- cultural resources
- energy
- geology/soils
- hydrology and water quality
- land use and planning
- mineral resources
- noise
- population and housing
- public services
- recreation
- solid/hazardous waste
- transportation/traffic

Consistency

The Southern California Association of Governments (SCAG) and the SCAQMD have developed, with input from representatives of local government, the industry community, public health agencies, the EPA - Region IX and the California Air Resources Board (CARB), guidance on how to assess consistency within the existing general development planning process in the district. Pursuant to the development and adoption of its Regional Comprehensive Plan Guide (RCPG), SCAG has developed an Intergovernmental Review Procedures Handbook (June 1, 1995). The SCAQMD also adopted criteria for assessing consistency with regional plans and the AQMP in its CEQA Air Quality Handbook.

Summary Chapter 5 - Alternatives

Three feasible alternatives to the proposed amendments are summarized in Table 1-1: Alternative A (No Project); Alternative B (Further Delay Compliance Date); and Alternative C (Rescind January 1, 2005 Limits). A comparison of the potential air quality impacts from each of the project alternatives with PAR 1168 is given in Table 1-2. No other significant adverse impacts were identified for PAR 1168 or any of the project alternatives. The proposed project is considered to provide the best balance between emission reductions delayed, health risk, and adhesive performance and, therefore, is preferred over the project alternatives. However, although the proposed project provides the best balance between emission reductions delayed, health risk, and adhesive performance, the Governing Board may choose to adopt any of the alternatives in whole or in part in place of the proposed project.

PAR 1168 as modified consists of a mixture of the project proposed in the Revised Draft SEA and Alternative C. Like the project proposed in the Revised Draft SEA, PAR 1168 would forego 0.81 ton (2,096 pounds) per day between July 1, 2005 and January 1, 2007, when the new VOC content limit requirements for PVC/CPVC primers and ABS welding

become effective. In addition, PAR 1168 would forego 0.60 ton (1,206 pounds) of VOC emission reductions per day after July 1, 2007, when the final VOC content limit requirement for top and trim adhesives becomes effective. However, like Alternative C, between January 1, 2005 and July 1, 2005, PAR 1168 would forgo 1.05 ton (2,096 pounds) of VOC emission reductions per day.

The environmental impacts from the project proposed in the Revised Draft SEA and Alternative C were fully analyzed and disclosed in the Revised Draft SEA. The Revised Draft SEA clearly stated that Governing Board may choose to adopt any of the alternatives in whole or in part in place of the proposed project; therefore, the Governing Board may adopt this modification or any other alternative or portion of an alternative that may generate environmental impacts that are significantly worse than those proposed in the project as long as impacts were disclosed in the document circulated for public review.

Summary Chapter 6 - Other CEQA Topics

CEQA requires CEQA documents to address the potential for impacts from the project that cannot be avoided, irreversible environmental changes, and growth-inducing impacts. Consistent with the Final 2003 AQMP Program EIR, additional analysis of the proposed project confirms that it would not result in irreversible environmental changes or the irretrievable commitment of resources, foster economic or population growth or the construction of additional housing, or be inconsistent with regional plans.

Areas of Controversy

CEQA Guidelines §15123(b)(2) requires a public agency to identify areas of controversy, including issues raised by other agencies and the public. SCAQMD has not been made aware of any areas of controversy, nor has it received any comments during public review and comment periods for the 2003 Final SEA, 2002 Final EA or NOP/IS identifying any areas of controversy. The scheduled comment period for the rescinded 2004 Draft SEA ~~does not~~ ended until November 30, 2004. ~~As a result, SCAQMD has not received any comments on this document identifying any areas of controversy.~~ One comment letter was received on the Draft SEA and is included in Appendix C. No areas of controversy were identified in the comment letter.

The Revised Draft SEA was circulated for a public review and comment period from November 5, 2004 to December 21, 2004. No comment letters were received. Since no areas of controversy were identified by SCAQMD or the public during the review and comment periods for both the Draft SEA and Revise Draft SEA, it is concluded that PAR 1168 does not contain any areas of controversy as defined by CEQA.

Table 1-1
Project Alternatives

Rule Component	VOC Content Limits (Compliance Dates)			
	PAR 1168	**ALTERNATIVE A** (No Project)	**ALTERNATIVE B** (Further Delay Compliance Dates)	**ALTERNATIVE C** (Rescind January 1, 2005 Limits)
Top & Trim Adhesives	• Interim Limit: 540 g/l (In Effect) • Final Limit: 250 g/l (by 01/01/07)	• Interim Limit: 540 g/l (In Effect) • Final Limit: 250 g/l (by 01/01/05)	• Interim Limit: 540 g/l (In Effect) • Final Limit: 250 g/l (by 01/01/07)	• Interim Limit: 540 g/l (In Effect) • Rescind 01/01/05 250 g/l Final Limit
PVC Welding	• Interim Limit: 510 g/l (In Effect) • Rescind 01/01/05 285 g/l Final Limit	• Interim Limit: 510 g/l (In Effect) • Final Limit: 285 g/l (by 01/01/05)	• Interim Limit: 510 g/l (In Effect) • Final Limit: 285 g/l (by 01/01/07)	• Interim Limit: 510 g/l (In Effect) • Rescind 01/01/05 285 g/l Final Limit
CPVC Welding	• Interim Limit: 490 g/l (In Effect) • Rescind 01/01/05 270 g/l Final Limit	• Interim Limit: 490 g/l (In Effect) • Final Limit: 270 g/l (by 01/01/05)	• Interim Limit: 490 g/l (In Effect) • Final Limit: 270 g/l (by 01/01/07)	• Interim Limit: 490 g/l (In Effect) • Rescind 01/01/05 270 g/l Final Limit
PVC and CPVC Primer	• Interim Limit: 650 g/l (In Effect) • Rescind 01/01/05 250 g/l Final Limit, and • Add Final Limit 550 g/l (by ~~01~~ 07/01/05)	• Interim Limit: 650 g/ (In Effect) • Final Limit: 250 g/l (by 01/01/05)	• Interim Limit: 650 g/ (In Effect) • Final Limit: 250 g/l (by 01/01/07)	• Interim Limit: 650 g/l ((In Effect) • Rescind 01/01/05 250 g/l Final Limit
ABS Welding	• 400 g/ (In Effect) • Add Final Limit 325 g/l (by ~~01~~ 07/01/05)	• 400 g/l (In Effect)	• 400 g/l (In Effect)	• 400 g/l (In Effect)
Solvent Welding Hard Acrylic, Polycarbonate, PETG	• No Methylene Chloride Requirement* (In Effect) • Add Methylene Chloride Conc. Limit of 60% by Weight (by 01/01/05) • Add 20 gal/day Limit per Facility on Methylene Chloride Welding Solvent (by 01/01/05)	• No Methylene Chloride Requirement* (In Effect) • Elimination of Methylene Chloride (by 01/01/05)	• No Methylene Chloride Requirement* (In Effect) • Elimination of Methylene Chloride (by 01/01/07)	• No Methylene Chloride Requirement* (In Effect) • Rescind Elimination of Methylene Chloride (by 01/01/05)

*May be restricted by other SCAQMD rules (e.g., Rules 212, 1401)

Table 1-2
Comparison of Adverse Air Quality Impacts of the Alternatives
Loss of Anticipated VOC Emission Reductions

Category	PAR 1168	ALTERNATIVE A (No Project)	ALTERNATIVE B (Further Delay Compliance Dates)	ALTERNATIVE C (Rescind January 1, 2005 Limits)
Top & Trim Adhesives	Temporary loss in VOC emission reductions of 414 pounds per day continues until 01/01/07	No emission reductions foregone	Temporary loss in VOC emission reductions of 414 pounds per day continues until 01/01/07	Permanent loss in VOC emission reductions of 414 pounds per day
PVC Welding	Permanent loss in VOC emission reductions of ~~504~~ 500* pounds per day	No emission reductions foregone	Temporary loss in VOC emission reductions of ~~504~~ 502* pounds per day continues until 01/01/07	Permanent loss in VOC emission reductions of ~~504~~ 502* pounds per day
CPVC Welding	Permanent loss in VOC emission reductions of ~~158~~ 156* pounds per day	No emission reductions foregone	Temporary loss in VOC emission reductions of ~~158~~ 156* pounds per day continues until 01/01/07	Permanent loss in VOC emission reductions of ~~158~~ 156* pounds per day
PVC and CPVC Primer	Temporary loss in VOC emission reductions of 1,024 pounds per day continues until 07/01/05. Permanent loss in VOC emission reductions of ~~773~~ 768* pounds per day after 07/01/05	No emission reductions foregone	Temporary loss in VOC emission reductions of ~~1,030~~ 1,024* pounds per day continues until 01/01/07	Permanent loss in VOC emission reductions of ~~1,030~~ 1,024* pounds per day
ABS Welding	Additional Emissions reductions of 220 pounds per day	No change	No change	No change
Solvent Welding Hard Acrylic, Polycarbonate, PETG	Carcinogenic risk of three in a million. Acute and chronic hazard indices less than 1.0.	Elimination of carcinogenic and noncarcinogenic risk from methylene chloride	Acute and chronic hazard indices less than 1.0.until 01/01/07	Carcinogenic risk of four in a million. Acute and chronic hazard indices less than 1.0.
VOC Air Quality Impacts Significant?	Yes	No	Yes Less Than PAR 1168	Yes Greater Than PAR 1168
Methylene Chloride Risk Impacts Significant?	No	No	No	No

* Changed to be consistent with Table 4-4. Difference is a result of rounding. Ton values presented in Table 4-4 are rounded to three significant figures based on the original estimates in the October 1992 Staff Report for PAR 1168. Values in Table 1-2 were not rounded previously.

CHAPTER 2

PROJECT DESCRIPTION

Project Location
Background
Project Objective
Project Description
Technology Review

PROJECT LOCATION

The SCAQMD has jurisdiction over an area of 10,473 square miles (referred to hereafter as the district), consisting of the four-county South Coast Air Basin and the Riverside County portions of the Salton Sea Air Basin (SSAB) and the Mojave Desert Air Basin (MDAB). The Basin, which is a subarea of the SCAQMD's jurisdiction, is bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The 6,745 square-mile Basin includes all of Orange County and the nondesert portions of Los Angeles, Riverside, and San Bernardino counties. The Riverside County portion of the SSAB and MDAB is bounded by the San Jacinto Mountains in the west and spans eastward up to the Palo Verde Valley. The federal nonattainment area (known as the Coachella Valley Planning Area) is a subregion of both Riverside County and the SSAB and is bounded by the San Jacinto Mountains to the west and the eastern boundary of the Coachella Valley to the east (Figure 2-1).

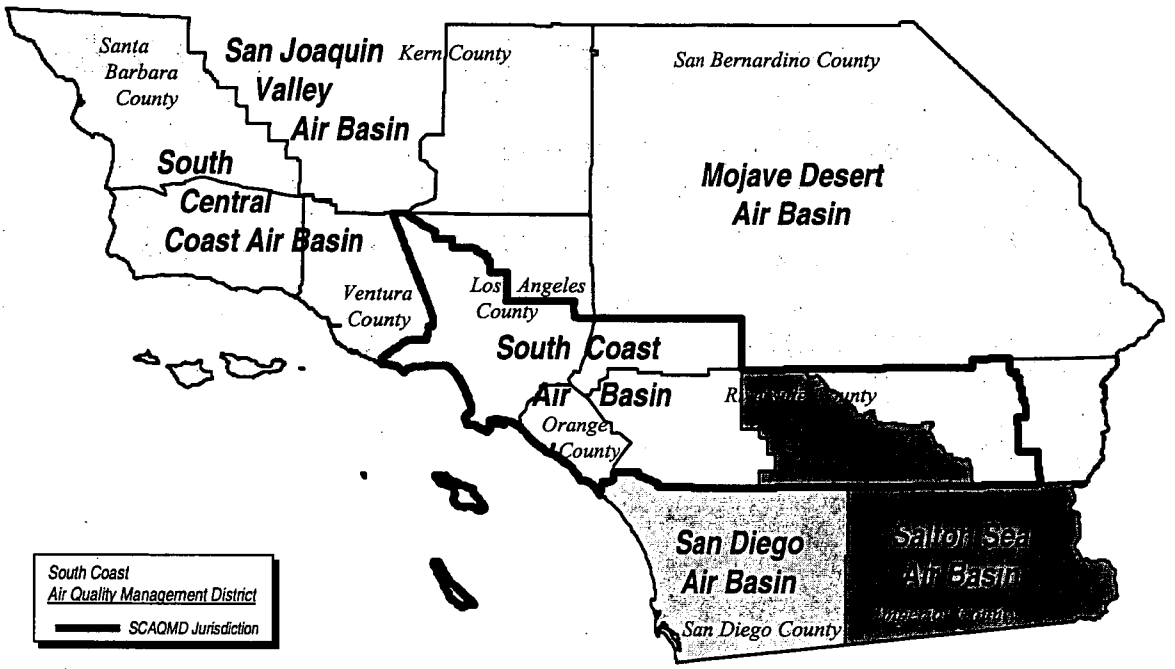

Figure 2-1
South Coast Air Quality Management District

BACKGROUND

Rule 1168 – Adhesive and Sealant Applications, controls VOC emissions from the use of adhesives and sealants used by industrial and commercial sources. Industrial sources use a wide variety of adhesives and sealants primarily for structural, thermal, or electrical applications to bond metals, plastics and composites of plastics, glass, ceramics, rubber, and paper to themselves or to each other. Companies in the district that use adhesives and sealants are engaged in a variety of activities including the assembly of corrugated boxes, motor vehicle parts and accessories, motor homes, metal and wood office furniture, pen and mechanical pencil parts, tire retreading and repairs, hardwood veneers, plastic foam products, wood office furniture and shelving, wood kitchen cabinets, fabricated metal parts and products, household furniture, electronic components and accessories, industrial machinery, and fabricated textile products. The commercial sector of the adhesives market is largely architecturally based. Application examples include: indoor and outdoor carpeting, carpet pad, wood flooring, ceramic tile, dry wall, paneling, subfloor, rubber floor, cove base, vinyl composition tile (VCT) and asphalt tile, single-ply roof membrane adhesives, and most of the plastic pipe welding and priming applications.

Three of the components of the Rule 1168 amendments that were adopted in 2002 included the following: allow the inclusion of additional time for manufacturers to develop compliant products for top and trim adhesive, PVC and CPVC welding and primers; and a provision that prohibits methylene chloride use in solvent welding formulations used to bond hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrication on or after January 1, 2005.

Automotive and marine top and trim adhesives are typical used for recovering door panels, seats, dashboards, convertible tops, and floor covering, as well as the installation of sunroofs and vinyl tops. The June 2002 amendments created a special category for top and trim adhesives and set an interim VOC limit of 540 grams per liter until January 1, 2004. By this date, the VOC limit would reduce to 250 grams per liter. Pursuant to the Governing Board resolution, staff performed a technology assessment in 2003 to determine the feasibility of the 250 grams of VOC per liter limit for top and trim applications. Based on this evaluation, staff recommended, and the Governing Board agreed to delay implementation of the January 1, 2004 limits to January 1, 2005. The primary arguments for supporting a delay of emission reductions were difficulties in application of waterborne top and trim adhesives (precise tack time, low initial strength, and lesser heat resistance), coupled with the experimental nature of acetone-containing adhesives meeting the 250 grams of VOC per liter limit. Both types of adhesives, as well as hot melt glues, were being used at larger automotive conversion shops but there were performance and application concerns with water and acetone-based adhesives. Acetone based replacement adhesives are still experimental in nature and to date have not shown the necessary high heat and stain resistant characteristics that are needed for the performance demands of this industry.

In addition, previous amendments to Rule 1168 in December 1992, April 1997, and October 2003 postponed the final emission limits for adhesives and primers used to weld plastic pipes and pipe-fittings together and allow more time for development of low-VOC formulations. Despite those numerous extensions, efforts to develop compliant low-VOC adhesive technology has had limited success due to difficulties in substituting exempt

compounds for VOC solvents in PVC and CPVC welding formulations, obtaining other regulatory agency and product approval requirements, such as those of the National Sanitation Foundation (NSF), as well as conformity with specified strength requirements of applicable American Society of Testing and Materials (ASTM) standards.

Also, as part of the June 7, 2003 amendment, the Governing Board approved a ban on the sale of adhesives and sealants containing toxic chemicals such as methylene chloride, perchloroethylene, ethylene dichloride, chloroform and trichloroethylene; completely phasing-out the use of these solvents by January 1, 2005, considering one-year sell-through provisions. The ban was justified by the availability of alternative compliant adhesives and sealants. One exception to the availability of non-methylene chloride containing adhesives is solvent welding of hard acrylic, polycarbonate and polyethylene terephalate glycol plastic fabrications. As a result, an additional year (and subsequent one-year sell-through provision) was provided to allow for the continued development of acceptable replacements for methylene chloride formulations.

On October 13, 2004 a draft subsequent environmental assessment (SEA) was completed and circulated for a 45-day public review period ending November 30, 2004. At that time, it was believed that top and trim adhesives could meet the January 1, 2005, 250 grams of VOC per liter limit. Therefore, no changes to top and trim portions of Rule 1168 were proposed. It was also determined that products formulated with the January 1, 2005 VOC content limits for PVC, CPVC welding or methylene chloride replacement in hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrication produced inferior performance and could not meet industry standards and; therefore, are proposed to be rescinded. No measures available to mitigate the significant adverse air quality impacts were found.

During the 45-day public review period of the 2004 Draft SEA, the top and trim industry reported that the adhesives that met the January 1, 2005 final VOC limit (250 grams of VOC per liter of adhesive) were not meeting industry open time, repositionability, heat resistance, and stain resistance standards. Based on these findings, SCAQMD staff recommended delaying the 250 grams of VOC per liter of top and trim adhesive standard for two years (January 1, 2007). No other changes were made to PR 1168 at that time.

Therefore, the project was revised to retain the interim 540 gram per liter of VOC content limit for top and trim adhesives until January 1, 2007, at which time the final 250 gram per liter VOC limit would become effective. The remaining elements of PAR 1168 remained the same at that time. The January 1, 2005 VOC content limit for PVC/CPVC primers of 250 grams per liter would be replaced with a VOC content limit of 550 grams per liter. New VOC content limits are proposed for ABS welding. In addition, concentration and facility use limits are proposed to limit health risk associated with the use of methylene chloride solvent welding formulations used to bond hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications.

After the release of the Revised Draft SEA, PAR 1168 was modified to delay the new VOC content limit requirements of 550 grams per liter for PVC/CPVC and 325 grams per liter

from January 1, 2005 to July 1, 2005. The remaining elements of PAR 1168 remain the same.

PROJECT OBJECTIVE

The primary project objectives include the following:

- The primary project goal of allowing facilities to use the lowest VOC and methylene chloride content limits that can meet industry performance requirements.
- Delay the future final VOC content limit requirements for top and trim adhesives for two years (January 1, 2007) to allow adhesive manufactures to develop a compliant adhesive that can satisfy industry performance requirements.
- Rescind the future VOC content limit requirements for PVC and CPVC welding, and the elimination of methylene chloride from welding formulations used to bond hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications.
- Revise the VOC content limits for PVC and CPVC primers. Establish new lower VOC content limit requirements for ABS welding.
- Allow the use of methylene chloride in solvent welding formulations used to bond hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications after January 1, 2005, but limit carcinogenic and noncarcinogenic risk by establishing restrictions on methylene chloride concentrations and annual facility usage of solvent welding formulations used to bond hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications.

PROJECT DESCRIPTION

The following is a summary of the proposed changes to PAR 1168.

- Extend the 540 grams per liter interim VOC limit for top and trim adhesives to January 1, 2007. The effective date for the final VOC limit of 250 grams per liter for top and trim adhesives under the current rule is January 1, 2005. Therefore, the effective date for the final VOC limit of 250 grams per liter for top and trim adhesives would be delayed until January 1, 2007.
- Rescind the January 1, 2005, prohibition of methylene chloride used to bond hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications. The proposed rule would allow the use of solvent welding formulations containing methylene chloride used to bond hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications provided the concentration of methylene chloride does not exceed 60 percent by weight and the purchase of all methylene chloride welding products for hard sheet plastic does not exceed 20 gallons per calendar year at a single facility.
- Rescind the January 1, 2005, 285 grams per liter VOC content limit requirement for solvent cements used to weld polyvinyl chloride (PVC) plastic pipes and fittings, and instead keep the PVC welding VOC content limit requirement at the interim 510 grams per liter.
- Rescind the January 1, 2005, 270 grams per liter VOC content limit requirement for solvent cements used to weld chlorinated polyvinyl chloride (CPVC) plastic pipes and fittings, and instead keep the CPVC welding VOC content limit requirement at the interim 490 grams per liter.
- Rescind the January 1, 2005 VOC content limit requirement for PVC/CPVC primers of 250 grams per liter, and extend the interim VOC content limit requirement for

PVC/CPVC primers of 650 grams per liter from the January 1, 2005 effective date to July 1, 2005. On July, 1, 2005, reduce the VOC content limit requirement for PVC/CPVC primers from 650 grams per liter to 550 grams per liter. ~~Replace the January 1, 2005, VOC content limit requirement for PVC/CPVC primers of 250 grams per liter with a VOC content limit requirement of 550 grams per liter. This new 550 gram per liter VOC content limit is lower that the existing PVC/CPVC primers VOC content limit of 600 grams per liter.~~

- Lower the acrylonitrile-butadiene-styrene (ABS) welding VOC content limit requirement to 325 grams per liter which is currently at 400 grams per liter effective July 1, 2005.

A copy of PAR 1168 can be found in Appendix A.

TECHNOLOGY REVIEW

Top and Trim Adhesives

In the October 3, 2003 amendment to Rule 1168, staff recommended delaying the 250 grams of VOC per liter future compliance date by an additional year. This recommendation was primarily due to the experimental nature of acetone-based contact adhesives use in the automotive top and trim market, as well as comments by industry representatives regarding the difficulties with using waterborne adhesives. Since June 2004, operators of one large automotive converter have now transitioned into a new acetone-based adhesive (designed initially for the aerospace industry) whose performance and workability meets their satisfaction and complies with the future VOC limit of this specialty application. It was primarily because of this finding that staff recommends retaining the January 1, 2005 limit of 250 grams of VOC per liter, less water and less exempt compounds at the public workshop held on June 29, 2004. Based on correspondence with a large operator, the staff assessment of this formulation was that small shops could also use this adhesive for their operations. As of October 26, 2004, staff has confirmed that use of this acrylonitrile rubber-based cement has been discontinued due to unacceptable heat resistance in the field and a staining problem with light colored vinyl top material. The higher-VOC adhesive (540 grams per liter) is easier to use and is demonstrated to work; however, staff also believes that waterborne products available in the marketplace are viable as well and will work for certain applications where porous-to-porous or porous-to-nonporous substrates are bonded in areas of the vehicle that are not subject to direct heat insolation. Due to the lack of a single multipurpose top and trim adhesive, staff is further recommending delaying implementation of the 250 grams of VOC per liter standard for an additional two years.

Currently Compliant High-VOC Adhesives

The top and trim industry uses adhesives to attach various natural and synthetic materials to a variety of differing substrates including hard plastics and plastic foams, synthetic rubber, metal, and wood. Normally, these operations result in aftermarket trim including upholstery, carpeting, wood veneer, and dash covering, vinyl tops, convertible tops, headliners, door panels, seat covering, and sunroofs.

Several products are on the market and contain 490 to 540 grams of VOC per liter, less exempt compounds. They are multipurpose spray-grade contact adhesives that work for a

variety of automotive and marine applications. They contain some exempt compounds, such as acetone (25 to 35 percent by weight), and have solids contents on the order of 22 to 25 percent by volume. The applied VOC emissions resulting from their use are approximately 340 to 385 grams per liter of material used (2.8 to 3.2 pounds per gallon), and are the mainstay for small business operators today.

Waterborne Adhesives

Waterborne contact adhesives are available and are in use at a few top and trim facilities. These materials are formulated with the same neoprene rubber base, in water, with rosin acids and very little VOC (up to 80 grams per liter, less water), or as dispersions of acrylic resin and synthetic rubber in water with no VOC. These materials are much more expensive and require the use of gravity feed spray equipment, if the container can be placed above the article to be sprayed. If not, an HVLP gun with an activator pump will be needed. These products work well on foam and fabrics to foam, wood, supported vinyl, cardboard and other porous substrates. Some products may not perform well on direct spray overhead applications due to low initial green strength; however, some technical data sheets claim instant bond strength after application. Most waterborne top and trim adhesives have little or no tack and release capability, which may affect applications where materials need to be repositioned as in curvature bonding. Bonding to rubber, metal or plastic is also difficult. Some are prone to fabric staining through bleed-through; users should consult manufacturers' specification data to determine substrate compatibility.

Since the dry time of waterborne contact adhesives is longer, open time can be reduced by the addition of a salt activator. The waterborne adhesives have greater solids content (50 to 60 percent by volume). It is generally true that when applying a waterborne adhesive, one of the two adjoining substrates must be porous to allow the water to evaporate. 3M, Simalfa, and Casa Adhesive Systems manufacture a host of compliant waterborne adhesives that are being used in Original Equipment Manufacturer (OEM) facilities. The following company is using two of them today:

Known Conversion

✓ **El Kapitan Vans**

El Kapitan Vans is a van conversion facility located in Westminster, CA. Stock vans are customized to fit individual requirements. El Kapitan uses both an activated waterborne polychloroprene and a single component latex adhesive to install various trim materials to metal, synthetic foam rubbers, and wood. Examples of this are the application of dense foam rubber padding to metal flooring and wheel wells and carpeting to the rubber padding, headliner material to molded plastic foam shells and various wood surfaces to foam backed vinyl or leather trim. In each case, at least one of the surfaces is porous.

The conversion to waterborne adhesives has not been simple as the adhesive is very aggressive and cannot be repositioned without reapplying additional adhesive. Precision placement of trim materials is necessary around contours. Cold day applications (increased tack time) are overcome with additional activator. The polychloroprene adhesive works best when applied in a mist rather than higher or more complete coverage. This adhesive has been in use for nearly 3 years. The latex adhesive has been in use for a little less than a year, as they find it to work better that the activated product

on their carpet applications. Incidental problem areas are addressed by hand-held aerosol spray adhesive. Hand-held aerosol adhesives are exempt from Rule 1168, but subject to the California Air Resources Board's Consumer Products Regulation.

Acetone-Based Adhesives

Acetone-based contact adhesives are still experimental in nature and stain light colored materials. Neoprene rubber-based cements, which display the necessary heat resistance are not yet viable in the workplace at or below 250 grams of VOC per liter. Attempts to formulate low-VOC acetone-based adhesives with satisfactory performance have yet to be fruitful, in all operations and for all colors of materials. To date, adhesive manufacturers have developed at least four products but have not achieved full marketability in the top and trim industry.

Sovereign Industrial Adhesives has tested several adhesives at a new vehicle convertible top converter in Ventura County4. Some of the formulations are zero VOC acetone-based. 3M also has one product formulated with acetone that is near zero VOC, which had shown promise, yet was found to be unsuitable by the end user. In addition, a canister adhesive (Westech HSC13) is available that is touted by the manufacturer to be excellent for automotive headliners, the VOC content is less than 80 grams per liter. ITW TACC had formulated a high-solids adhesive with acetone, but made the business decision to stop production at this time. Unfortunately, the technical viability of these products is not yet proven, and manufacturers need more time for research, development, and performance testing of products with low-VOC content, but with high volumes of exempt compound.

Known Partial Conversion

✓ **Krystal Koach**

Krystal Koach is a large limousine manufacturer that also manufactures a line of tour buses. Operators of this facility use a variety of hot melt, waterborne, pressure sensitive tapes and acetone-based adhesives for a variety of applications. The most difficult applications are headliner and vinyl top installations. Krystal Koach bonds a zero VOC closed cell foam tape to the roof and follows that with the application of near zero VOC acetone-based contact adhesive to bond supported vinyl fabric to the closed cell foam to form a vinyl top. This adhesive is an acrylonitrile butadiene rubber (NBR), which has inherently high heat resistance of 212°F. The product is described to be repositionable, have good tack time and very high strength when dry. However, due to staining of light colored vinyl top materials and insufficient long term heat resistance, Krystal Koach no longer uses this product. Krystal Koach continues to use activated waterborne neoprene cement and hot melt adhesives in applications where high heat resistance (220°F) is not a factor.

Hot Melts

Sprayable hot melts are typically used for light-duty applications such as application of leather seating and door panel trim and carpeting to metal, vinyl, fiberglass and other plastics. The adhesives are very cost effective compared to standard high-VOC contact adhesives. The material comes in 1¾-inch and 2-inch slugs that melt inside an

[4]Variance Progress Report to the Ventura County Air Pollution Control District, Robbins Auto Top, 5-27-03

accompanying spray tool. Materials display high heat resistance and are available with long and short tack times. Krystal Koach is using a pressure sensitive hot melt technology, but not for areas of the vehicle that are subject to the highest temperature swings.

PVC and CPVC Welding

These products provide the mechanism for bonding same substrate materials such as plastic plumbing and electrical parts and plastic sheeting together by direct fusing to form a leak-tight continuous joint. Both plastic types typically require the use of a primer to soften the joint areas prior to the application of the cement. The finished plastic piping systems deliver drinking and irrigation water, discharge and vent sewage, transport liquid chemicals, and act as a conduit for electric and telephone wiring. Building and Uniform Plumbing codes mandate that International Association of Plumbing and Mechanical Officials (IAPMO) specifications be met. American Society for Testing and Materials (ASTM) and Nation Sanitation Foundation (NSF) requirements set the basis for IAPMO approval.

Since these products are exposed to drinking water, ASTM standards allow the use of a few organic compounds. Allowable compounds include the following: tetrahydrofuran, methyl ethyl ketone, cyclohexanone, and acetone. Acetone is an exempt compound and reduces the VOC content of adhesive formulations; however, there are certain solubility limits that restrict the total volume of acetone that can be added to a specific formulation, which in turn limits the benefit of VOC content reduction once the volume of acetone is subtracted out. High quantities of acetone cause surface crazing, a phenomenon that is not conducive to proper welding. Plastic pipe and pipefittings must be dissolved with a primer to soften the joint before application of the cement. Acetone is the only approved exempt compound under NSF ruling and it does not dissolve PVC or CPVC. Furthermore, in order for the joint to have durability, 20 to 25 percent of the reactive diluent must remain in the assembly to provide proper wetting. To date, newer formulations containing more acetone result in applications that do not meet ASTM requirements. This also applies to the primer. Solvent cement manufacturers have unsuccessfully spent approximately 11 years trying to formulate low-VOC cements and primers that meet applicable standards.

During the promulgation of the June 7, 2002 amendments, staff was hopeful that an adhesive technology (specifically epoxy) could replace solvent welding. Laboratory tests on such products show high bond strengths (lap shears) after 16 hours. However, there is no apparent penetration and softening of the PVC by the adhesive and this may interfere with long-term performance. Hydrostatic pressure burst testing also shows failure after two hours, indicative of failure under higher pressures. The requirement under ASTM 2564 standards is withstanding a pressure of 400 psig. In addition, epoxies showed the potential for constricted flow paths due to the configuration of the designed taper of pipefittings and the relative high viscosity of the epoxy adhesive. Two-component mixes are also more challenging to work with compared to one component solvent cements offered today. To date, staff cannot identify lower-VOC adhesives that can be used to adequately bond PVC and CPVC pipes and pipefittings, that meet Rule 1168 technological forcing limits, and only slight reductions are available in primers.

Water-based formulations have also been tried and were found to lead to excessive dry times and low bond strength; water has a high surface tension while the surface tension of rigid

plastic is low. Therefore, the ability of waterborne products to adequately wet the surface and provide the mechanism for welding is considered to be inadequate at this time.

Staff has determined that the current limits of 510 grams of VOC per liter for PVC welding and 490 grams of VOC per liter for CPVC welding represent reasonably available control technology limits.

~~However, reformulation of adhesives used in ABS welding will partially offset the emission reductions foregone from VOC content reductions not realized by PVC and CPVC welding systems including primers. Specifically, reformulated ABS welding products are now 325 grams per liter, reduced from 400 grams per liter. New VOC regulation for PVC/CPVC primers can be set at 550 grams per liter from 650 grams per liter, but not retained at 250 grams of VOC per liter. New PVC/CPVC primer and ABS cements at 550 and 325 grams of VOC per liter, respectively, will be available from the two largest manufacturers of these products for both industrial and architectural applications by January 1, 2005.~~ Previously, information was provide to staff that PVC/CPVC primer and ABS cements at 550 and 325 grams of VOC per liter, respectively, would be available from the two largest manufacturers of these products for both industrial and architectural applications by the first of the year. Based on this information, staff proposed a compliance date of January 1, 2005, for the lower VOC primers and ABS cements. However, in mid November 2004, one of the manufacturers requested an additional six months to complete the certification process for its primer under the NSF standards and make it available in the marketplace. In order to ease the transition into the marketplace for both lower-VOC primer and ABS cement, staff now recommends establishing a compliance date of July 1, 2005, for the lower VOC limits for PVC/CPVC primer and ABS cement. A one-year sell-through and use of cements and primers meeting the existing limits will also help cover the transition period.

Other Plastic Welding – Methylene Chloride

Acrylic, polycarbonate, and polyethylene terephalate glycol plastic (PETG) sheeting is used to build various plastic items. Among these are card deck shoes, food bins, aquariums, trophies and display cases of all kinds. Typical assemblies are cut from sheet acrylic, polycarbonate into specified geometries, dry fitted and welded in place with a syringe applicator. The solution, which contains large percentages of methylene chloride, wicks under the adjoining surfaces, fusing them together. The process from welding to packaging takes 15 to 20 minutes. Exempt compounds, such as acetone, do not provide the degree of solvation that methylene chloride does and results in weak bonds. However, manufacturers have replaced some of the total mix with methyl acetate (an exempt compound) resulting in lower concentrations of methylene chloride. The formulations now contain roughly 40 to 60 percent by weight of methylene chloride, depending on the viscosity of the applied cement (light, medium or heavily bodied cements).

As part of the July 7, 2002 amendments to Rule 1168, staff recognized that phasing out the use of methylene chloride based solvent cements for hard plastic may be difficult to achieve by reformulation. Efforts by manufacturers of these adhesives over the last two years have resulted in reducing the maximum methylene chloride content to 60 percent by weight, down from 91 percent in the original formulation. The inferior performance of substitute products compared to methylene chloride makes a complete phase out of methylene chloride

in this specific application infeasible. However, the maximum annual use of such solvent welding products for each end user is quite small because a syringe full of solvent welding material can weld many parts. To limit health risk associated with the use of these products, staff proposes to limit the methylene chloride content of these adhesives to 60 percent by weight and proposes to restrict the sales to and use by any single facility to 20 gallons per year of methylene chloride containing products used for solvent welding of acrylic, polycarbonate and PETG plastics. This estimates the current maximum annual usage of larger fabricators. Emissions from existing sources at this level are well within current health-based standards using a "worst-case" scenario for an impacted receptor.

CHAPTER 3

EXISTING SETTING

Introduction
Air Quality
Affected Sources

INTRODUCTION

In order to determine the significance of the impacts associated with a proposed project, it is necessary to evaluate the project's impacts against the backdrop of the environment as it exists at the time the NOP/IS is published. The CEQA Guidelines defines "environment" as "the physical conditions that exist within the area which will be affected by a proposed project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historical or aesthetic significance" (CEQA Guidelines §15360; see also Public Resources Code §21060.5). Furthermore, a CEQA document must include a description of the physical environment in the vicinity of the project, as it exists at the time the notice of preparation is published, from both a local and regional perspective (CEQA Guidelines §15125). Therefore, the "environment" or "existing setting" against which a project's impacts are compared consists of the immediate, contemporaneous physical conditions at and around the project site (Remy, et al; 1996).

The following sections summarize the existing setting for air quality which is the only environmental area that may be adversely affected by proposed amended Rule 1168. An overview of air quality in the district is given below. A more complete discussion of current and projected future air quality in the district, with and without additional control measures can be found in the 2003 Final Program EIR for the 2003 AQMP (Chapters 3 and 4). The Final Program EIR for the 2003 AQMP contains more comprehensive information on existing and projected environmental settings for all environmental areas discussed in this chapter. Copies of the above-referenced documents are available from the SCAQMD's Public Information Center by calling (909) 396-2039.

AIR QUALITY

Criteria Pollutants

It is the responsibility of the SCAQMD to ensure that state and federal ambient air quality standards are achieved and maintained in its geographical jurisdiction. Health-based air quality standards have been established by California and the federal government for the following criteria air pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO2), sulfur dioxide (SO2), particulate matter less than 10 microns (PM10), particulate matter less than 2.5 microns (PM2.5), and lead. These standards were established to protect sensitive receptors with a margin of safety from adverse health impacts due to exposure to air pollution. The California standards are more stringent than the federal standards and in the case of PM10 and SO2, far more stringent. California has also established standards for sulfates, visibility reducing particles, hydrogen sulfide, and vinyl chloride. The state ambient air quality standards and NAAQS for each of these pollutants and their effects on health are summarized in Table 3-1.

The SCAQMD monitors levels of various criteria pollutants at 32 monitoring stations. The 2002 air quality data from SCAQMD's monitoring stations are presented in Table 3-2.

Table 3-1
State and Federal Ambient Air Quality Standards

AIR POLLUTANT	STATE STANDARD	FEDERAL PRIMARY STANDARD	MOST RELEVANT EFFECTS
	CONCENTRATION, AVERAGING TIME		
Carbon Monoxide (CO)	20 ppm, 1-hour average > 9 ppm, 8-hour average >	35 ppm, 1-hour average > 9.5 ppm, 8-hour average <=	(a) Aggravation of angina pectoris and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Impairment of central nervous system functions; and, (d) Possible increased risk to fetuses.
Ozone (O_3)	0.09 ppm, 1-hour average >	0.12 ppm, 1-hour average > 0.08 ppm, 8-hour average >	(a) Short-term exposures: 1) Pulmonary function decrements and localized lung edema in humans and animals; and, 2) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (b) Long-term exposures: Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (c) Vegetation damage; and, (d) Property damage.
Nitrogen Dioxide (NO_2)	0.25 ppm, 1-hour average >	0.0534 ppm, AAM >	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (b) Risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; and, (c) Contribution to atmospheric discoloration.

KEY:

ppm = parts per million parts of air, by volume	AAM = Annual Arithmetic Mean
$\mu g/m^3$ = micrograms per cubic meter	AGM = Annual Geometric Mean

Table 3-1 (concluded)
State and Federal Ambient Air Quality Standards

AIR POLLUTANT	STATE STANDARD	FEDERAL PRIMARY STANDARD	MOST RELEVANT EFFECTS
	CONCENTRATION, AVERAGING TIME		
Sulfur Dioxide (SO_2)	0.25 ppm, 1-hour average > 0.04 ppm, 24-hour average >	0.03 ppm, AAM > 0.14 ppm, 24-hour average >	(a) Bronchoconstriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma.
Suspended Particulate Matter (PM10)	20 $\mu g/m^3$, AAM > 50 $\mu g/m^3$, 24-hour average >	50 $\mu g/m^3$, AAM > 150 $\mu g/m^3$, 24-hour average >	(a) Excess deaths from short-term exposures and exacerbation of symptoms in sensitive patients with respiratory disease; and (b) Excess seasonal declines in pulmonary function, especially in children.
Suspended Particulate Matter (PM2.5)	12 $\mu g/m^3$, AAM >	15 $\mu g/m^3$, AAM > 65 $\mu g/m^3$, 24-hour average >	(a) Increased hospital admissions and emergency room visits for heart and lung disease; (b) Increased respiratory symptoms and disease; and (c) Decreased lung functions and premature death.
Lead	1.5 $\mu g/m^3$, 30-day average >=	1.5 $\mu g/m^3$, calendar quarterly average >	(a) Increased body burden; and (b) Impairment of blood formation and nerve conduction.
Sulfates (SOx)	25 $\mu g/m^3$, 24-hour average >=		(a) Decrease in ventilatory function; (b) Aggravation of asthmatic symptoms; (c) Aggravation of cardio-pulmonary disease; (d) Vegetation damage; (e) Degradation of visibility; and, (f) Property damage.
Visibility-Reducing Particles	In sufficient amount to give an extinction coefficient >0.23 inverse kilometers (visual range to less than 10 miles) with relative humidity less than 70 percent, 8-hour average (10am – 6pm PST)		Nephelometry and AISI Tape Sampler; instrumental measurement on days when relative humidity is less than 70 percent.
Hydrogen Sulfide	0.03 ppm, 1-hour average >=		Odor annoyance.
Vinyl Chloride	0.010 ppm, 24-hour average >=		Known carcinogen.

KEY:

ppm = parts per million parts of air, by volume	AAM = Annual Arithmetic Mean
$\mu g/m^3$ = micrograms per cubic meter	AGM = Annual Geometric Mean

Table 3-2
2003 Air Quality Data – South Coast Air Quality Management District

CARBON MONOXIDE (CO)						
					No. Days Standard Exceeded[a]	
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. (ppm, 1-hour)	Max. Conc. (ppm, 8-hour)	Federal ≥ 9.5 ppm, 8-hour	State > 9.0 ppm, 8-hour
LOS ANGELES COUNTY (Co)						
1	Central Los Angeles	365	6	4.6	0	0
2	Northwest Coast Los Angeles Co	365	5	2.7	0	0
3	Southwest Coast Los Angeles Co	361	7	5.0	0	0
4	South Coast Los Angeles Co	363	6	4.7	0	0
6	West San Fernando Valley	365	6	4.1	0	0
7	East San Fernando Valley	349	5*	4.7*	0*	0*
8	West San Fernando Valley	365	5	3.8	0	0
9	East San Gabriel Valley 1	365	5	2.6	0	0
9	East San Gabriel Valley 2	357	3	2.1	0	0
10	Pomona/Walnut Valley	365	6	4.4	0	0
11	South San Gabriel Valley	365	5	4.0	0	0
12	South Central Los Angeles Co	362	12	7.3	0	0
13	Santa Clarita Valley	363	3	1.7	0	0
ORANGE COUNTY						
16	North Orange County	365	8	4.1	0	0
17	Central Orange County	365	6	3.9	0	0
18	North Coastal Orange County	365	7	5.8	0	0
19	Saddleback Valley	362	3	1.8	0	0
RIVERSIDE COUNTY						
22	Norco/Corona	--	--	--	--	--
23	Metropolitan Riverside County 1	365	5	3.7	0	0
23	Metropolitan Riverside County 2	360	5	3.4	0	0
24	Perris Valley	--	--	--	--	--
25	Lake Elsinore	345	4*	1.3*	0*	0*
29	Banning Airport	--	--	--	--	--
30	Coachella Valley 1**	339	3*	1.3*	0*	0*
30	Coachella Valley 2**	--	--	--	--	--
SAN BERNARDINO COUNTY						
32	NW San Bernardino Valley	363	4	2.9	0	0
33	SW San Bernardino Valley	--	--	--	--	--
34	Central San Bernardino Valley 1	--	--	--	--	--
34	Central San Bernardino Valley 2	365	5	4.6	0	0
35	East San Bernardino Valley	--	--	--	--	--
37	Central San Bernardino Mountains	--	--	--	--	--
38	East San Bernardino Mountains	--	--	--	--	--
DISTRICT MAXIMUM			12	7.3	0	0
SOUTH COAST AIR BASIN			12	7.3	0	0

KEY:

ppm = parts per million parts of air, by volume	* Less than 12 full months of data. May not be representative.
-- = Pollutant not monitored	** Salton Sea Air Basin

[a] The federal 1-hour standard (1-hour average CO > 35 ppm) and state 1-hour standard (1-hour average CO > 20 ppm) were not exceeded.

Table 3-2 (Continued)
2003 Air Quality Data – South Coast Air Quality Management District

OZONE (O_3)									
							No. Days Standard Exceeded		
							Federal		State
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. (ppm, 1-hour)	Max. Conc. (ppm, 8-hour)	Fourth Highest Conc. (ppm, 8-hour)	Health Advisory ≥ 0.15 ppm, 1-hour	> 0.12 ppm, 1-hour	> 0.08 ppm, 8-hour	> 0.09 ppm, 1-hour
LOS ANGELES (LA) COUNTY (Co)									
1	Central LA	365	0.152	0.088	0.083	1	1	2	11
2	NW Coast LA Co	365	0.134	0.105	0.083	0	1	1	11
3	SW Coast LA Co	365	0.110	0.078	0.073	0	0	0	2
4	South Coast LA Co	365	0.099	0.071	0.063	0	0	0	1
6	W San Fernando Valley	365	0.179	0.129	0.119	1	14	49	68
7	E San Fernando Valley	341	0.134*	0.108*	0.097*	0*	4*	20*	37*
8	W San Fernando Valley	365	0.152	0.108	0.103	1	7	28	44
9	E San Gabriel Valley 1	365	0.150	0.124	0.107	1	11	21	40
9	E San Gabriel Valley 2	365	0.162	0.134	0.123	7	22	41	61
10	Pomona/Walnut Valley	365	0.161	0.123	0.109	3	13	24	39
11	S San Gabriel Valley	364	0.128	0.097	0.084	0	1	2	18
12	South Central LA Co	361	0.081	0.063	0.059	0	0	0	0
13	Santa Clarita Valley	363	0.194	0.152	0.137	15	35	69	89
ORANGE (OR) COUNTY (Co)									
16	North OR Co	365	0.165	0.087	0.082	1	1	2	7
17	Central OR Co	365	0.136	0.087	0.082	0	2	1	11
18	North Coastal OR Co	364	0.107	0.088	0.080	0	0	1	4
19	Saddleback Valley	362	0.153	0.105	0.097	1	4	8	16
RIVERSIDE (RV) COUNTY (Co)									
22	Norco/Corona	--	--	--	--	--	--	--	--
23	Metropolitan RV Co 1	365	0.169	0.140	0.123	4	18	62	56
23	Metropolitan RV Co 2	--	--	--	--	--	--	--	--
24	Perris Valley	357	0.155	0.121	0.119	1	7	47	59
25	Lake Elsinore	345	0.154*	0.137*	0.113*	2*	7*	35*	52
29	Banning Airport	365	0.166	0.146	0.127	3	27	63	64
30	Coachella Valley 1**	359	0.141	0.111	0.108	0	4	44	49
30	Coachella Valley 2**	365	0.123	0.105	0.102	0	0	19	24
SAN BERNARDINO (SB) COUNTY									
32	Northwest SB Valley	365	0.155	0.134	0.116	2	15	35	48
33	Southwest SB Valley	--	--	--	--	--	--	--	--
34	Central SB Valley 1	351	0.176	0.148	0.134	7	26	48	65
34	Central SB Valley 2	358	0.160	0.137	0.123	4	19	45	59
35	East SB Valley	365	0.174	0.153	0.138	12	38	72	91
37	Central SB Mountains	341	0.163*	0.142*	0.130*	6*	34*	74*	84*
38	East SB Mountains	--	--	--	--	--	--	--	--
DISTRICT MAXIMUM			0.194	0.153	0.138	15	38	74	91
SOUTH COAST AIR BASIN			0.194	0.153	0.138	36	68	119	133

KEY:

ppm = parts per million parts of air, by volume	* Less than 12 full months of data. May not be representative.
-- = Pollutant not monitored	** Salton Sea Air Basin

Table 3-2 (Continued)
2003 Air Quality Data – South Coast Air Quality Management District

NITROGEN DIOXIDE (NO_2)				
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. (ppm, 1-hour[b])	Annual Average[b] AAM Conc. (ppm)
LOS ANGELES COUNTY				
1	Central Los Angeles	361	0.16	0.0338
2	Northwest Coast Los Angeles County	352	0.12	0.0231
3	Southwest Coast Los Angeles County	363	0.12	0.0238
4	South Coast Los Angeles County	341	0.14*	0.0288*
6	West San Fernando Valley	364	0.13*	0.0260*
7	East San Fernando Valley	344	0.14*	0.0356*
8	West San Fernando Valley	356	0.14	0.0322
9	East San Gabriel Valley 1	347	0.12*	0.0296*
9	East San Gabriel Valley 2	361	0.12	0.0271
10	Pomona/Walnut Valley	365	0.12	0.0352
11	South San Gabriel Valley	360	0.14	0.0353
12	South Central Los Angeles County	356	0.13	0.0312
13	Santa Clarita Valley	363	0.12	0.0221
ORANGE COUNTY				
16	North Orange County	361	0.16	0.0284
17	Central Orange County	362	0.13	0.0240
18	North Coastal Orange County	362	0.11	0.0199
19	Saddleback Valley	--	--	--
RIVERSIDE COUNTY				
22	Norco/Corona	--	--	--
23	Metropolitan Riverside County 1	360	0.09	0.0217
23	Metropolitan Riverside County 2	--	--	--
24	Perris Valley	--	--	--
25	Lake Elsinore	328	0.08*	0.0182*
29	Banning Airport	346	0.09*	0.0193*
30	Coachella Valley 1**	347	0.06*	0.0173*
30	Coachella Valley 2**	--	--	--
SAN BERNARDINO COUNTY				
32	Northwest San Bernardino Valley	363	0.11	0.0349
33	Southwest San Bernardino Valley	--	--	--
34	Central San Bernardino Valley 1	355	0.12	0.0307
34	Central San Bernardino Valley 2	362	0.10	0.0270
35	East San Bernardino Valley	--	--	--
37	Central San Bernardino Mountains	--	--	--
38	East San Bernardino Mountains	--	--	--
DISTRICT MAXIMUM			0.16	0.0356
SOUTH COAST AIR BASIN			0.16	0.0356

KEY:

ppm = parts per million parts of air, by volume	* Less than 12 full months of data. May not be representative.
AAM = Annual Arithmetic Mean	** Salton Sea Air Basin
-- = Pollutant not monitored	

[b] The state standard (1-hour average NO_2 > 0.25 ppm) and the federal standard (AAM NO_2 > 0.0534 ppm) were not exceeded.

Table 3-2 (Continued)
2003 Air Quality Data – South Coast Air Quality Management District

SULFUR DIOXIDE (SO_2)				
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Maximum Concentration[c]	
			(ppm, 1-hour)	(ppm, 24-hour)
LOS ANGELES COUNTY				
1	Central Los Angeles	349	0.05*	0.006*
2	Northwest Coast Los Angeles County	--	--	--
3	Southwest Coast Los Angeles County	365	0.03	0.006
4	South Coast Los Angeles County	361	0.03	0.008
6	West San Fernando Valley	--	--	--
7	East San Fernando Valley	338	0.01*	0.005*
8	West San Fernando Valley	--	--	--
9	East San Gabriel Valley 1	--	--	--
9	East San Gabriel Valley 2	--	--	--
10	Pomona/Walnut Valley	--	--	--
11	South San Gabriel Valley	--	--	--
12	South Central Los Angeles County	--	--	--
13	Santa Clarita Valley	--	--	--
ORANGE COUNTY				
16	North Orange County	--	--	--
17	Central Orange County	--	--	--
18	North Coastal Orange County	354	0.02	0.012
19	Saddleback Valley	--	--	--
RIVERSIDE COUNTY				
22	Norco/Corona	--	--	--
23	Metropolitan Riverside County 1	363	0.02	0.012
23	Metropolitan Riverside County 2	--	--	--
24	Perris Valley	--	--	--
25	Lake Elsinore	--	--	--
29	Banning Airport	--	--	--
30	Coachella Valley 1**	--	--	--
30	Coachella Valley 2**	--	--	--
SAN BERNARDINO COUNTY				
32	Northwest San Bernardino Valley	--	--	--
33	Southwest San Bernardino Valley	--	--	--
34	Central San Bernardino Valley 1	361	0.01	0.004
34	Central San Bernardino Valley 2	--	--	--
35	East San Bernardino Valley	--	--	--
37	Central San Bernardino Mountains	--	--	--
38	East San Bernardino Mountains			
DISTRICT MAXIMUM			0.05	0.012
SOUTH COAST AIR BASIN			0.05	0.012

KEY:

ppm = parts per million parts of air, by volume	* Less than 12 full months of data. May not be representative.
AAM = Annual Arithmetic Mean	** Salton Sea Air Basin
-- = Pollutant not monitored	

[c] The state standards (1-hour average SO_2 > 0.25 ppm and 24-hour average SO_2 > 0.04 ppm) and the federal standards (AAM SO_2 > 0.03 ppm, 24-hour average SO_2 > 0.14 ppm, and 3-hour average SO_2 > 0.50 ppm) were not exceeded.

Table 3-2 (Continued)
2003 Air Quality Data – South Coast Air Quality Management District

SUSPENDED PARTICULATE MATTER PM10 [d]						
				No. (%) Samples Exceeding Standard		
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. ($\mu g/m^3$, 24-hour)	Federal > 150 $\mu g/m^3$, 24-hour	State > 50 $\mu g/m^3$, 24-hour	Annual Average[e] AAM Conc. ($\mu g/m^3$)
LOS ANGELES COUNTY (Co)						
1	Central Los Angeles	61	81	0	6(9.8)	34.6
2	NW Coast Los Angeles County	--	--	--	--	--
3	SW Coast Los Angeles County	61	58	0	3(4.9)	29.7
4	South Coast Los Angeles County	61	63	0	4(6.6)	32.8
6	West San Fernando Valley	--	--	--	--	--
7	East San Fernando Valley	50	81*	0*	7(14.0)*	38.1*
8	West San Fernando Valley	--	--	--	--	--
9	East San Gabriel Valley 1	60	119	0	21(35.0)	44.4
9	East San Gabriel Valley 2	--	--	--	--	--
10	Pomona/Walnut Valley	--	--	--	--	--
11	South San Gabriel Valley	--	--	--	--	--
12	South Central Los Angeles County	--	--	--	--	--
13	Santa Clarita Valley	61	72	0	10(16.4)	31.8
ORANGE COUNTY						
16	North Orange County	--	--	--	--	--
17	Central Orange County	61	96	0	6(9.8)	32.7
18	North Coastal Orange County	--	--	--	--	--
19	Saddleback Valley	57	64	0	2(3.5)	26.7
RIVERSIDE COUNTY						
22	Norco/Corona	58	116	0	15(25.9)	40.5
23	Metropolitan Riverside County 1	109	164	2(1.8)	62(56.9)	56.9
23	Metropolitan Riverside County 2	--	--	--	--	--
24	Perris Valley	58	142	0	19(32.8)	43.9
25	Lake Elsinore	--	--	--	--	--
29	Banning Airport	60	79	0	9(15.0)	29.0
30	Coachella Valley 1**	60	108	0	4(6.7)	27.1
30	Coachella Valley 2**	112	124+	0+	47(42.0)+	50.2+
SAN BERNARDINO COUNTY						
32	NW San Bernardino Valley	--	--	--	--	--
33	SW San Bernardino Valley	62	149	0	18(29.0)	42.9
34	Central San Bernardino Valley 1	50	101*	0*	27(54.0)*	47.2*
34	Central San Bernardino Valley 2	59	98	0	23(39.0)	44.9
35	East San Bernardino Valley	58	92	0	15(25.9)	37.0
37	Central San Bernardino Mountains	50	47*	0*	0*	25.6*
38	East San Bernardino Mountains	--	--	--	--	--
DISTRICT MAXIMUM			164	2	62	56.9
SOUTH COAST AIR BASIN			164	2	69	56.9

KEY:

$\mu g/m^3$ = micrograms per cubic meter	-- = Pollutant not monitored
AAM = Annual Arithmetic Mean	** Salton Sea Air Basin

d PM10 samples were collected every six days at all sites except for Station Numbers 4144 and 4157 where samples were collected every three days.

e The federal standard is AAM PM10 > 50 $\mu g/m^3$ and the state standard is AAM PM10 > 20 $\mu g/m^3$ (replaced the annual geometric mean AGM PM10 > 30 $\mu g/m^3$ effective July 5, 2003).

\+ The data for five samples collected on high-wind days (178 $\mu g/m^3$ on 01/06/03, 132 $\mu g/m^3$ on 02/02/03, 227 $\mu g/m^3$ on 05/15/03, 148 $\mu g/m^3$ on 06/20/03, and 309 $\mu g/m^3$ on 06/23/03 were excluded in accordance with EPA's Natural Events Policy.

Table 3-2 (Continued)
2003 Air Quality Data – South Coast Air Quality Management District

SUSPENDED PARTICULATE MATTER PM2.5 [f]					
				No. (%) Samples Exceeding Standard	Annual Averages[g]
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. ($\mu g/m^3$, 24-hour)	Federal > 65 $\mu g/m^3$, 24-hour	AAM Conc. ($\mu g/m^3$)
LOS ANGELES COUNTY					
1	Central Los Angeles	330	83.7	5(1.5)	21.3
2	Northwest Coast Los Angeles County	--	--	--	--
3	Southwest Coast Los Angeles County	--	--	--	--
4	South Coast Los Angeles County	324	115.2	3(0.9)	18.0
6	West San Fernando Valley	115	47.5	0	16.4
7	East San Fernando Valley	92	120.6	1(1.1)	20.9
8	West San Fernando Valley	110	89.0	1(0.9)	18.6
9	East San Gabriel Valley 1	314	121.2	3(1.0)	19.2
9	East San Gabriel Valley 2	--	--	--	--
10	Pomona/Walnut Valley	--	--	--	--
11	South San Gabriel Valley	111	90.3	1(0.9)	20.6
12	South Central Los Angeles County	117	54.8	0	20.2
13	Santa Clarita Valley	--	--	--	--
ORANGE COUNTY					
16	North Orange County	--	--	--	--
17	Central Orange County	340	115.5	3(0.9)	17.3
18	North Coastal Orange County	--	--	--	--
19	Saddleback Valley	109	50.6	0	13.1
RIVERSIDE COUNTY					
22	Norco/Corona	--	--	--	--
23	Metropolitan Riverside County 1	350	104.3	8(2.3)	24.9
23	Metropolitan Riverside County 2	116	73.3	1(0.9)	22.6
24	Perris Valley	--	--	--	--
25	Lake Elsinore	--	--	--	--
29	Banning Airport	--	--	--	--
30	Coachella Valley 1**	112	21.2	0	9.0
30	Coachella Valley 2**	118	26.8	0	11.4
SAN BERNARDINO COUNTY					
32	Northwest San Bernardino Valley	--	--	--	--
33	Southwest San Bernardino Valley	118	88.9	3(2.5)	23.8
34	Central San Bernardino Valley1	111	98.1	1(0.9)	21.8
34	Central San Bernardino Valley2	119	73.9	1(0.8)	22.2
35	East San Bernardino Valley	--	--	--	--
37	Central San Bernardino Mountains	--	--	--	--
38	East San Bernardino Mountains	55	35.0	0	10.5
DISTRICT MAXIMUM			121.2	8	24.9
SOUTH COAST AIR BASIN			121.2	14	24.9

KEY:

$\mu g/m^3$ = micrograms per cubic meter	-- = Pollutant not monitored
AAM = Annual Arithmetic Mean	** Salton Sea Air Basin

f PM2.5 samples were collected every three days at all sites except for Station Numbers 060, 072, 087, 3176, and 4144 where samples were taken every day, and Station Number 5818 where samples were taken every six days.

g The federal standard is AAM PM2.5 > 15 $\mu g/m^3$ and the state standard is AAM PM2.5 > 12 $\mu g/m^3$ (new standard, established July 5, 2003).

Table 3-2 (Continued)
2003 Air Quality Data – South Coast Air Quality Management District

TOTAL SUSPENDED PARTICULATES TSP [h]				
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. ($\mu g/m^3$, 24-hour)	Annual Average AAM Conc. ($\mu g/m^3$)
LOS ANGELES COUNTY (Co)				
1	Central Los Angeles	61	157	73.5
2	Northwest Coast Los Angeles Co	59	114	49.4
3	Southwest Coast Los Angeles Co	61	122	56.7
4	South Coast Los Angeles Co	64	159	63.9
6	West San Fernando Valley	--	--	--
7	East San Fernando Valley	--	--	--
8	West San Fernando Valley	59	111	54.3
9	East San Gabriel Valley 1	55	176	83.9
9	East San Gabriel Valley 2	--	--	--
10	Pomona/Walnut Valley	--	--	--
11	South San Gabriel Valley	60	160	75.4
12	South Central Los Angeles Co	60	449	105.2
13	Santa Clarita Valley	--	--	--
ORANGE COUNTY				
16	North Orange County	--	--	--
17	Central Orange County	--	--	--
18	North Coastal Orange County	--	--	--
19	Saddleback Valley	--	--	--
RIVERSIDE COUNTY				
22	Norco/Corona	--	--	--
23	Metropolitan Riverside County 1	58	283	105.6
23	Metropolitan Riverside County 2	60	225	85.0
24	Perris Valley	--	--	--
25	Lake Elsinore	--	--	--
29	Banning Airport	--	--	--
30	Coachella Valley 1**	--	--	--
30	Coachella Valley 2**	--	--	--
SAN BERNARDINO COUNTY				
32	NW San Bernardino Valley	60	269	69.6
33	SW San Bernardino Valley	--	--	--
34	Central San Bernardino Valley 1	59	335	119.8
34	Central San Bernardino Valley 2	60	242	97.8
35	East San Bernardino Valley	--	--	--
37	Central San Bernardino Mountains	--	--	--
38	East San Bernardino Mountains	--	--	--
DISTRICT MAXIMUM			449	119.8
SOUTH COAST AIR BASIN			449	119.8

KEY:

$\mu g/m^3$ = micrograms per cubic meter	-- = Pollutant not monitored
AAM = Annual Arithmetic Mean	** Salton Sea Air Basin

h Total suspended particulates, lead, and sulfates were determined from samples collected every six days by the high volume sampler method, on glass fiber filter media.

Table 3-2 (Concluded)
2003 Air Quality Data – South Coast Air Quality Management District

		LEAD [i]		SULFATES (SOx) [i]	
Source Receptor Area No.	Location of Air Monitoring Station	Max. Monthly Average Conc.[j] ($\mu g/m^3$)	Max. Quarterly Average Conc.[j] ($\mu g/m^3$)	Max. Conc. ($\mu g/m^3$, 24-hour)	No. (%) Samples Exceeding State Standard ≥ 25 $\mu g/m^3$, 24-hour
LOS ANGELES COUNTY (Co)					
1	Central Los Angeles	0.15	0.15	14.6	0
2	Northwest Coast Los Angeles Co	--	--	14.3	0
3	Southwest Coast Los Angeles Co	0.17	0.10	16.4	0
4	South Coast Los Angeles Co	--	0.05	17.8	0
6	West San Fernando Valley	--	--	--	--
7	East San Fernando Valley	--	--	--	--
8	West San Fernando Valley	--	--	12.7	0
9	East San Gabriel Valley 1	--	--	11.7	0
9	East San Gabriel Valley 2	--	--	--	--
10	Pomona/Walnut Valley	--	--	--	--
11	South San Gabriel Valley	0.05	0.04	14.4	0
12	South Central Los Angeles Co	0.04	0.04	14.9	0
13	Santa Clarita Valley	--	--	--	--
ORANGE COUNTY					
16	North Orange County	--	--	--	--
17	Central Orange County	--	--	--	--
18	North Coastal Orange County	--	--	--	--
19	Saddleback Valley	--	--	--	--
RIVERSIDE COUNTY					
22	Norco/Corona	--	--	--	--
23	Metropolitan Riverside County 1	0.02	0.02	10.1	0
23	Metropolitan Riverside County 2	0.02	0.01	10.0	0
24	Perris Valley	--	--	--	--
25	Lake Elsinore	--	--	--	--
29	Banning Airport	--	--	--	--
30	Coachella Valley 1**	--	--	--	--
30	Coachella Valley 2**	--	--	--	--
SAN BERNARDINO COUNTY					
32	NW San Bernardino Valley	0.02	0.02	11.8	0
33	SW San Bernardino Valley	--	--	--	--
34	Central San Bernardino Valley 1	--	--	11.9	0
34	Central San Bernardino Valley 2	0.14	0.08	12.1	0
35	East San Bernardino Valley	--	--	--	--
37	Central San Bernardino Mountains	--	--	--	--
38	East San Bernardino Mountains	--	--	--	--
DISTRICT MAXIMUM		0.17	0.15	17.8	0
SOUTH COAST AIR BASIN		0.17	0.15	17.8	0

KEY:

$\mu g/m^3$ = micrograms per cubic meter	** Salton Sea Air Basin
-- = Pollutant not monitored	

i Total suspended particulates, lead, and sulfate were determined from samples collected every six days by the high volume sampler method, on glass fiber filter media.

j The federal standard (quarterly average lead > 1.5 $\mu g/m^3$) and the state standard (monthly average lead ≥ 1.5 $\mu g/m^3$) were not exceeded. In 2003, special monitoring immediately downwind of stationary sources of lead was carried out at four locations. The maximum monthly average lead concentration measured 0.35 $\mu g/m^3$ and the maximum quarterly average lead concentration measured 0.29 $\mu g/m^3$, both recorded in Central Los Angeles.

Carbon Monoxide

CO is a colorless, odorless gas formed by the incomplete combustion of fuels. CO competes with oxygen, often replacing it in the blood, thus reducing the blood's ability to transport oxygen to vital organs in the body. The ambient air quality standard for carbon monoxide is intended to protect persons whose medical condition already compromises their circulatory systems' ability to deliver oxygen. These medical conditions include certain heart ailments, chronic lung diseases, and anemia. Persons with these conditions have reduced exercise capacity even when exposed to relatively low levels of CO. Fetuses are at risk because their blood has an even greater affinity to bind with CO. Smokers are also at risk from ambient CO levels because smoking increases the background level of CO in their blood.

CO was monitored at 23 locations in the district in 2002. The federal and state eight-hour CO standards were exceeded at one location. The highest eight-hour average CO concentration of the year (10.1 ppm) was 106 percent of the federal standard. Source/Receptor Area No. 12, South Central Los Angeles County (Station No. 084), was the only location to report one day exceedances of both the federal and state CO standards in 2002.

Ozone

Unlike primary criteria pollutants that are emitted directly from an emissions source, ozone is a secondary pollutant. It is formed in the atmosphere through a photochemical reaction of VOC, NOx, oxygen, and other hydrocarbon materials with sunlight.

Ozone is a deep lung irritant, causing the passages to become inflamed and swollen. Exposure to ozone produces alterations in respiration, the most characteristic of which is shallow, rapid breathing and a decrease in pulmonary performance. Ozone reduces the respiratory system's ability to fight infection and to remove foreign particles. People who suffer from respiratory diseases such as asthma, emphysema, and chronic bronchitis are more sensitive to ozone's effects. In severe cases, ozone is capable of causing death from pulmonary edema. Early studies suggested that long-term exposure to ozone results in adverse effects on morphology and function of the lung and acceleration of lung-tumor formation and aging. Ozone exposure also increases the sensitivity of the lung to bronchoconstrictive agents such as histamine, acetylcholine, and allergens.

The national ozone ambient air quality standard is exceeded far more frequently in the SCAQMD's jurisdiction than almost every other area in the United States[5]. In the past few years, ozone air quality has been the cleanest on record in terms of maximum concentration and number of days exceeding the standards and episode levels. Ozone levels were monitored at 28 locations in 2002. Maximum one-hour average and eight-hour average ozone concentrations in 2002 (0.169 ppm and 0.145 ppm) were 141 percent and 181 percent of the federal one-hour and eight-hour standards, respectively. Ozone concentrations exceeded the one-hour state standard at all, but four of the monitored locations in 2002.

In 1997, the EPA promulgated a new NAAQS for ozone. Soon thereafter, a court decision ordered that the EPA could not enforce the new standard until adequate justification for the

[5] It should be noted that in 1999 and 2000 Houston, Texas exceeded the federal ozone standards on more occasions than the district and reported the highest ozone concentrations in the nation.

new standard was provided. The EPA appealed the decision to the Supreme Court. On February 27, 2001, the Supreme Court upheld EPA's authority and methods to establish clean air standards. The Supreme Court, however, ordered EPA to revise its implementation plan for the new ozone standard. Meanwhile, CARB and local air districts continue to collect technical information in order to prepare for an eventual SIP to reduce unhealthful levels of ozone in areas violating the new federal standard. California has previously developed a SIP for the current ozone standard, which has been approved by EPA for the South Coast Air Basin.

Nitrogen Dioxide

NO2 is a brownish gas that is formed in the atmosphere through a rapid reaction of the colorless gas nitric oxide (NO) with atmospheric oxygen. NO and NO2 are collectively referred to as NOx. NO2 can cause health effects in sensitive population groups such as children and people with chronic lung diseases. It can cause respiratory irritation and constriction of the airways, making breathing more difficult. Asthmatics are especially sensitive to these effects. People with asthma and chronic bronchitis may also experience headaches, wheezing and chest tightness at high ambient levels of NO2. NO2 is suspected to reduce resistance to infection, especially in young children.

By 1991, exceedances of the federal standard were limited to one location in Los Angeles County. The Basin was the only area in the United States classified as nonattainment for the federal NO2 standard under the 1990 Clean Air Act Amendments (CAA). No location in the area of SCAQMD's jurisdiction has exceeded the federal standard since 1992 and the South Coast Air Basin was designated attainment for the national standard in 1998. In 2002, 23 stations monitored NO2 levels in the district and the maximum annual arithmetic mean (AAM) was 0.0402 ppm which represents 75 percent of the federal standard (the federal standard is an AAM of NO2 greater than 0.0534 ppm.). The more stringent one-hour state standard (0.25 ppm) was exceeded for one day in Source/Receptor Area No. 7, East San Fernando Valley (Station No. 069) in year 2002. Despite declining NOx emissions over the last decade, further NOx emissions reductions are necessary to ensure no further exceedances of the NO2 standard and because NOx emissions are PM10 and ozone precursors.

Sulfur Dioxide

SO2 is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels. Health effects include acute respiratory symptoms and difficulty in breathing for children. In 2002, seven locations monitored SO2 levels and neither the state nor the federal standards were exceeded. Though SO2 concentrations have been reduced to levels well below state and federal standards, further reductions in emissions of SO2 are needed because it is a precursor for sulfates, PM10, and PM2.5.

Particulate Matter (PM10)

PM10 is defined as suspended particulate matter measuring 10 microns or less in diameter and includes a complex mixture of man-made and natural substances including sulfates, nitrates, metals, elemental carbon, sea salt, soil, organics and other materials. PM10 may have adverse health impacts because these microscopic particles are able to penetrate deeply into the respiratory system. In some cases, the particulates themselves may cause actual damage to the alveoli of the lungs or they may contain adsorbed substances that are

injurious. Children can experience a decline in lung function and an increase in respiratory symptoms from PM10 exposure. People with influenza, chronic respiratory disease and cardiovascular disease can be at risk of aggravated illness from exposure to fine particles. Increases in death rates have been statistically linked to corresponding increases in PM10 levels.

In 2003, PM10 was monitored at 19 locations in the district. There were two exceedances of the federal 24-hour standard (150 μg/m3), while the state 24-hour standard (50 μg/m3) was exceeded at all 19 monitored locations. The federal standard (AAM greater than 50 μg/m3) was exceeded in two locations.

Particulate Matter (PM2.5)

In 1997, the USEPA promulgated a new national ambient air quality standard for PM2.5, particulate matter 2.5 microns or less in diameter. The PM2.5 standard is a subset of PM10 such that it complements existing national and state ambient air quality standards that target the full range of inhalable PM10. In addition to the health effects for PM10, additional effects from exposure to PM2.5 may result in increased hospital admissions and emergency room visits for heart and lung disease, increased respiratory symptoms and disease, decreased lung functions, and premature death.

The SCAQMD began regular monitoring of PM2.5 in 1999. In 2003, concentrations of PM2.5 were monitored at 18 locations throughout the district. The federal 24-hour standard (65 $\mu g/m^3$) was exceeded at 12 locations. The federal standard (AAM greater than 15 $\mu g/m^3$) was exceeded in 14 locations, and the state standard (AAM greater than 12 $\mu g/m^3$) was exceeded in 15 locations.

Lead

Lead concentrations once exceeded the state and national ambient air quality standards by a wide margin, but have not exceeded state or federal standards at any regular monitoring station since 1982. Though special monitoring sites immediately downwind of lead sources recorded very localized violations of the state standard in 1994, no violations were recorded at these stations since that time.

Sulfates

Sulfates or SOx are a group of chemical compounds containing the sulfate group, which is a sulfur atom with four oxygen atoms attached. Though not exceeded in 1993, 1996, 1997, and 1998, the 24-hour state sulfate standard (25 $\mu g/m^3$) was exceeded at three locations in 1994 and one location in 1995, 1999, 2000 and 2001. There are no federal air quality standards for sulfate.

Visibility Reducing Particles

Since deterioration of visibility is one of the most obvious manifestations of air pollution and plays a major role in the public's perception of air quality, the state of California has adopted a standard for visibility or visual range. Until 1989, the standard was based on visibility estimates made by human observers. The standard was changed to require measurement of visual range using instruments that measure light scattering and absorption by suspended particles.

Volatile Organic Compounds

It should be noted that there are no state or national ambient air quality standards for VOCs because they are not classified as criteria pollutants. VOCs are regulated, however, because limiting VOC emissions reduces the rate of photochemical reactions that contribute to the formation of ozone. They are also transformed into organic aerosols in the atmosphere, contributing to higher PM10 and lower visibility levels.

Although health-based standards have not been established for VOCs, health effects can occur from exposures to high concentrations of VOCs because of interference with oxygen uptake. In general, ambient VOC concentrations in the atmosphere are suspected to cause coughing, sneezing, headaches, weakness, laryngitis, and bronchitis, even at low concentrations. Some hydrocarbon components classified as VOC emissions are thought or known to be hazardous. Benzene, for example, one hydrocarbon component of VOC emissions, is known to be a human carcinogen.

Non-Criteria Pollutant Emissions

Although the SCAQMD's primary mandate is attaining both the state ambient air quality standards and the NAAQS for criteria pollutants within the district, SCAQMD also has a general responsibility pursuant to the Health and Safety Code §41700 to control emissions of air contaminants and prevent endangerment to public health. As a result, over the last few years the SCAQMD has regulated pollutants other than criteria pollutants such as TACs, greenhouse gases and stratospheric ozone depleting compounds. The SCAQMD has developed a number of rules to control non-criteria pollutants from both new and existing sources. These rules originated through state directives, CAA requirements, or the SCAQMD rulemaking process.

In addition to promulgating non-criteria pollutant rules, the SCAQMD has been evaluating AQMP control measures as well as existing rules to determine whether or not they would affect, either positively or negatively, emissions of non-criteria pollutants. For example, rules in which VOC components of coating materials are replaced by a non-photochemically reactive chlorinated substance would reduce the impacts resulting from ozone formation, but could increase emissions of toxic compounds or other substances that may have adverse impacts on human health.

Tables 3-3, 3-4, 3-5 and 3-6 lists some key ingredients that are used in various PVC and CPVC primers, ABS welding solvents, sheet plastic welding solvents, and top and trim adhesives; and whether those ingredients are regulated under Rule 1401 - New Source Review of Toxic Air Contaminants. It is important to note that this table does not represent all of the ingredients used to manufacture PVC and CPVC primers, ABS welding cements and sheet plastic welding solvents. Of the ingredients listed in Tables 3-3, 3-4, 3-5 and 3-6 one ingredient, methylene, is regulated for carcinogenic risk, chronic (long-term non-cancer) risk and acute (short-term non-cancer) risk, one ingredient, methyl ethyl ketone, is regulated for its acute risk.

Table 3-3
Typical Ingredients Found in PVC and CPVC Primer

Ingredients	CAS #	Weight (percent)	Rule 1401 Regulated Health Impacts	Significance Threshold (at 25 meters)
Methyl Ethyl Ketone	78-93-3	15-20%	Acute Non-Cancer	6.50 lb/hr
Tetrahydrofuran	109-99-9	20-30%	Not Listed	Not Listed
Cyclohexanone	108-94-1	30-40%	Not Listed	Not Listed
Acetone	67-64-1	5-15%	Not Listed	Not Listed

Table 3-4
Typical Ingredients Found in ABS Cements

Ingredients	CAS #	Weight (percent)	Rule 1401 Regulated Health Impacts	Significance Threshold (at 25 meters)
Methyl Ethyl Ketone	78-93-3	25-65%	Acute Non-Cancer	Not Listed
Acetone	67-64-1	5-15%	Not Listed	Not Listed

Table 3-5
Typical Ingredients Found in Sheet Plastic Welding

Ingredients	CAS #	Weight (percent)	Rule 1401 Regulated Health Impacts	Significance Threshold (at 25 meters)
Methylene Chloride	75-09-02	40-65%	Carcinogen Chronic Non-Cancer; Acute Non-Cancer	33.06 lb/yr 7 lb/hr
Methyl Acetate	79-20-9	10-50%	Not Listed	Not Listed

Table 3-6
Typical Ingredients Found in Top and Trim Adhesives

Ingredients	CAS #	Weight (percent)	Rule 1401 Regulated Health Impacts	Significance Threshold (at 25 meters)
Acetone	67-64-1	< 75	Not Listed	Not Listed
Cyclohexane	110-82-7	5	Not Listed	Not Listed
Cyclohexanone	108-94-1	3 – 7	Not Listed	Not Listed
Dimethyl Ether	115-10-6	10	Not Listed	Not Listed
Hexane	110-54-3	< 20	Chronic Non-Cancer	231,000 lbs/yr
Light Aliphatic Naphtha	64742-89-8	< 25	Not Listed	Not Listed
Methyl Acetate	79-20-9	7 - 13	Not Listed	Not Listed
Propane	74-98-6	< 20	Not Listed	Not Listed
Toluene	108-88-3	< 10	Chronic Non-Cancer; Acute Non-Cancer	9,920 lbs/yr 18.5 lbs/hr
Zinc Oxide	1314-13-2	< 1.5	Not Listed*	Not Listed*

* This compound is not classified in Rule 1401 as carcinogenic, but it has a chronic risk value proposed by OEHHA that has not yet been finalized.

The following sections summarize the existing setting for the two major categories of non-criteria pollutants: compounds that contribute to ozone depletion and global warming, and TACs.

Ozone Depletion and Global Warming

The SCAQMD adopted a "Policy on Global Warming and Stratospheric Ozone Depletion" on April 6, 1990. The policy commits the SCAQMD to consider global impacts in rulemaking and in drafting revisions to the AQMP.

In March 1992, the SCAQMD Governing Board reaffirmed this policy and adopted amendments to the policy to include the following directives:

- phase out the use and corresponding emissions of chlorofluorocarbons (CFCs), methyl chloroform (1,1,1-trichloroethane or TCA), carbon tetrachloride, and halons by December 1995;
- phase out the large quantity use and corresponding emissions of hydrochlorofluorocarbons (HCFCs) by the year 2000;
- develop recycling regulations for HCFCs;
- develop an emissions inventory and control strategy for methyl bromide; and
- support the adoption of a California greenhouse gas emission reduction goal.

In support of these polices, the SCAQMD Governing Board has adopted several rules to reduce ozone depleting compounds. Several other rules concurrently reduce global warming gases and criteria pollutants.

On March 17, 2000, the SCAQMD Governing Board approved "An Air Toxics Control Plan for the Next Ten Years." The Air Toxics Control Plan identifies potential strategies to reduce toxic levels in the Basin over the ten years following adoption. To the extent the strategies are implemented by the relative agencies, the plan will improve public health by reducing health risks associated with both mobile and stationary sources. Exposure to toxic air contaminants can increase the risk of contracting cancer or result in other deleterious health effects which target such systems as cardiovascular, reproductive, hematological, or nervous. The health effects may be through short-term, high-level or "acute" exposure or long-term, low-level or "chronic" exposure.

Toxic Air Contaminants

Historically, the SCAQMD has regulated criteria air pollutants using either a technology-based or an emissions limit approach. The technology-based approach defines specific control technologies that may be installed to reduce pollutant emissions. The emission limit approach establishes an emission limit, and allows industry to use any emission control equipment, as long as the emission requirements are met. The regulation of toxic air contaminants (TACs) requires a similar regulatory approach as explained in the following subsections.

Control of TACs Under the TAC Identification and Control Program

California's TAC identification and control program, adopted in 1983 as Assembly Bill (AB) 1807, is a two-step program in which substances are identified as TACs, and airborne toxic control measures (ATCMs) are adopted to control emissions from specific sources. CARB has adopted a regulation designating all 188 federal hazardous air pollutants (HAPs) as TACs.

ATCMs are developed by CARB and implemented by the SCAQMD and other air districts through the adoption of regulations of equal or greater stringency. Generally, the ATCMs reduce emissions to achieve exposure levels below a determined health threshold. If no such threshold levels are determined, emissions are reduced to the lowest level achievable through the best available control technology unless it is determined that an alternative level of emission reduction is adequate to protect public health.

Under California state law, a federal National Emission Standard for Hazardous Air Pollutants (NESHAP) automatically becomes a state ATCM, unless CARB has already adopted an ATCM for the source category. Once a NESHAP becomes an ATCM, CARB and the air pollution control or air quality management district have certain responsibilities related to adoption or implementation and enforcement of the NESHAP/ATCM.

Control of TACs Under the Air Toxics "Hot Spots" Act

The Air Toxics Hot Spots Information and Assessment Act of 1987 (AB2588) establishes a state-wide program to inventory and assess the risks from facilities that emit TACs and to notify the public about significant health risks associated with the emissions. Facilities are phased into the AB2588 program based on their emissions of criteria pollutants or their occurrence on lists of toxic emitters compiled by the SCAQMD. Phase I consists of facilities that emit over 25 tons per year of any criteria pollutant and facilities present on the SCAQMD's toxics list. Phase I facilities entered the program by reporting their air TAC emissions for calendar year 1989. Phase II consists of facilities that emit between 10 and 25 tons per year of any criteria pollutant, and submitted air toxic inventory reports for calendar

year 1990 emissions. Phase III consists of certain designated types of facilities which emit less than 10 tons per year of any criteria pollutant, and submitted inventory reports for calendar year 1991 emissions. Inventory reports are required to be updated every four years under the state law.

In October 1992, the SCAQMD Governing Board first adopted public notification procedures specifically for Phase I and II facilities by amending Rule 212 - Standards For Approving Permits and Issuing Public Notice. These procedures require AB2588 facilities to provide public notice when exceeding the following risk levels:

- Maximum Individual Cancer Risk: greater than 10 in 1 million (10×10^{-6})
- Total Hazard Index: greater than 1.0 for TACs except lead, or > 0.5 for lead

Public notice is to be provided by letters mailed to all addresses and all parents of children attending school in the impacted area. In addition, facilities must hold a public meeting and provide copies of the facility risk assessment in all school libraries and a public library in the impacted area.

The SCAQMD continues to complete its review of the health risk assessments submitted to date and may require revision and resubmission as appropriate before final approval. Notification will be required from facilities with a significant risk under the AB2588 program based on their initial approved health risk assessments and will continue on an ongoing basis as additional and subsequent health risk assessments are reviewed and approved.

Control of TACs With Risk Reduction Audits and Plans

Senate Bill (SB) 1731, enacted in 1992 and codified at Health and Safety Code §44390 et seq., amended AB2588 to include a requirement for facilities with significant risks to prepare and implement a risk reduction plan which will reduce the risk below a defined significant risk level within specified time limits. SCAQMD Rule 1402 - Control of Toxic Air Contaminants From Existing Sources, was adopted on April 8, 1994, to implement the requirements of SB1731.

In addition to the TAC rules adopted by SCAQMD under authority of AB1807 and SB1731, the SCAQMD has adopted source-specific TAC rules, based on the specific level of TACs emitted and the needs of the area. These rules are similar to the state's ATCMs because they are source-specific and only address emissions and risk from specific compounds and operations.

Cancer Risks from Toxic Air Contaminants

New and modified sources of toxic air contaminants in the SCAQMD are subject to Rule 212 and Rule 1401. Rule 212 requires notification of the SCAQMD's intent to grant a permit to construct a significant project, defined as a new or modified permit unit located within 1000 feet of a school (a state law requirement under AB3205), a new or modified permit unit posing an maximum individual cancer risk of one in one million (1×10^{-6}) or greater, or a new or modified facility with criteria pollutant emissions exceeding specified daily maximums. Distribution of notice is required to all addresses within a 1/4-mile radius, or other area deemed appropriate by the SCAQMD. Rule 1401 currently controls emissions of carcinogenic and non-carcinogenic (health effects other than cancer) air contaminants

from new, modified and relocated sources by specifying limits on cancer risk and hazard index (explained further below), respectively.

Health Effects

One of the primary health risks of concern due to exposure to TACs is the risk of contracting cancer. The carcinogenic potential of TACs is a particular public health concern because it is currently believed by many scientists that there is no "safe" level of exposure to carcinogens. Any exposure to a carcinogen poses some risk of causing cancer. It is currently estimated that about one in four deaths in the United States is attributable to cancer. About two percent of cancer deaths in the United States may be attributable to environmental pollution (Doll and Peto 1981). The proportion of cancer deaths attributable to air pollution has not been estimated using epidemiological methods.

Non-Cancer Health Risks from Toxic Air Contaminants

Unlike carcinogens, for most noncarcinogens it is believed that there is a threshold level of exposure to the compound below which it will not pose a health risk. The California Environmental Protection Agency (CalEPA) Office of Environmental Health Hazard Assessment develops Reference Exposure Levels (RELs) for TACs which are health-conservative estimates of the levels of exposure at or below which health effects are not expected. The non-cancer health risk due to exposure to a TAC is assessed by comparing the estimated level of exposure to the REL. The comparison is expressed as the ratio of the estimated exposure level to the REL, called the hazard index (HI).

AFFECTED SOURCES

The types of facilities affected by the proposed amendments are installers of automotive and marine top and trim, plumbers and city/county public works municipalities, and several businesses related to fabricating display cases, signage, trophies and aquariums (to name a few) out of sheet plastic.

Nearly all affected industries are area sources in nature, that is, operations that do not require written permits pursuant to Rule 219, because of low spray volumes, or hand applications of solvent cements and solvent welding solutions. Table 3-7 presents an estimate of the number of affected facilities. Table 3-8 presents an estimate of the existing emissions inventory.

Table 3-7
Numbers of Known Industries

Industry Type	Numbers of Operators
Automotive Top and Trim	752
Marine Top and Trim	40
Plumbers	8,000+
Plastic Fabricators	270

Table 3-8
Estimated Existing Emissions Inventory

Industry Type	VOC Emissions (ton/day)	Methylene Chloride Emissions (ton/day)
Top and Trim[1]	0.25	
Plumbers[2]	2.18	
Plastic Fabricators[3]		0.058
Total	**2.43**	**0.058**

1) SCAQMD, Final Subsequent Environmental Assessment, Proposed Rule 1168 – Adhesive and Sealant Application, SCAQMD No. 08070BAR, Table 4-2, September 24, 2003.
2) Appendix B, Table B-1
3) Presentation titled SCAQMD Rule 1168, Methylene Chloride Use in Solvent Cements by manufacturer delivered to SCAQMD on March 23, 2004.

CHAPTER 4

ENVIRONMENTAL IMPACTS

Introduction
Potential Environmental Impacts and Mitigation Measures
Potential Environmental Impacts Found Not to be Significant
Consistency

INTRODUCTION

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

The CEQA Guidelines indicate that the degree of specificity required in a CEQA document depends on the type of project being proposed [CEQA Guidelines §15146]. The detail of the environmental analysis for certain types of projects cannot be as great as for others. For example, the environmental document for projects, such as the adoption or amendment of a comprehensive zoning ordinance or a local general plan, should focus on the secondary effects that can be expected to follow from the adoption or amendment, but the analysis need not be as detailed as the analysis of the specific construction projects that might follow. As a result, this ~~Revised Draft~~ Final SEA analyzes impacts on a regional level and impacts on the level of individual industries or individual facilities where feasible.

The categories of environmental impacts to be studied in a CEQA document are established by CEQA [Public Resources Code, §21000 et seq.], and the CEQA Guidelines, as promulgated by the State of California Secretary of Resources. Under the CEQA Guidelines, there are approximately 17 environmental categories in which potential adverse impacts from a project are evaluated. Projects are evaluated against the environmental categories in an Environmental Checklist and those environmental categories that may be adversely affected by the project are further analyzed in the appropriate CEQA document.

POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Pursuant to CEQA, an NOP/IS and Final EA were prepared for the 2002 amendments to Rule 1168, and these documents are the basis for the preparation of this ~~Revised Draft~~ Final SEA to the current proposed amendments to Rule 1168. Of the 17 potential environmental impact categories previously analyzed, only one (air quality) was concluded to have potentially significant adverse impacts resulting from implementing the 2002 amendments. Further, the current proposed amendments to Rule 1168 are directly related to the analysis for the 2002 amendments because the currently proposed project constitutes a modification of the previously adopted project. Thus, air quality is again expected to be potentially significantly adversely affected by the proposed project.

Therefore, the environmental impact area of air quality is the focus of the subsequent detailed evaluation in this chapter. The environmental impact analysis for air quality incorporates a "worst-case" approach. This entails the premise that whenever the analysis requires that assumptions be made, those assumptions that result in the greatest adverse impacts are typically

chosen. This method ensures that all potential effects of the proposed project are documented for the decision-makers and the public.

Accordingly, the following analyses use a conservative "worst-case" approach for analyzing the potentially significant adverse environmental impacts associated with the implementation of the proposed project.

Air Quality

Under the existing rule, emissions are controlled by limiting the VOC content of the adhesives and sealants used and applied for various types of activities. Rule 1168 also prohibits the use of certain toxic chemicals in adhesives and sealants. The proposal contains the following amendments to Rule 1168:

- Extend the 540 grams per liter interim VOC content limit for top and trim adhesives to January 1, 2007. The effective date for the final VOC content limit of 250 grams per liter for top and trim adhesives under the current rule is January 1, 2005. Therefore, the effective date for the final VOC content limit of 250 grams per liter for top and trim adhesives would be delayed until January 1, 2007.
- Rescind the January 1, 2005, prohibition of methylene chloride used to bond hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications. The proposed rule would allow the use of solvent welding formulations containing methylene chloride used to bond hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications provided the concentration of methylene chloride does not exceed 60 percent by weight and the purchase of all methylene chloride welding products for hard sheet plastic does not exceed 20 gallons per calendar year at a single facility.
- Rescind the January 1, 2005, 285 grams per liter VOC content limit requirement for solvent cements used to weld polyvinyl chloride (PVC) plastic pipes and fittings, and instead keep the PVC welding VOC content limit requirement at the interim 510 grams per liter.
- Rescind the January 1, 2005, 270 grams per liter VOC content limit requirement for solvent cements used to weld chlorinated polyvinyl chloride (CPVC) plastic pipes and fittings, and instead keep the CPVC welding VOC content limit requirement at the interim 490 grams per liter.
- Rescind the January 1, 2005 VOC content limit requirement for PVC/CPVC primers of 250 grams per liter, and extend the interim VOC content limit requirement for PVC/CPVC primers of 650 grams per liter from the January 1, 2005 effective date to July 1, 2005. On July, 1, 2005, reduce the VOC content limit requirement for PVC/CPVC primers from 650 grams per liter to 550 grams per liter. ~~Replace the January 1, 2005, the VOC content limit requirement for PVC/CPVC primers of 250 grams per liter with a VOC content limit requirement of 550 grams per liter. This new 550 gram per liter VOC content limit is lower that the existing PVC/CPVC primers VOC content limit of 600 grams per liter.~~
- Lower the acrylonitrile-butadiene-styrene (ABS) welding VOC content limit requirement to 325 grams per liter which is currently at 400 grams per liter effective July 1, 2005.

As shown in the following discussion, the proposed amendments to delay, replace and rescind previously described ~~the final~~ VOC content limit requirements ~~for top and trim adhesives for two years, rescind the future VOC content limits of PVC and PCPVC cements, and replace the 250 gram per liter VOC content limit for PVC/CPVC primers with a 550 gram per liter VOC~~

~~content limit is~~ are expected to eliminate VOC emission reductions originally anticipated in the 2002 amendments to Rule 1168. An additional VOC content limit reduction for ABS welding is included in PAR 1168. However, even with the additional VOC reductions for ABS welding, based on the volume of PVC/CPVC cement and primer sold and presumably used, the VOC emission reductions foregone are anticipated to exceed the SCAQMD's daily significance threshold and, thus, the proposed project is expected to have significant adverse air quality impacts. The following discussion also demonstrates that the proposed methylene chloride concentration limit of 60 percent by weight and the proposed facility limit of 20 gallons per year would prevent significant adverse air quality impacts from adhesive formulated with methylene chloride.

Significance Criteria

The project will be considered to have significant adverse air quality impacts if any one of the thresholds in Table 4-1 are equaled or exceeded.

Construction Emissions

PROJECT-SPECIFIC IMPACT: The implementation of the proposed amended rule will not trigger any construction activity. No add-on control equipment or additional employees will be required from the implementation of the proposed amendments. Additionally, no add-on control equipment will be used to reduce VOC or methylene chloride emissions at affected facilities. The primary effects of the proposed amendments are to allow the continued use of existing adhesive products that comply with the existing VOC content limit requirements of 540 grams per liter for top and trim adhesives, 510 grams per liter for PVC welding and 490 grams per liter for CPVC welding, which would rescind the future January 1, 2005 VOC content limit requirements of 285 grams per liter for PVC welding and 270 grams per liter for CPVC welding. The final VOC content limit of 250 grams per liter for top and trim adhesive would be delayed until January 1, 2007, during which time the interim VOC limit of 540 would remain in place. ~~New~~ A new VOC content limit~~s~~ requirement of 325 grams per liter (currently 400 grams per liter) for ABS cements effective July 1, 2005 would be established by PAR 1168.~~, and the~~ PAR 1168 would rescind the January 1, 2005 VOC content limit requirement of 250 grams per liter for PVC/CPVC primers. After January 1, 2005, the 650 grams per liter interim VOC content limit requirement for PVC/CPVC primers would remain in effect until July 1, 2007 when it would be replaced with a 550 grams per liter VOC content limit requirement.~~ (currently 650 grams per liter) for PVC/CPVC primers would replace the 250 gram per liter VOC content limit~~. Replacing the prohibition of methylene chloride in solvent welding formulations used to bond hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrication with concentration and facility limits would also not require additional construction.

Therefore, no construction and construction air quality impacts are anticipated for implementing PAR 1168.

Table 4-1
SCAQMD Air Quality Significance Thresholds

Mass Daily Thresholds		
Pollutant	**Construction**	**Operation**
NOx	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM10	150 lbs/day	150 lbs/day
SOx	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Lead	3 lbs/day	3 lbs/day
TAC, AHM, and Odor Thresholds		
Toxic Air Contaminants (TACs)	Maximum Incremental Cancer Risk (MICR) $\geq$ 10 in 1 million Hazard Index (HI) $\geq$ 1.0 (project increment) Hazard Index (HI) $\geq$ 3.0 (facility-wide)	
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402	
Ambient Air Quality Thresholds for Criteria Pollutants		
NO_2 1-hour average Annual average	20 $\mu g/m^3$ (= 1.0 pphm) 1 $\mu g/m^3$ (= 0.05 pphm	
PM10 24-hour average Annual Geometric Mean	2.5 µg/m3 1.0 µg/m3	
Sulfate 24-hour average	1.0 µg/m3	
CO 1-hour average 8-hour average	1.1 mg/m^3 (= 1.0 ppm) 0.50 mg/m^3 (= 0.45 ppm)	

AHM = Acutely Hazardous Material; TAC = toxic air contaminant; mg/m^3 = milligram per cubic meter; $\mu g/m^3$ = microgram per cubic meter; pphm = parts per hundred million; ppm = parts per million

PROJECT-SPECIFIC MITIGATION: No mitigation required.

Operational Emissions

PROJECT-SPECIFIC IMPACT:

VOC Emissions

Implementation of PAR 1168 is expected to result in VOC emission reductions foregone. Retaining the current VOC content limits for top and trim, PVC and CPVC welding; coupled with the reduction in VOC content for ABS welding and adhesive primers for ~~plastic~~ PVC and CPVC, would forego the 2002 FEA VOC emission reductions. Tables 4-2, 4-3 and 4-4 below summarize the inventory and the emissions foregone, resulting from these proposed amendments. VOC emission limits, emissions inventory, emissions reductions, and emissions foregone for PVC, CPVC, and ABS welding; and PVC and CPVC primer are presented in Table 4-2. Proposed changes to these categories would become permanent if the proposed project is adopted. Top and trim inventory, VOC emission inventory and VOC emission reductions delayed are presented in Table 4-3. This delay in VOC emission reductions is temporary and would end on January 1, 2007. A summary VOC emission reduction foregone for all affected adhesives are presented in Table 4-4. The first column presents the VOC emission reductions foregone in tons per day if final VOC content limits for all affected adhesive categories are rescinded. The second column presents the VOC emission reductions foregone in tons per day that would occur ~~after~~ between January 1, 2005 and July 1, 2005, if the project were approved. The third column presents the VOC emission foregone between July 1, 2005 and January 1, 2007, if the project were approved. The last column presents the VOC emission reductions forgone in tons per day that would occur after January 1, 2007, if the project were approved. The remaining columns present the same information in pounds per day.

Table 4-2
VOC Emissions Limits, Emissions Inventory, and Emissions Foregone

	VOC Limits			VOC Emissions Inventory			Emissions Foregone	
Plastic Welding Type	**Current VOC Content Limits** (gram/liter)	**1/1/2005 FEA VOC Content Limits** (gram/liter)	**Proposed VOC Content Limits** (gram/liter)	**Current Emission Inventory** (ton/day)	**Future Emissions Inventory Based on 1/1/2005 FEA VOC Content Limits**[a] (ton/day)	**Future Emission Inventory Based on 1/1/2005 Proposed VOC Content Limits**[b] (ton/day)	**Emissions Foregone Based on Rescinding FEA VOC Content Limits**[c] (ton/day)	**Emissions Foregone Based on Proposed VOC Content Limits**[d] (ton/day)
PVC	510	285	510	0.569	0.569	0.318	-0.251	-0.251
CPVC	490	270	490	0.174	0.174	0.096	-0.078	-0.078
ABS	400	400	325	0.588	0.478	0.588	0.000	0.110
PVC/CPVC Primer	650	250	550	0.832	0.704	0.320	-0.512	-0.384
Totals				**2.163**	**1.925**	**1.322**	**-0.840**	**-0.600**

[a] Future emission inventory based on 1/1/2005 FEA VOC content limits, ton/day = Current emissions inventory x ((Proposed VOC content limits)/(Current VOC content limits))

[b] Future emission inventory based on 1/1/2005 Proposed VOC content limits, ton/day = Current emissions inventory x ((1/1/2005 FEA VOC content limits)/(Current VOC content limits))

[c] Emissions foregone based rescinding FEA VOC limits (tons/day) = Future emission inventory based on 1/1/2005 proposed limits (ton/day) - Current emission inventory (ton/day)

[d] Emissions foregone based proposed VOC limits (tons/day) = Future emission inventory based on 1/1/2005 proposed limits (ton/day) - Future emissions inventory based on 1/1/2005 FEA VOC limits (ton/day)

Table 4-3
Estimated Top and Trim Adhesives Inventory and VOC Emission Reductions Delayed

Adhesive Type Based on Range of VOC Content	**VOC Content of Material** less water/exempt compounds		**VOC Content of Material, As Applied** less water/exempt compounds		**Adhesive Coverage**	**Estimated Annual Adhesive Inventory Based on Coverage**[a]	**Estimated VOC Emissions**[b]	
	grams /liter	lb/gal	grams /liter	lb/gal	sq. ft./gal	gal/yr	lb/day	ton/day
Interim VOC Limit Adhesive (Current limit post-June 2002)	540	4.50	340	2.83	309	65,194	506	0.253
Final VOC Limit Adhesive (To be in effect January 1, 2007)	250	2.08	125	1.04	625	32,232	92	0.046
Total Estimated VOC Emission Reductions Delayed[c]							**414**	**0.299**

[a] To calculate the estimated annual adhesives usage based on adhesive coverage data, multiply the 'interim VOC adhesive' inventory by a ratio of the interim VOC adhesive coverage to the coverage for the material in question. For example, the calculation of the estimated annual adhesive usage for a compliant adhesive is as follows: 65,194 gal/yr x (309 sq. ft./gal / 625 sq. ft./gal) = 32,232 gal/yr of compliant adhesive

[b] To calculate the 'estimated VOC emissions', multiply the 'VOC content of material, as applied' by the 'estimated annual adhesive inventory based on coverage' and adjust for days and tons, as applicable. For example, for the 'interim VOC limit' adhesive category, the calculation of estimated VOC emissions is as follows: 1.04 lb VOC/gal x 65,194 gal/yr x 1 yr/365 days = 506 lb VOC/day x (1 ton/2000 lb) = 0.253 tons VOC / day

[c] To calculate the 'total estimated VOC emission reductions delayed', subtract the estimated VOC emissions for final VOC limit adhesives from the estimated VOC emissions for interim VOC limit adhesives as follows: 506 lb VOC/day - 92 lb VOC/day = 414 lb VOC/day of emissions reductions delayed

~~Table 4-4~~
~~Summary of Daily VOC Emissions Foregone~~

	~~Emissions Foregone in Tons per Day~~			~~Emissions Foregone in Pounds per Day~~		
~~Plastic Welding Type~~	~~Emissions Foregone Based on Rescinding FEA VOC Content Limits (ton/day)~~	~~Emissions Foregone Based on Proposed VOC Content Limits after January 1, 2005 (ton/day)~~	~~Emissions Foregone Based on Proposed VOC Content Limits after January 1, 2007 (ton/day)~~	~~Emissions Foregone Based on Rescinding FEA VOC Content Limits (lb/day)~~	~~Emissions Foregone Based on Proposed VOC Content Limits after January 1, 2005 (lb/day)~~	~~Emissions Foregone Based on Proposed VOC Content Limits after January 1, 2007 (lb/day)~~
~~Top and Trim Adhesives~~	~~-0.21~~	~~-0.21~~	~~0~~	~~-420~~	~~-420~~	~~0~~
~~PVC Welding~~	~~-0.25~~	~~-0.25~~	~~-0.25~~	~~-500~~	~~-500~~	~~-500~~
~~CPVC Welding~~	~~-0.08~~	~~-0.08~~	~~-0.08~~	~~-160~~	~~-160~~	~~-160~~
~~ABS Welding~~	~~0~~	~~0.11~~	~~0.11~~	~~0~~	~~220~~	~~220~~
~~PVC and CPVC Primer~~	~~-0.52~~	~~-0.39~~	~~-0.39~~	~~-1,040~~	~~-780~~	~~-780~~
~~**Totals**~~	~~**-1.06**~~	~~**-0.82**~~	~~**-0.61**~~	~~**-2,120**~~	~~**-1,640**~~	~~**-1,220**~~
~~**Significance Threshold**~~	~~**0.028**~~	~~**0.028**~~	~~**0.028**~~	~~**55**~~	~~**55**~~	~~**55**~~
~~**Significant**~~	~~**Yes**~~	~~**Yes**~~	~~**Yes**~~	~~**Yes**~~	~~**Yes**~~	~~**Yes**~~

Table 4-4
Summary of Daily VOC Emissions Foregone

Plastic Welding Type	Emissions Foregone in Tons per Day[a]				Emissions Foregone in Pounds per Day[b]			
	Emissions Foregone Based on Rescinding FEA VOC Content Limits (ton/day)	Emissions Foregone Based on Proposed VOC Content Limits after January 1, 2005 (ton/day)	Emissions Foregone Based on Proposed VOC Content Limits after July 1, 2005 (ton/day)	Emissions Foregone Based on Proposed VOC Content Limits after January 1, 2007 (ton/day)	Emissions Foregone Based on Rescinding FEA VOC Content Limits (lb/day)	Emissions Foregone Based on Proposed VOC Content Limits after January 1, 2005 (lb/day)	Emissions Foregone Based on Proposed VOC Content Limits after July 1, 2005 (lb/day)	Emissions Foregone Based on Proposed VOC Content Limits after January 1, 2007 (lb/day)
Top and Trim Adhesives	-0.207	-0.207	-0.207	0	-414	-414	-414	0
PVC Welding	-0.251	-0.251	-0.251	-0.251	-502	-502	-502	-502
CPVC Welding	-0.078	-0.078	-0.078	-0.078	-156	-156	-156	-156
ABS Welding	0.000	0.000	0.110	0.110	0	0	220	220
PVC and CPVC Primer	-0.512	-0.512	-0.384	-0.384	-1,024	-1,024	-768	-768
Totals	**-1.048**	**-1.048**	**-0.810**	**-0.603**	**-2,096**	**-2,096**	**-1,620**	**-1,206**
Significance Threshold	-	-	-	-	55	55	55	55
Significant	-	-	-	-	**Yes**	**Yes**	**Yes**	**Yes**

a) Emissions foregone in tons per day were estimated in Tables 4-2 and 4-3.
b) Emissions foregone in tons per day were calculated by multiplying emissions foregone in tons per day by 2,000 pounds per ton.

The adhesive inventories, emissions inventories and emission reductions were obtained through research performed during earlier revisions of Rule 1168, based on information supplied by the manufacturers. It is assumed that one can of higher VOC content cement provides coverage for roughly the same number of pipe joints and fittings as low VOC adhesives. However, it is assumed that the top and trim adhesives vary in coverage based on the VOC content. The emission reductions that will not be achieved due to technical infeasibility based on rescinding the VOC content limits for top and trim, and PVC and CPVC welding and primer would be ~~1.06~~ 1.05 tons of VOC per day (~~2,120~~ 2,096 pounds of VOC per day) between January 1, 2005 and ~~January~~ July 1, ~~2007~~2005. With the additional VOC content limits for PVC and CPVC primers and ABS weld solvents proposed by the project, the quantity of VOC reductions foregone would be ~~0.82~~ 0.81 ton of VOC per day (~~1,640~~ 1,620pounds of VOC per day) between ~~January~~ July 1, 2005 and January 1, 2007. ~~Therefore, even with the additional VOC content limits, the proposed project would exceed the SCAQMD VOC significance threshold of 55 pounds per day.~~

After January 1, 2007, the final VOC content limit for top and trim adhesives would become effective. As presented in Table 4-2, 414 pounds of VOC emissions reductions would occur. Therefore, after January 1, 2007, the amount of VOC reductions foregone would become 0.61 ton (~~1,220~~ 1,206 pounds per day)~~,~~. ~~which~~ The VOC emission reductions foregone for all three stages of VOC content limit effective dates would also exceed the SCAQMD VOC significance threshold of 55 pounds per day.

~~Because the amendments result in significant air quality impacts, the modifications proposed in PAR 1168 to the original project (i.e., the 2002 amendments to Rule 1168) are considered to be new information that would result in making the existing significant adverse air quality impacts substantially worse. As a result, in accordance with CEQA Guidelines §15162, this Revised Draft SEA was prepared.~~ A Draft SEA was released on October 13, 2004, that included rescinding the PVC and CPVC welding VOC content limits, revised the PVC/CPVC primer VOC content limits on January 1, 2005, established a new VOC content limit for ABS welding, and replaced the elimination of methylene chloride in hard plastic sheeting cements with a methylene chloride weight and single facility use limit. After the release of the Draft SEA, PAR 1168 was modified to include a two-year delay in the final VOC content limit of 250 grams per liter for top and trim adhesives from January 1, 2005, to January 1, 2007. The delay in the effective date of the final VOC content limit for top and trim adhesives, resulted in increasing the total emissions foregone from 0.85 ton (1,700 pounds) per day to 1.05 ton (2,069 pounds) per day between January 1, 2005, and January 1, 2007. The increase in emissions foregone exceeds the SCAQMD significance threshold of 55 pounds of VOC per day. The Draft SEA included an alternative (Alternative B) that presented and analyzed adverse impacts similar to those proposed by delaying the top and trim adhesives. However, the Draft SEA did not clearly state that the Governing Board may chose any alternative analyzed in the Draft SEA. The adverse air quality impacts from Alternative B were analyzed to be significantly worse than the proposed project at the time. The Draft SEA was updated and recirculated as a Revised Draft SEA in accordance with CEQA Guidelines §15088.5, because the modification considered to be new information that would result in making the existing significant adverse air quality impacts substantially worse, and the Draft SEA did not clearly explain that the Governing Board could choose an alternative or part of an alternative that was less environmentally desirable than the

proposed project. To address this ambiguity, the Revised Draft SEA included language that clearly states that the Governing Board can choose all or part of any of the alternative even if the alternative or portion of the alternative may generate environmental impacts that are significantly worse than those proposed in the project as long as these impacts were disclosed in the CEQA document circulated for public review.

After the release of the Revised Draft Subsequent Environmental Assessment (SEA) for PAR 1168, PAR 1168 was modified to delay the PVC and CPVC primer and ABS welding VOC content limit requirements from January 1, 2005, to July 1, 2005. The delay of the PVC and CPVC primer and ABS welding VOC content limit requirements from January 1, 2005, to July 1, 2005 is considered to be within the scope of the analysis of the environmental impacts resulting from implementing Alternative C. Alternative C would result in 1,024 pounds per day of VOC emissions foregone from PVC and CPVC primer VOC emissions foregone. These VOC emissions are considered foregone, because the existing Rule 1168 VOC content limit requirement of 250 grams per liter for PVC/CPVC primers becomes effective on January 1, 2005. In addition, 0.11 ton (220 pounds) per day of VOC emissions reductions would begin on July 1, 2005 instead of January 1, 2005 as proposed in the Revised Draft SEA. The 0.11 ton (220 pounds) per day of VOC emissions reductions are not considered foregone, because the VOC content limit requirement was apart of the draft proposed project, which had not been presented to and approved by the Governing Board for adoption.

After January 1, 2007, VOC content limit requirements for top and trim adhesives would become effective and the VOC emission reductions foregone would become 0.61 ton (1,206 pounds) per day. These 0.61 ton (1,206 pounds) per day of VOC emissions foregone after January 1, 2007 are the same amount as those expected after January 1, 2007 in the Revised Draft SEA.

While the emissions reductions foregone from the delay of PVC and CPVC primer and ABS welding VOC content limit requirements from January 1, 2005, to July 1, 2005 are a modification to the previously proposed project, these modification are considered to be within the scope of the analysis of the environmental impacts resulting from implementing Alternative C. Alternative C proposed rescinding existing top and trim adhesive, and PVC and CPVC welding and primer VOC content limit requirements effective January 1, 2005. Alternative C does not include the new VOC content limit requirements for PVC and CPVC primers and ABS welding. Alternative C also proposes to rescind the restriction of methylene chloride in cement used for welding of hard sheet plastic. The proposed delay in implementing the new PVC and CPVC primer VOC content limit requirement of 550 grams per liter from January 1, 2005, to July 1, 2005 would only delay implementation for six months, a more environmentally beneficial proposal than keeping the existing interim VOC content limit requirement of 650 grams per liter proposed in Alternative C remained in effect. The Revised Draft SEA clearly presented Alternative C and the adverse environmental impacts from choosing Alternative C. The Revised Draft SEA also clearly states that the Governing Board can choose all or part of any of the alternative even if the alternative or portion of the alternative may generate environmental impacts that are significantly worse than those proposed in the project as long as these impacts were disclosed in the CEQA document circulated for public review. Therefore, the Governing Board may adopt this modification or any other alternative or portion of an

alternative that may generate environmental impacts that are significantly worst than those proposed in the project.

Methylene Chloride Emissions

The existing rule allows the use of methylene chloride in solvent welding formulations used to bond hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications until January 1, 2005. In the FEA, the SCAQMD did not quantify the use of methylene chloride in compounds subject to Rule 1168, nor took any credit for reducing methylene chloride use.

In the July 7, 2002 amendment package, staff recognized that phasing out the use of methylene chloride based solvent cements for hard plastic may be difficult to achieve. There is one primary manufacturer of methylene chloride-based solvent welding products for use in the SCAQMD. The company sales of methylene chloride cements to the acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrication industries is 0.058 tons per day of methylene chloride. A solvent substitution with the exempt compound methyl acetate has replaced another toxic compound trichloroethylene. Trichloroethylene is scheduled for phase-out on January 1, 2005, and unlike methylene chloride, does not have one-year sell-through privileges. The largest manufacturer of solvent welding products has reduced methylene chloride content in its lowest viscosity product by 34 percent, and by 23 percent on its heavier bodied cement. The company has performed tests on its products with reduced methylene chloride and has determined that these reductions are the maximum available reductions they can formulate without compromising the strength of the welded joint, while still maintaining reasonable production dry time.

Efforts by manufacturers of light bodied adhesives over the last two years have resulted in formulations with maximum methylene chloride content of 60 percent by weight. The inferior performance of substitute products compared to methylene chloride makes a complete phase out of methylene chloride in this specific application infeasible. However, the maximum annual use of such solvent welding products for each end user is quite small because a syringe full of solvent welding material can weld many parts.

When considering an exemption from the prohibition of sales of adhesives and sealants containing methylene chloride, as it relates to acrylic, polycarbonate and polyethylene terephalate glycol welding, staff concludes that a limited exemption is appropriate as it protects human health to the maximum extent possible. Since the application of these materials is classified as an area source problem, they are exempt from written permits under Rule 219.

The proposed project would limit the methylene chloride content of these adhesives to a maximum of 60 percent by weight and also proposes to restrict the sales to and use by any one facility to 20 gallons of methylene chloride containing products use for solvent welding of acrylic, polycarbonate and polyethylene terephalate glycol plastics per year, which is estimated to be the current maximum annual usage of the larger fabricators.

Emissions from existing sources using the single facility maximum of 20 gallons per year and methylene chloride concentrations of 60 percent by weight are well within current or proposed health-based standards using a worst case scenario for an adversely impacted receptor.

The individual risks and health indices were established based on the Risk Assessment Procedures for Rules 1401 and 212, as published by the SCAQMD. The procedure may be extended to Rule 1402 evaluations, which sets the basis for AB2588 compliance. The attached table in Appendix B shows the various health risks associated with methylene chloride, as it is used by the plastic fabrication industries at a maximum of 20 gallons per year of 60 percent by weight of methylene chloride solvent welding formulations. The calculations show the maximum cancer risk would occur in West Los Angeles with a value of approximately three in a million residents and two in a million workers. The health indices for acute and chronic exposures (short and long term health exposure indices) at this level are below the 1.0. The significance threshold for carcinogenic risk is 10 in a million and the significance thresholds of 1.0 for both acute and chronic indices. Therefore, the proposed project is not significant for carcinogenic and noncarcinogenic risk.

PROJECT-SPECIFIC MITIGATION: Rule 1168 is being amended because compliant adhesive products for top and trim, PVC welding, CPVC welding, PVC and CPVC primers, and welding products for hard plastics such as acrylic, polycarbonate, and polyethylene terephalate glycol without methylene chloride are currently not available or fully feasible. Consequently, there are no measures available to mitigate the air quality impacts from the proposed project.

REMAINING AIR QUALITY IMPACTS: The air quality analysis concluded that significant adverse air quality impacts could be created by the proposed amendments because the 1.06 tons per day of emission reductions foregone between January 1, 2005 and July 1, 2005; the 0.82 ton (1,640 pounds) per day of emission reductions foregone between ~~January~~ July 1, 2005 and January 1, 2007; and the 0.61 ton (1,220 pounds) per day of emission reductions foregone after January 1, 2007, would exceed the SCAQMD's VOC significance thresholds of 55 pounds per day. As a result, a Statement of Findings and a Statement of Overriding Considerations ~~will be~~ has been prepared for the Governing Board's consideration and approval prior to the public hearings for the proposed amendments.

CUMULATIVE AIR QUALITY IMPACTS: In general, the preceding analysis concluded that air quality impacts from any construction activities would not be significant from implementing the proposed project. The proposed amendments would permanently forego emissions reductions originally anticipated for Rule 1168 in an amount that exceeds the SCAQMD's daily VOC significance threshold. It should be noted, however, that the air quality analysis is a conservative, "worst-case" analysis and the actual impacts may not be as great as estimated here.

The SIP settlement agreement (the Agreement) between the National Resources Defense Council, Coalition for Clean Air, and Communities for a Better Environment and the South Coast Air Quality Management District requires that when the limits under Rule 1168 are relaxed, the Board must find that it is infeasible to implement the measure by 2003. On June 7, 2002, the board authorized a delay of the implementation of technology forcing limits for top and trim adhesives, PVC welding, CPVC welding, associated primers and for other plastic cement welding to January 1, 2005. The emissions delayed were 1.06 tons (2,120 pounds) per day. Furthermore, if a limit is found to be technologically infeasible the SCAQMD may make

up the shortfall through alternative measures within two years after implementation of the 1998 rule. In this case that shortfall has been more than compensated by the September 15, 2000 amendments to Rule 1168, which achieved year 2010 reductions of 8.0 tons per day of VOC. These reductions are well in excess of the required 1.3 tons of VOC reductions required from VOC reduction measures of the Agreement. Therefore, the VOC emissions forgone by this amendment to Rule 1168 of the 1.05 tons per day of emission reductions foregone between January 1, 2005 and July 1, 2005; the ~~0.82~~ 0.81 ton (~~1,640~~ 1,620 pounds) per day between ~~January~~ July 1, 2005 and January 1, 2007; and the 0.61 tons (~~1,220~~ 1,206 pounds) per day of emission reductions foregone after January 1, 2007 do not negatively affect the Agreement.

Further, air quality modeling performed for the 2003 AQMP demonstrated that all state ambient air quality standards except for ozone and PM10 are also expected to be attained by 2010. Therefore, the cumulative adverse air quality impacts from the proposed amendments to Rule 1168 as compared to the total future reduction in the VOC inventory overall as demonstrated the 2003 AQMP are not anticipated to be significant. This determination is consistent with the conclusion in the 2003 AQMP EIR that the overall cumulative air quality impacts from implementing all AQMP control measures are not expected to be significant (SCAQMD, 2003) because of the reduction in the overall VOC emissions inventory.

POTENTIAL ENVIRONMENTAL IMPACTS FOUND NOT TO BE SIGNIFICANT

The proposed project has been evaluated and it was determined that the changes proposed to the compliance date for affected adhesives only affects air quality. While all the environmental topics required to be analyzed under CEQA were reviewed to determine if the proposed amendments would create significant impacts, the screening analysis concluded that the following environmental areas would not be significantly adversely affected by PAR 1168: aesthetics, agriculture resources, biological resources, cultural resources, energy, geology/soils, hazards and hazardous materials, hydrology and water quality, land use and planning, mineral resources, noise, population and housing, public services, recreation, solid/hazardous waste and transportation/traffic. These topics were not analyzed in further detail in this environmental assessment, however, a brief discussion of each is provided below.

In general, by rescinding the January 1, 2005 PVC and CPVC cement and primer VOC content limits, delaying the final VOC limit for top and trim adhesive, ~~replacing the January 1, 2005 PVC/CPVC primer VOC content limit of 250 grams per liter with a limit of 550 grams per liter,~~ and replacing the prohibition of methylene chloride in solvent welding formulations used to bond hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrication after January 1, 2005 with concentration and single facility use limits on methylene chloride, these amendments would forego future emission reductions expected that were expected after January 1, 2005. However, these amendments would effectively keep emissions at slightly below existing levels, since the VOC content limits and methylene chloride prohibition have not gone into effect. In addition, the proposed projected would instituting a new ~~reduce the~~ VOC content limit requirements for PVC/CPVC primer ABS cements ~~from 400 to 325 grams per liter~~. Therefore, the proposed project would in practice still lower existing VOC and methylene chloride emissions, although not as much as previously projected in the 2002 FEA, this proposed project has been determined to have little effect on environmental areas other than air quality.

Aesthetics

The proposed changes are not expected to result in substantial adverse effects on any scenic vistas, substantially degrade the existing visual character or quality of any site and its surroundings, or create new sources of substantial light or glare which would adversely affect day or nighttime views of an area. No major changes to existing facilities or stockpiling of additional materials or products outside of existing facilities are expected to result.

Agriculture Resources

The proposed project would not result in any new construction of buildings or other structures that would convert farmland to non-agricultural use or conflict with zoning for agricultural use or a Williamson Act contract. There are no provisions in the proposed amended rule that would affect land use plans, policies, or regulations. Land use and other planning considerations are determined by local governments and no land use or planning requirements will be altered by the proposed project.

Biological Resources

IV. a) - f): The affected cements and primers are typically used at existing commercial facilities and, therefore, would have no direct or indirect impacts that could adversely affect plant or animal species or the habitats on which they rely in the SCAQMD's jurisdiction. A conclusion of the 2003 AQMP EIR was that population growth in the region would have greater adverse effects on plant species and wildlife dispersal or migration corridors in the basin than SCAQMD regulatory activities, (e.g., air quality control measures or regulations). The current and expected future land use development to accommodate population growth is primarily due to economic considerations or local government planning decisions.

There are no provisions in the proposed amended rule that would affect land use plans, policies, or regulations. Land use and other planning considerations are determined by local governments and no land use or planning requirements will be altered by the proposed project. The proposed amendments to Rule 1168 would not affect in any way habitat conservation or natural community conservation plans, agricultural resources or operations, and would not create divisions in any existing communities.

Cultural Resources

There are existing laws in place that are designed to protect and mitigate potential impacts to cultural resources. The application of adhesives and sealants, in the vast majority of situations, would occur after construction has already occurred. Consequently, application of adhesives and sealants has little or no potential to disturb cultural resources. Instead, disturbance of cultural resources would most likely occur during site preparation and would be addressed at that time. Therefore, PAR1168 has no potential to cause a substantial adverse change a historical or archaeological resource, directly or indirectly destroy a unique paleontological resource or site or unique geologic feature, or disturb any human remains, including those interred outside a formal cemeteries. The proposed amendments to Rule 1168 are, therefore, not anticipated to result in any activities or promote any programs that could have a significant adverse impact on cultural resources in the district.

Energy

Because add-on control equipment is not expected to be used to comply with the provisions of PAR 1168, no additional electricity or natural gas use is expected to be required. The adhesives and sealants affected by the proposed amendments would continue to be applied in generally the same ways they are currently applied. Additionally, PAR 1168 will not substantially increase the number of businesses or amount of equipment in the district since the affected categories of solvent cements or primers are used at existing commercial facilities. An increase in energy consumption from non-renewable resources (e.g., diesel and gasoline) above current levels is not expected because the amount of adhesives and sealants shipped to suppliers and users is not anticipated to change. Further, the continued use of the affected products would not be expected to conflict with adopted energy conservation plans, result in the need for new or substantially altered power or natural gas utility systems, or be out of compliance with existing energy standards.

Geology and Soils

The proposed amendments affect existing commercial facilities that use specific types of adhesives and sealants, and, therefore, will not generate significant new adverse effects on geophysical formations in the district. Additionally, since no add-on control equipment will be used to reduce VOC emissions from the affected adhesive categories, PAR 1168 is not expected to result in additional exposure of people to potential impacts involving seismicity, landslides, mudslides or erosion as no new development is anticipated. The proposed project would not result in significant disruption or overcovering of soil, or changes in topography or surface relief features. The proposal would not result in the erosion of beach sand, or a change in existing siltation rates.

Hazards and Hazardous Materials

It is unlikely that the affected adhesives would be formulated with a non-VOC that is also a HAP because the existing version of Rule 1168 currently precludes the use of specific HAPs (e.g., chloroform, ethylene dichloride, perchloroethylene, and trichloroethylene) in adhesives and sealants, other than the proposed continued methylene chloride use in limited concentration and amounts. The possibility of a product becoming subject to Rule 1401 and Rule 1402 if it is reformulated with a HAP that is not otherwise already prohibited from use by PAR 1168, makes it unlikely that PAR 1168 will cause reformulated affected adhesives to be more toxic than what is currently commercially available for use.

As stated in the Technology Review portion in Section 2, with the exception of top and trim adhesives that meet the final VOC content limit of 250 grams of VOC per liter, adhesives for the other affected categories are available that already meet the project proposed VOC and methylene chloride limits. Components in the existing adhesive categories are presented in Tables 3-3 through 3-6. Top and trim adhesives would need to be reformulated to meet the proposed final VOC content limit of 250 grams per liter by January 1, 2007. It is also possible that some manufactures would need to reformulate some adhesives to meet the project proposed PVC/CPVC primers and ABS welding requirements. To meet the proposed VOC content limits, some PVC and CPVC primers and ABS welding cements manufacturers may need to reformulate with exempt compounds such as acetone. This solvent has potential flammability impacts, but is relatively low in toxicity. The methylene chloride content requirements may also

require reformulation of solvent welders for hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications. It is expected that any reformulation of the top and trim adhesives, PVC and CPVC primers and ABS welding cements and solvent welding for hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications would use the same components that are currently used in existing adhesives as presented in Tables 3-3 to 3-6.

Methyl acetate and acetone are assumed to be the solvents that would be chosen as a replacement for VOCs in top and trim adhesives. Acetone and methyl acetate comprise 82 to 88 percent of top and trim adhesives (Table 3-6). Since the existing amount of acetone and methyl acetate is high, replacing remaining VOCs with additional acetone and methyl acetate would not greatly alter the adverse hazards impact of the top and trim adhesives.

Methyl acetate is assumed to be the solvent that would be chosen as a replacement for methyl ethyl ketone in solvent welding formulations, and small quantities of acetone may replace some of the tetrahydrofuran and cyclohexanone in PVC and CPVC primers and ABS welding solvents. The storage or use of acetone in top and trim adhesives, PVC and CPVC primers and ABS welding cements at sites subject to Rule 1168 would not be expected to result in significant adverse hazard impacts. As shown in Table 4-5, the flammability classifications by the NFPA are the same for acetone, methyl acetate, methyl ethyl ketone, tetrahydrofuran, cyclohexane, hexane and toluene. Cyclohexanone, dimethyl ether and methylene chloride have less flammable ratings. Cyclohexanone is the only conventional solvent that has higher flash point than acetone, and all have similar lower explosive limits.

In addition, the Agency for Toxic Substances and Disease Registry and the EPA prepare and maintain a priority list of hazardous substances that are determined to pose the most significant potential threat to human health (2001 CERCLA[6] Priority List of Hazardous Substances)[7]. These substances are ranked in order of highest priority (i.e., greatest potential threat to human health), according to a combination of their known or suspected toxicity and potential for human exposure. Acetone, despite its flammability potential, is ranked at the lowest priority of 181 when compared to the following other materials that are already prohibited by the current version of Rule 1168: chloroform (rank 11), trichloroethylene (rank 15), perchloroethylene (rank 32), methylene chloride (rank 78), and ethylene dichloride (rank 82).

Further, potential impacts of formulating products with acetone, however, were previously analyzed in Subsequent Environmental Impact Report for PAR 1113 (SCAQMD No. 960626DWS, November, 1996). The conclusions that potential hazard impacts from using this exempt compound would not be significant in that document continue to be valid for the proposed project. Therefore, no new routine transport, use, emission and disposal of hazardous materials will result from the proposed amendments.

[6] The Comprehensive Environmental Response, Compensation, and Liability Act, §104(i).
[7] Agency for Toxic Substances and Disease Registry (ATSDR) and the EPA, 2001. 2001 CERCLA Priority List of Hazardous Substances.

Table 4-5
Chemical Characteristics of Solvents

Conventional Solvents								
Chemical Compound	**M.W.** [a]	**Boiling Point (@760 mmHg, °C)**	**Evap. Rate (@25 °C)**	**Flash point (°C)**	**LEL/UEL** [b] **(% by Vol.)**	**Auto-ignition Temp (°C)**	**Vapor Press (mmHg @ 20 °C)**	**Flammability Classification** [c] **(NFPA)** [d]
Methyl Ethyl Ketone	72.1	79.5	4.78	-7	1.4/11.4	505	90.6	3
Tetrahydrofuran	72.1	65	6.3	-14.4	2/11.8	321	162.2	3
Methylene chloride	84.9	40	14.5	None	13/23	556	435	1
Cyclohexanone	98.2	155.4	0.29	44	1.1/9.4	420	4.33	2
Cyclohexane	84.18	807	5.5	-18	1.3/8.4	260	97.6	3
Dimethyl Ether	46.07	-25	>1	-41	3.4/26.7	350	4450	2
Hexane	86.18	68.7	9	-9	1.1-7.5	225	150	3
Toluene	92.13	110.7	2.24	-95	1.1-7.1	480	3.8	3
Replacement Solvents								
Chemical Compound	**M.W.** [a]	**Boiling Point (@760 mmHg, °C)**	**Evap. Rate (@25 °C)**	**Flash point (°C)**	**LEL/UEL** [b] **(% by Vol.)**	**Auto-ignition Temp (°C)**	**Vapor Press (mmHg @ 20 °C)**	**Flammability Classification** [c] **(NFPA)** [d]
Acetone	58.1	56	7.7	0	2.5/12.8	465	180	3
Methyl Acetate	74.1	-98	5.3	-13	3.1./16	455	216.2	3

Sources: ARB Consumer Product Solvents Database; NIOSH, Online NIOSH Pocket Guide to Chemical Hazards; International Programme on Chemical Safety, International Chemical Safety Cards

[a] Molecular weight

[b] Lower explosive limit/upper explosive limit

[c] Flammability Rating: 0 = Not Combustible; 1 = Combustible if heated; 2 = Caution: Combustible liquid flash point of 100°F to 200°F; 3 = Warning: Flammable liquid flash point below 100°F; 4 = Danger: Flammable gas or extremely flammable liquid

[d] NFPA = National Fire Protection Association

The Uniform Fire Code and Uniform Building Code set standards intended to minimize risks from flammable or otherwise hazardous materials. Local jurisdictions are required to adopt the uniform codes or comparable regulations. Local fire agencies require permits for the use or storage of hazardous materials and permit modifications for proposed increases in their use. Permit conditions depend on the type and quantity of the hazardous materials at the facility. Permit conditions may include, but are not limited to, specifications for sprinkler systems, electrical systems, ventilation, and containment. The fire departments make annual business inspections to ensure compliance with permit conditions and other appropriate regulations.

Further, all hazardous materials are expected to be used in compliance with established OSHA or Cal/OSHA regulations and procedures, including providing adequate ventilation, using recommended personal protective equipment and clothing, posting appropriate signs and warnings, and providing adequate worker health and safety training. When taken together, the above regulations provide comprehensive measures to reduce hazards of explosive or otherwise hazardous materials. Compliance with these and other federal, state and local regulations and

proper operation and maintenance of equipment should ensure the potential for explosions or accidental releases of hazardous materials is not significant.

It is anticipated that the current regulatory requirements regarding flammable and otherwise hazardous materials will not need to be amended as a result of the proposed project since, in part; acetone and methyl acetate are already widely used. Based on the preceding information, it is also expected that implementing PAR 1168 is not expected to increase or create any new hazardous emissions which would adversely affect existing/proposed schools.
Elimination of methylene chloride concentrations in welding solvents for hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications would have eliminated the highest toxic component in the welding solvent. Staff believed that rescinding the elimination of methylene chloride in welding solvents for hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications could potentially increase carcinogenic and/or noncarcinogenic risk to significant levels when compared to zero risk from the elimination of methylene chloride. Therefore, staff proposes to limit the concentration of methylene chloride to 60 percent in welding solvents for hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications and to limit the use of welding solvents for hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications with methylene chloride to 20 gallons per facility per year.

Based on Table 3-5 methyl acetate would be the replacement solvent for methylene chloride in sheet plastic welding. Methyl acetate has a higher flash point and flammability rating. By eliminating the prohibition against methylene chloride less methyl acetate would be used, and therefore, the solvents used for sheet plastic welding would be less flammable.

Twenty gallons per year of welding solvents for hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications is below the 10,000 gallon storage threshold for California Accidental Release Prevention (CalARP) Program/EPA Risk Management Program (RMP). It is not believed that facilities would store much more than the twenty gallons usage restriction. Even if a facility stored twice the usage limit on site, the forty gallons is still much less than the CalARP/RMP threshold for reporting. Facilities that are not required to report under the CalARP program are not required to complete an off-site consequence analysis; therefore, any accidental release is not expected to adversely impact any receptors off-site. Therefore, the rescinding of the methylene chloride and establishment of methylene chloride concentration and facility limits for welding solvents with methylene chloride for hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications would not cause a significant increase in hazard materials.

It is expected that facilities that handle more than 55 gallons of hazardous material have listed welding solvents for hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications in their business plans/business emergency plan filed with the local fire department or designated Certified Unified Program Agency (CUPA). Business emergency plans are required for facilities that handle more than 55 gallons of hazardous materials. Since PAR 1168 is expected only to affect existing facilities no new reporting or change to business emergency plans are expected.

Affected products are currently used in controlled environments in limited quantities at commercial facilities so operating practices would not change and no new fire hazards to wildland areas are expected. Further, if there was an accidental condition, the impact would not be expected create a significant hazard to the public, possible nearby public airports or private airstrips or hazardous materials sites compiled pursuant to Government Code §65962.5. Similarly, the proposed amendments would not interfere with airport land use plans, adopted emergency response plans or emergency evacuation plans for the same reasons.

Hydrology and Water Quality

No add-on control equipment is required as a result of the proposed amendments. The effect of the proposed amendments would effectively allow existing use of the affected top and trim adhesives, and cements and primers. Also, it is unlikely that changes proposed in PAR 1168 will cause ABS cements and PVC/CPVC primers to be formulated with a non-VOC that contains HAPs because the current version of Rule 1168 currently precludes the use of specific HAPs (e.g., chloroform, ethylene dichloride, perchloroethylene, and trichloroethylene) in adhesives and sealants, and the proposed rule would limit use of methylene chloride. The possibility of a product becoming subject to Rule 1401 and Rule 1402 if it is reformulated with a HAP that is not otherwise already prohibited from use by PAR 1168, makes it unlikely that PAR 1168 will cause reformulated affected adhesives to be more toxic than what is currently commercially available for use.

The anticipated increase in the use of waterborne adhesives is analogous to the use of waterborne architectural coatings and inks used in graphic art operations since these waterborne products might become part of the wastewater stream only due to clean up activities. The EA prepared for amendments to Rule 1113 determined that the increased use of waterborne architectural coatings would not cause a significant adverse water quality impact. The increased use of water may have the potential to adversely affect both water demand and water quality. These impacts, however, were previously analyzed in a Subsequent Environmental Impact Report for PAR 1113 (SCAQMD No. 960626DWS, November, 1996). Therefore, the conclusions relative to water quality impacts from aqueous-based architectural coatings are applicable to affected adhesives and sealants, and, therefore, would not be significant.

Because the proposed amendments would allow continued use of existing affect top and trim adhesives, cements and primers, additional groundwater supplies would be not depleted, existing drainage patterns and systems would not be altered, and water quality would not be degraded.

The proposed project affects top and trim adhesives, adhesive and sealant operations at existing commercial facilities and, therefore, would not result in placing housing within a 100-year flood hazard area, expose people to new flooding, seiche, tsunami or mudflow conditions.

The proposed project would continue the existing operations for affected adhesives, and, therefore, will not require or result new wastewater or water drainage facilities, reduce water supplies or alter the wastewater provider's existing commitments. It is expected that affected facilities would continue to comply with any applicable requirements of the appropriate

Regional Water Quality Control Board. In conclusion, no new hydrology impacts will result from the proposed amendments.

Land Use and Planning

There are no provisions of the proposed project that would affect land use plans, policies, or regulations because the proposed amendments maintain the existing VOC content limits for PVC and CPVC cements, delay the top and trim adhesives final VOC content limit, replace PVC and CPVC primer future final VOC content limits with a new higher VOC content limit, and lower VOC content limits for ABS cements, which are used in existing commercial facilities. The proposal would allow continued but limited methylene chloride use. Land use and other planning considerations are determined by local governments and no land use or planning requirements will be altered by the proposed project. The proposed project would not affect in any way habitat conservation or natural community conservation plans, agricultural resources or operations, and would not create divisions in any existing communities. No new development or alterations to existing land designations will occur as a result of the implementation of the proposed amendments. It is not anticipated that continued use of certain adhesive and sealant products at existing commercial facilities would require additional land to continue operations or require rezoning. Therefore, no significant adverse impacts affecting existing or future land uses are expected.

Mineral Resources

There are no provisions of the proposed project that would result in the loss of availability of a known mineral resource of value to the region and the residents of the state, or of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan. The proposed amendments would allow continued use of affected adhesives, cements and primers products.

Noise

PAR 1168 would allow continued manufacture and use of existing adhesive and sealant products and continued use of those products by owners/operators of existing commercial facilities. Therefore, no changes in noise levels at affected commercial facilities or in residential areas are anticipated. Users of adhesives and sealants are typically located in existing industrial or commercial areas where noise levels are already relatively high. It is assumed that affected facilities in these areas are subject to and in compliance with existing community noise ordinances and applicable OSHA or Cal/OSHA workplace noise reduction requirements. In addition to noise generated by current operations, noise sources in each area may include nearby freeways, truck traffic to adjacent businesses, and operational noise from adjacent businesses.

Implementing PAR 1168 is not expected to result in significant noise impacts in residential areas. As with industrial or commercial areas, it is assumed that these areas are subject to local community noise standards. Owners/operators of commercial facilities that use adhesives and sealants that are located in residential areas are expected to comply with local community noise standards.

Population and Housing

PAR 1168 allows continued use of existing adhesive and sealant products and, therefore, is not expected to affect in any way population growth or the supply and/or availability of houses. Human population in the SCAQMD's jurisdiction is anticipated to grow regardless of implementing the proposed project. The proposal would not result in the creation of any industry that would induce or inhibit population growth or distribution. Because the proposed project has no effect on population growth or distribution, the proposed rule would not directly or indirectly induce the construction of single- or multiple-family housing units. Accordingly, no significant adverse impacts on human population or housing are expected.

Because the proposed project will not change existing operations at commercial facilities that use the specified adhesive and sealant products, existing housing and associated populations will not be displaced. As a result, there is no anticipated need for construction of replacement housing.

Public Services

The proposed amendments would continue current operations for affected adhesives and sealants used at existing commercial facilities. As a result, PAR 1168 is not expected to increase the need or demand for additional public services such as fire departments, police departments, schools, parks, government, etc, above current levels. Further, the proposal would not result in the need for new or physically altered government facilities in order to maintain acceptable service ratios, response times or other performance objectives.

Recreation

As discussed under "Land Use" above, there are no provisions to the proposed project that would affect land use plans, policies, or regulations. Land use and other planning considerations are determined by local governments; no land use or planning requirements will be altered by the proposal. The proposed project would not increase the use of existing neighborhood and regional parks or other recreational facilities or include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.

Solid/Hazardous Waste

It is assumed that existing operations are disposing solid/hazardous waste appropriately and in amounts approved by the appropriate regulatory agencies. Because PAR 1168 would allow continued manufacture and use of affected adhesive products, the proposed project would not substantially increase the amount of solid/hazardous waste in the Basin, but would only affect the composition of the hazardous materials in the waste, since the proposed rescinded limits have not gone into effect. However, the new methylene chloride and VOC content limits established would reduce the actual concentration of hazardous substances in the waste. Since add-on control equipment is not expected to be used to comply with the proposed amendments, no additional increase on the demand for waste disposal utilities is expected.

Based on the above, the proposed amended rule is not expected to significantly increase the volume of solid or hazardous wastes, require additional waste disposal capacity, or generate waste that does not meet applicable local, state, or federal regulations.

Transportation/Traffic

The proposed amendments will not substantially increase the amount of businesses or equipment in the district. The main effect of the proposed amendments will be a continuation of existing commercial operations that use adhesive and sealant products affected by the proposed amendments. There are no provisions in the proposed amendments that would increase existing traffic load, worker commute trips, raw material or finished product transport trips, adversely affect parking, or conflict with adopted policies associated with alternative transportation. The level of service standard, traffic levels or existing emergency accesses are expected to change because the proposed project is maintaining the existing setting.

CONSISTENCY

The Southern California Association of Governments (SCAG) and the SCAQMD have developed, with input from representatives of local government, the industry community, public health agencies, the EPA - Region IX and the CARB, guidance on how to assess consistency within the existing general development planning process in the Basin. Pursuant to the development and adoption of its Regional Comprehensive Plan Guide (RCPG), SCAG has developed an Intergovernmental Review Procedures Handbook (June 1, 1995). The SCAQMD also adopted criteria for assessing consistency with regional plans and the AQMP in its CEQA Air Quality Handbook. The following sections address the consistency between PAR 1168 and relevant regional plans pursuant to the SCAG Handbook and SCAQMD Handbook.

Consistency with Regional Comprehensive Plan and Guide (RCPG) Policies

The RCPG provides the primary reference for SCAG's project review activity. The RCPG serves as a regional framework for decision making for the growth and change that is anticipated during the next 20 years and beyond. The Growth Management Chapter (GMC) of the RCPG contains population, housing, and jobs forecasts, which are adopted by SCAG's Regional Council and that reflect local plans and policies, shall be used by SCAG in all phases of implementation and review. It states that the overall goals for the region are to (1) re-invigorate the region's economy, (2) avoid social and economic inequities and the geographical isolation of communities, and (3) maintain the region's quality of life. PAR 1168 does not hinder achieving RCPG policies as explained in the following sections.

Consistency with Growth Management Chapter (GMC) to Improve the Regional Standard of Living

The Growth Management goals are to develop urban forms that enable individuals to spend less income on housing cost, that minimize public and private development costs, and that enable firms to be more competitive, strengthen the regional strategic goal to stimulate the regional economy. Proposed amended Rule 1168 in relation to the GMC would not interfere with the achievement of such goals, nor would it interfere with any powers exercised by local land use agencies. PAR 1168 will not interfere with efforts to minimize red tape and expedite the permitting process to maintain economic vitality and competitiveness. PAR 1168 would contribute in a minor way to maintaining economic vitality by allowing affected industries to continue using currently available adhesives until such time as compliant products are available.

Consistency with Growth Management Chapter (GMC) to Provide Social, Political and Cultural Equity

The Growth Management goals to develop urban forms that avoid economic and social polarization promotes the regional strategic goals of minimizing social and geographic disparities and of reaching equity among all segments of society. Consistent with the Growth Management goals, local jurisdictions, employers and service agencies should provide adequate training and retraining of workers, and prepare the labor force to meet the challenges of the regional economy. Growth Management goals also includes encouraging employment development in job-poor localities through support of labor force retraining programs and other economic development measures. Local jurisdictions and other service providers are responsible to develop sustainable communities and provide, equally to all members of society, accessible and effective services such as: public education, housing, health care, social services, recreational facilities, law enforcement, and fire protection. Implementing PAR 1168 has no effect on and, therefore, is not expected to interfere with the goals of providing social, political and cultural equity.

Consistency with Growth Management Chapter (GMC) to Improve the Regional Quality of Life

The Growth Management goals also include attaining mobility and clean air goals and developing urban forms that enhance quality of life, accommodate a diversity of life styles, preserve open space and natural resources, are aesthetically pleasing, preserve the character of communities, and enhance the regional strategic goal of maintaining the regional quality of life. The RCPG encourages planned development in locations least likely to cause environmental impacts, as well as supports the protection of vital resources such as wetlands, groundwater recharge areas, woodlands, production lands, and land containing unique and endangered plants and animals. While encouraging the implementation of measures aimed at the preservation and protection of recorded and unrecorded cultural resources and archaeological sites, the plan discourages development in areas with steep slopes, high fire, flood and seismic hazards, unless complying with special design requirements. Finally, the plan encourages mitigation measures that reduce noise in certain locations, measures aimed at preservation of biological and ecological resources, measures that would reduce exposure to seismic hazards, minimize earthquake damage, and develop emergency response and recovery plans. Although proposed amended Rule 1168 will result in a temporary delay in originally anticipated VOC emission reductions, the cumulative effects of implementing AQMP control measures it promotes improving air quality in the region. Therefore, in relation to the GMC, PAR 1168 is not expected to interfere with attaining these goals.

Consistency with Regional Mobility Element (RMP) and Congestion Management Plan (CMP)

PAR Rule 1168 is consistent with the RMP and CMP since no significant adverse impact to transportation/circulation will result from the delay of VOC emission reductions within the district. Because affected facilities will not increase their handling capacities, there will not be an increase in material transport trips associated with the implementation of PAR 1168. Therefore, PAR 1168 is not expected to significantly adversely affect circulation patterns or congestion management. SCAQMD received a letter[8] from SCAG dated October 25, 2004 that

[8] Letter from Mr. Jeffery M Smith, AICP, Senior Regional Planner at SCAG to Mr. James Koizumi of SCAQMD on the subject of SCAG Clearinghouse No. I20040694 Proposed Amended Rule 1168, October 25, 2004.

states that the version of PAR 1168 (August 30, 2004) circulated with the 2004 Draft SEA is not regionally significant per SCAG Intergovernmental Review (IGR) criteria and CEQA Guidelines §15206.

CHAPTER 5

ALTERNATIVES

Introduction
Alternatives Rejected as Infeasible
Description of Alternatives
Comparison of Alternatives
Conclusion

INTRODUCTION

This ~~Revised Draft~~ Final SEA provides a discussion of alternatives to the proposed project as required by CEQA Guidelines. Alternatives include measures for attaining objectives of the proposed project and provide a means for evaluating the comparative merits of each alternative. A "No Project" alternative must also be evaluated. The range of alternatives must be sufficient to permit a reasoned choice, but need not include every conceivable project alternative. CEQA Guidelines §15126.6(c) specifically notes that the range of alternatives required in a CEQA document is governed by a 'rule of reason' and only necessitates that the CEQA document set forth those alternatives necessary to permit a reasoned choice. The key issue is whether the selection and discussion of alternatives fosters informed decision making and meaningful public participation. A CEQA document need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative.

SCAQMD Rule 110 (the rule which implements the SCAQMD's certified regulatory program) does not impose any greater requirements for a discussion of project alternatives in an environmental assessment than is required for an EIR under CEQA.

A 2004 Draft SEA was circulated for public review from October 13, 2004 to November 30, 2004. Because of substantive modification to PAR 1168, the 2004 Draft SEA has been subsequently revised and recirculated as a Revised Draft SEA. ~~This~~ The Revised Draft SEA contained~~s~~ the same alternatives as those proposed in the 2004 Draft SEA; however, the analysis ~~has been~~ was revised to compare the alternatives to the revised proposed project. The proposed project was revised with a two-year delay of the effective date for the top and trim adhesive final VOC content limit of 250 grams of VOC per liter of adhesive.

The proposed project ~~in the 2004 Draft SEA~~ project~~ed~~ ~~0.61 ton (1,220 pounds) of VOC emission reductions per day after January 1, 2005. The revision to the project would delay an additional 0.21 ton (414 pounds) of VOC emission reductions per day over the two year delay. Therefore, the revised project would forego 0.82 ton (1,640 pounds) of VOC emission reductions per day until January 1, 2007; then forego 0.61 ton (1,220 pounds) of VOC emission reductions per day after January 1, 2007.~~ 1.06 tons per day of emission reductions foregone between January 1, 2005 and July 1, 2005; the 0.82 ton (1,640 pounds) per day of emission reductions foregone between July 1, 2005 and January 1, 2007; and the 0.61 ton (1,220 pounds) per day of emission reductions foregone after January 1, 2007

ALTERNATIVES REJECTED AS INFEASIBLE

A CEQA document should identify any alternatives that were considered by the lead agency, but were rejected as infeasible during the scoping process and explain the reasons underlying the lead agency's determination [CEQA Guidelines §15126.6(c)]. These alternatives and the rationale for rejecting them as infeasible are discussed in the following subsections. No project alternatives were identified and rejected as infeasible.

DESCRIPTION OF ALTERNATIVES

The following proposed alternatives were developed by modifying specific components of the proposed amendments. The rationale for selecting and modifying specific components of the proposed amendments to generate feasible alternatives for the analysis is based on

CEQA's requirement to present "realistic" alternatives; that is, alternatives that can actually be implemented. The Governing Board may choose to adopt any portion or all of any alternative presented below. The Governing Board is able to adopt any portion or all of any of the following alternatives because the impacts of each alternative are fully disclosed to the public and the public has the opportunity to comment on the alternatives and impacts generated by each alternative.

The following four alternatives were developed by identifying and modifying major components of PAR 1168. Specifically, the primary components of the proposed alternatives that have been modified are the interim and final compliance dates and VOC content limit requirements. The alternatives, summarized in Table 5-1 and described in the following subsections, include the following: Alternative A (No Project); Alternative B (Further Delay Compliance Date); and Alternative C (Rescind January 1, 2005 Limits). Unless otherwise specifically noted, all other components of the project alternatives are identical to the components of PAR 1168. The following subsections provide a brief description of each alternative.

Alternative A - No Project Alternative

Alternative A, the No Project Alternative, would mean not amending Rule 1168 and, therefore, maintaining the existing Rule 1168 requirements. The final VOC content requirements of 250 grams per liter for top and trim adhesives, 285 grams per liter for PVC welding, 270 grams per liter for CPVC welding, 250 grams per liter for PVC/CPVC primers, and the elimination of methylene chloride welding solvents for hard acrylic, polycarbonate and polyethylene terephalate glycol plastics by using compliant reformulated products rather than installing control equipment would become effective on January 1, 2005. Users of these affected solvents and adhesives would be limited to only the compliant adhesives or any others that become available. Use of solvents and adhesives that would exceed the above VOC content limits would be prohibited. Because Alternative A would continue to prohibit reformation of adhesives with methylene chloride, it is considered to be the least toxic alternative.

If compliant adhesives are not available, owners/operators would have to discontinue using PVC, CPVC weld solvents and primers or discontinue business.

It is expected that Alternative A would continue to produce a net air quality benefit regarding VOC and methylene chloride reductions for the following reasons. It is anticipated that this alternative would continue the goal of the previous amendments to Rule 1168 and reduce VOC emissions by approximately ~~1,700~~ 2,096[9] pounds per day, either through eliminating the use of noncompliant adhesives or users finding alternative compliant formulations.

[9] Correct number was presented in Table 4-4 of the Revised Draft SEA.

Table 5-1
Project Alternatives

Rule Component	VOC Content Limits (Compliance Dates)			
	PAR 1168	ALTERNATIVE A (No Project)	ALTERNATIVE B (Further Delay Compliance Dates)	ALTERNATIVE C (Rescind January 1, 2005 Limits)
Top & Trim Adhesives	• Interim Limit: 540 g/l (In Effect) • Final Limit: 250 g/l (by 01/01/07)	• Interim Limit: 540 g/l (In Effect) • Final Limit: 250 g/l (by 01/01/05)	• Interim Limit: 540 g/l (In Effect) • Final Limit: 250 g/l (by 01/01/07)	• Interim Limit: 540 g/l (In Effect) • Rescind 01/01/05 250 g/l Final Limit
PVC Welding	• Interim Limit: 510 g/l (In Effect) • Rescind 01/01/05 285 g/l Final Limit	• Interim Limit: 510 g/l (In Effect) • Final Limit: 285 g/l (by 01/01/05)	• Interim Limit: 510 g/l (In Effect) • Final Limit: 285 g/l (by 01/01/07)	• Interim Limit: 510 g/l (In Effect) • Rescind 01/01/05 285 g/l Final Limit
CPVC Welding	• Interim Limit: 490 g/l (In Effect) • Rescind 01/01/05 270 g/l Final Limit	• Interim Limit: 490 g/l (In Effect) • Final Limit: 270 g/l (by 01/01/05)	• Interim Limit: 490 g/l (In Effect) • Final Limit: 270 g/l (by 01/01/07)	• Interim Limit: 490 g/l (In Effect) • Rescind 01/01/05 270 g/l Final Limit
PVC and CPVC Primer	• Interim Limit: 650 g/l (In Effect) • Rescind 01/01/05 250 g/l Final Limit, and • Add Final Limit 550 g/l (by 01/01/~~05~~07)	• Interim Limit: 650 g/ (In Effect) • Final Limit: 250 g/l (by 01/01/05)	• Interim Limit: 650 g/ (In Effect) • Final Limit: 250 g/l (by 01/01/07)	• Interim Limit: 650 g/l ((In Effect) • Rescind 01/01/05 250 g/l Final Limit
ABS Welding	• 400 g/ (In Effect) • Add Final Limit 325 g/l (by 01/01/~~05~~07)	• 400 g/l (In Effect)	• 400 g/l (In Effect)	• 400 g/l (In Effect)
Solvent Welding Hard Acrylic, Polycarbonate, PETG	• No Methylene Chloride Requirement* (In Effect) • Add Methylene Chloride Conc. Limit of 60% by Weight (by 01/01/05) • Add 20 gal/day Limit per Facility on Methylene Chloride Welding Solvent (by 01/01/05)	• No Methylene Chloride Requirement* (In Effect) • Elimination of Methylene Chloride (by 01/01/05)	• No Methylene Chloride Requirement* (In Effect) • Elimination of Methylene Chloride (by 01/01/07)	• No Methylene Chloride Requirement* (In Effect) • Rescind Elimination of Methylene Chloride (by 01/01/05)

*May be restricted by other SCAQMD rules (e.g., Rules 212, 1401)

Alternative B - Further Delay Final Compliance Date

Alternative B would allow affected facilities to continue existing operations and comply with the interim VOC content limits of 540 grams per liter for top and trim, 510 grams per liter for PVC welding, 490 grams per liter for CPVC welding, 600 grams per liter for PVC/CPVC primers, 400 grams per liter for ABS welding and the continued use of methylene chloride weld solvents for hard acrylic, polycarbonate and polyethylene terephalate glycol two additional year, that is until January 1, 2007. Once the final compliance date becomes effective, it would be expected that owners/operators will comply with the final VOC content limits of 250 grams per liter for top and trim, 285 grams per liter for PVC welding, 270 grams per liter for CPVC welding, 250 grams per liter for PVC/CPVC primers, and the elimination of methylene chloride weld solvents for hard acrylic, polycarbonate and polyethylene terephalate glycol plastics by using compliant reformulated products rather than installing control equipment.

Alternative C – Rescind January 1, 2005 Limits

Alternative C would permanently rescind top and trim adhesives; PVC welding, CPVC welding, PVC and CPVC primer, and methylene chloride restrictions in welding formulations used to bond hard acrylic, polycarbonate and polyethylene terephalate glycol plastic fabrications from future VOC compliance limits of 250 grams per liter for top and trim, 285 grams per liter for PVC welding, 270 grams per liter for CPVC welding, 250 grams per liter for PVC/CPVC primers, and the elimination of methylene chloride weld solvents for hard acrylic, polycarbonate and polyethylene terephalate glycol plastics instead of having an interim or final VOC content limits and corresponding compliance dates for these products.

COMPARISON OF THE ALTERNATIVES

The Environmental Checklist (see Chapter 2 of the Initial Study in Appendix B) identified only air quality as an environmental area that could be significantly adversely affected by the proposed project. Further evaluation of potential air quality impacts in Chapter 4 of this ~~Revised Draft~~ Final SEA confirmed that significant adverse project-specific air quality impacts would occur as a result of implementing PAR 1168. Because of the narrow focus of the proposed project, no feasible mitigation measures were identified.

The following section briefly compares the relative potential adverse air quality impacts that may be generated by each project alternative. Potential adverse impacts for the environmental topics are quantified where sufficient data are available. A comparison of the air quality impacts for each project alternative is provided in Table 5-2. No other environmental topics besides air quality were identified that could be adversely affected by implementing any project alternative.

Table 5-2
Comparison of Adverse Air Quality Impacts of the Alternatives
Loss of Anticipated VOC Emission Reductions

Category	PAR 1168	ALTERNATIVE A (No Project)	ALTERNATIVE B (Further Delay Compliance Dates)	ALTERNATIVE C (Rescind January 1, 2005 Limits)
Top & Trim Adhesives	Temporary loss in VOC emission reductions of 414 pounds per day continues until 01/01/07	No emission reductions foregone	Temporary loss in VOC emission reductions of 414 pounds per day continues until 01/01/07	Permanent loss in VOC emission reductions of 414 pounds per day
PVC Welding	Permanent loss in VOC emission reductions of ~~504~~ 500* pounds per day	No emission reductions foregone	Temporary loss in VOC emission reductions of ~~504~~ 502* pounds per day continues until 01/01/07	Permanent loss in VOC emission reductions of ~~504~~ 502* pounds per day
CPVC Welding	Permanent loss in VOC emission reductions of ~~158*~~ 160 pounds per day	No emission reductions foregone	Temporary loss in VOC emission reductions of ~~158~~ 156* pounds per day continues until 01/01/07	Permanent loss in VOC emission reductions of ~~158~~ 156* pounds per day
PVC and CPVC Primer	Temporary loss in VOC emission reductions of 1,024 pounds per day continues until 07/01/05. Permanent loss in VOC emission reductions of ~~773~~ 768* pounds per day after 07/01/05	No emission reductions foregone	Temporary loss in VOC emission reductions of ~~1,030~~ 1,024* pounds per day continues until 01/01/07	Permanent loss in VOC emission reductions of ~~1,030~~ 1,024* pounds per day
ABS Welding	Additional Emissions reductions of 220 pounds per day	No change	No change	No change
Solvent Welding Hard Acrylic, Polycarbonate, PETG	Carcinogenic risk of three in a million. Acute and chronic hazard indices less than 1.0.	Elimination of carcinogenic and noncarcinogenic risk from methylene chloride	Acute and chronic hazard indices less than 1.0.until 01/01/07	Carcinogenic risk of four in a million. Acute and chronic hazard indices less than 1.0.
VOC Air Quality Impacts Significant?	Yes	No	Yes Less Than PAR 1168	Yes Greater Than PAR 1168
Methylene Chloride Risk Impacts Significant?	No	No	No	No

* Changed to be consistent with Table 4-4. Difference is a result of rounding. Ton values presented in Table 4-4 are rounded to three significant figures based on the original estimates in the October 1992 Staff Report for PAR 1168. Values in Table 1-2 were not rounded previously

Alternative A - No Project Alternative
Like PAR 1168, Alternative A does not anticipate that owners/operators of affected facilities would have to install control equipment that could generate significant adverse air quality impacts due to construction emissions. Instead, unlike to PAR 1168, there would be no emission reductions foregone with Alternative A because owners/operators of affected facilities would continue existing operations using compliant adhesives if available. If compliant adhesives are not available, owners/operators would have to discontinue using PVC, CPVC welding cements and primers, and hard sheet plastic welding solvents with methylene chloride or discontinue business.

It is expected that Alternative A would continue to produce a net air quality benefit regarding VOC and methylene chloride reductions since the final 2002 FEA limit requirements would take affect. It is anticipated that this alternative would continue the goal of the previous amendments to Rule 1168 by reducing VOC emissions by approximately ~~1,700~~ 2,096[10] pounds per day, either through eliminating the use of noncompliant adhesives or users finding alternative compliant formulations. In addition, methylene chloride use in weld solvents for hard sheet plastic would be prohibited.

Alternative A Conclusion
Since Alternative A is the only alternative without any emission reductions foregone, this alternative is the least toxic and environmentally superior alternative. This alternative is not consistent with project objectives since as stated in the Technology Review of Section 2 of this document, there are no adhesives that can meet the VOC content limit requirements for PVC and CPVC welding solvents required to meet IAPMO, ASTM and NSF standards, and prevent the use of products needed to weld hard plastics such as acrylic, polycarbonate and polyethylene terephalate plastic sheeting.

Alternative B - Further Delay Compliance Date
Similar to PAR 1168, it is not expected that Alternative B will require installation of air pollution control equipment. As a result, it is not anticipated that owners/operators of affected facilities would have to install control equipment that could generate construction emissions. Instead, affected facilities are anticipated to continue existing operations and comply with the interim VOC content limits of 540 grams per liter for top and trim, 510 grams per liter for PVC welding, 490 grams per liter for CPVC welding, 600 grams per liter for PVC/CPVC primers, 400 grams per liter for ABS welding and the continued use of methylene chloride weld solvents for hard acrylic, polycarbonate and polyethylene terephalate glycol two additional years, that is until January 1, 2007. Once the final compliance date becomes effective, it would be expected that owners/operators will comply with the final VOC content limits of 250 grams per liter for top and trim, 285 grams per liter for PVC welding, 270 grams per liter for CPVC welding, 250 grams per liter for PVC/CPVC primers, and the elimination of methylene chloride weld solvents for hard acrylic, polycarbonate and polyethylene terephalate glycol plastics by using compliant reformulated products rather than installing control equipment.

[10] Correct number was presented in Table 4-4 of the Revised Draft SEA.

Alternative B would extend the final compliance date for top and trim adhesives, PVC and CPVC welding, PVC and CPVC primers, and the elimination of methylene chloride welding solvents for hard acrylic, polycarbonate and polyethylene terephalate glycol plastics from the expiration date of January 1, 2005, as proposed in PAR 1168, to January 1, 2007. This means that originally anticipated VOC and methylene chloride emission reductions for these adhesive categories would be delayed two additional years, to January 1, 2007. Total VOC emission reductions delayed would be approximately 1.05 tons (~~1,700~~ 2,096 pounds)[11] per day. Therefore, it is expected that Alternative B would generate significant adverse VOC air quality impacts during operation.

It is estimated that the carcinogenic risk associated with delaying the compliance date for the elimination of methylene chloride from welding formulations used to bond hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications would be four in a million over seventy years. Acute and chronic noncarcinogenic hazard indices are below 1.0. The significance criterion for carcinogenic risk is ten in a million over seventy years. The significance criteria for noncarcinogenic risk are hazard indices above 1.0. Therefore, carcinogenic risk from methylene chloride would be below 10 in one million over seventy years, and exposure to methylene chloride from this alternative would only continue for two additional years until it would be prohibited on January 1, 2007, no significant methylene chloride carcinogenic risk is expected. Because acute and chronic hazard indices are below 1.0, the project is not expected to generate significant noncarcinogenic risk.

Alternative B Conclusion

This alternative is not consistent with project objectives since no compliant products are available to field test; therefore, it is unlikely compliant products could be found and tested within the near future. Therefore, further delaying the final compliance dates would not result in providing industry with compliant products.

This alternative would generate the same VOC emissions as rescinding the affective adhesive limits for two years (Alternative B). Alternative A is superior to Alternative B because it does not forgo any emission reductions. The proposed project is superior in daily adverse VOC and methylene chloride impacts since, Alternative B includes emission reductions forgone from top and trim adhesives and does not include new VOC content limits for PVC and CPVC primers, ABS weld solvent, and methylene chloride concentration and facility limits for bonding of hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications. However, the emissions forgone under Alternative B would occur for two years, if compliant adhesives could be found by January 1, 2007. If compliant adhesives are not found by January 1, 2007, this alternative would not meet the project objective of allowing facilities to use the lowest VOC and methylene chloride content limits that can meet industry performance requirements.

Alternative C – Rescind January 1, 2005 Limits

Similar to PAR 1168, it is not expected that Alternative C will require installation of air pollution control equipment. As a result, no construction-related air quality impacts are expected to occur if this alternative is implemented. Instead, affected facilities for top and

[11] Correct number was presented in Table 4-4 of the Revised Draft SEA.

trim applications are anticipated to continue existing operations using the current adhesives or previously prohibited high-VOC adhesives (which would be permanently excluded from further compliance requirements) rather than installing control equipment.

Alternative C would rescind the January 1, 2005 VOC content limits for PVC and CPVC weld solvents and primers. It is estimated that 0.85 tons (1,700 pounds) per day of VOC emission reduction would be foregone by the elimination of the January 1, 2005 VOC content limits for PVC and CPVC weld solvents and primers (Table 4-2). In addition, Alternative C would permanently exempt top and trim adhesives from VOC compliance limits altogether. This means that originally anticipated 0.2 tons (414 pounds) per day VOC emission reductions from the 2003 Final SEA for this adhesives category would be permanently foregone. Therefore, altogether Alternative C would permanently forgo approximately one ton (~~2,100~~ 2,096 pounds) of VOC emission reductions, which is greater than the VOC emission reductions foregone proposed by PAR 1168.

It is estimated that the carcinogenic risk associated with rescinding the elimination of methylene chloride from welding formulations used to bond hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications would be four in a million over seventy years. Acute and chronic noncarcinogenic hazard indices would be below 1.0. The significance criterion for carcinogenic risk is ten in a million over seventy years of exposure. The significance criteria for noncarcinogenic risk are hazard indices above 1.0. Therefore, carcinogenic risk from methylene chloride is below 10 in one million, so no significant methylene chloride carcinogenic risk is expected. Because acute and chronic hazard indices are below 1.0, Alternative C is not expected to generate significant noncarcinogenic risk.

Alternative C Conclusion

Alternative C would completely rescind the VOC content limits now established in the existing rule for top and trim adhesives, PVC and CPVC welding, PVC and CPVC primers. Alternative C would also rescind the prohibition of methylene chloride used in weld solvents for hard acrylic, polycarbonate and polyethylene terephalate glycol plastics. Like the proposed project this alternative would forgo emission reductions for top and trim adhesives, PVC and CPVC welding, PVC and CPVC primers, and methylene chloride emission reductions from hard sheet plastic weld solvents. Alternative C would not include new VOC content limits for PVC and CPVC primers, ABS welding cements, and concentration and facility limits for methylene chloride used to weld hard plastics. Alternative A is superior to Alternative C because it does not forego any emission reductions. Unlike Alternative B which would limit the emissions foregone for two years, Alternative C would permanently forego emission reductions from these adhesives. Therefore, this alternative would be the most toxic and least environmentally superior alternative.

CONCLUSION

SCAQMD's policy document Environmental Justice Program Enhancements for FY 2002-03, Enhancement II-1 recommends that all SCAQMD CEQA assessments include a feasible project alternative with the lowest air toxics emissions. In other words, for any major equipment or process type under the scope of the proposed project that creates a significant environmental impact, at least one alternative, where feasible, shall be considered from a "least harmful" perspective with regard to hazardous air emissions. Because the 2002

amendments to Rule 1168 included a prohibition that eliminated the use of specific HAPs (e.g., chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene) from adhesive and sealant applications, the lowest air toxics alternative is Alternative A, the No Project Alternative.

CEQA Guidelines §15126.6(e)(2) states in part that if the environmentally superior alternative is the "No Project" alternative, the CEQA document shall also identify an environmentally superior alternative among the other alternatives. Alternative A is the environmentally superior alternative as it provides the least air quality impact because of its potential for continuing to achieve the anticipated VOC emission reductions resulting from compliance with the current version of Rule 1168. Since Alternative A, the no project alternative is the environmentally superior alternative, other than the proposed project Alternative B would be the next environmentally superior alternative. However, as presented above Alternative B would only remain the next environmentally superior alternative as long as the delayed VOC and methylene chloride limits could be met by January 1, 2007. Since no viable compliant adhesives were found, it is unlikely that facilities could comply with the VOC limit restrictions and methylene chloride prohibited by January 1, 2007. In addition the potential increase of risk from methylene chloride would be higher in Alternative B than in the proposed project which would add concentration and facility limits.

The proposed project is preferred over Alternative A and Alternative B because it achieves the primary project goal of allowing facilities to use the lowest VOC and methylene chloride content limits that can meet industry performance requirements. Imposing the current final VOC content limit requirements as proposed for Alternative A for top and trim adhesive, PVC welding, CPVC welding, PVC and CPVC primers, and prohibiting the use of methylene chloride in hard sheet plastic weld solvents could possibly eliminate these products from the market, leaving end-users with no suitable replacement alternatives. Because no compliant adhesives and sealants that achieve performance and industrial standards have been identified, Alternative B would only delay the implementation date of existing final VOC content limit requirements and methylene chloride prohibition requirement.

The proposed project is considered to provide the best balance between delayed emission reductions, health risk, and allowing additional time to formulate and manufacture compliant adhesive products for the affected adhesive categories with the desired performance characteristics and, therefore, is preferred over Alternatives A, B, and C. However, while the proposed project provides the best balance between emission reductions delayed, health risk, and adhesive performance, the Governing Board may choose to adopt any of the alternatives in whole or in part in place of the proposed project, based on other considerations in addition to environmental concerns such a compliance costs, effects on future employment (jobs lost, for example), etc.

PAR 1168 delays the new VOC content limit requirements for PVC/CPVC primers and ABS welding from the January 1, 2005 date proposed in the Revised Draft SEA to July 1, 2005. Because of this delay the 250 gram per liter VOC content limit requirement for PVC/CPVC primers would be rescinded, and the 650 gram per liter VOC content limit

requirement would be extended to July 1, 2005. On July 1, 2005 the new 550 gram per liter VOC content limit requirement would become effective. In addition, PAR 1168 would delay the new ABS welding VOC content limit requirement of 325 grams per liter from January 1, 2005 to July 1, 2005. These modifications are within the scope of the analysis of the environmental impacts resulting form implementing Alternative C.

Alternative C proposes to permanently rescind the existing January 1, 2005 effective VOC content limit requirements. Alternative C would forego 1.05 ton (2,096 pounds) of VOC emission reductions. Alternative C does not include the new VOC content limit requirements for PVC/CPVC primers and ABS welding. PAR 1168 would only delay the PVC/CPVC primers and ABS welding VOC content limit requirements from January 1, 2005 to July 1, 2005

PAR 1168 as modified would generate the following emissions foregone: On January 1, 2005, 1.05 ton (2,096 pounds) of VOC emission reductions per day would be foregone. On July 1, 2005, the amount of VOC emission reductions foregone would be 0.81 ton (2,096 pounds) per day, when the new VOC content limit requirements for PVC/CPVC primers and ABS welding become effective. On January 1, 2007, the VOC emission reductions foregone would be 0.61 ton (1,206 pounds) per day, when the final VOC content limit requirement for top and trim adhesives becomes effective.

Therefore, PAR 1168 as modified consists of a mixture of project proposed in the Revised Draft SEA and Alternative C. Like the project proposed in the Revised Draft SEA, PAR 1168 would forego 0.81 ton (2,096 pounds) per day between July 1, 2005 and January 1, 2007, when the new VOC content limit requirements for PVC/CPVC primers and ABS welding become effective. In addition, PAR 1168 would forego 0.61 ton (1,206 pounds) of VOC emission reductions per day after July 1, 2007, when the final VOC content limit requirement for top and trim adhesives becomes effective. However, like Alternative C, between January 1, 2005 and July 1, 2005, PAR 1168 would forgo 1.05 ton (2,096 pounds) of VOC emission reductions per day.

CHAPTER 6

OTHER CEQA TOPICS

Relationship Between Short-Term Uses and Long-Term Productivity
Significant Irreversible Environmental Changes
Potential Growth-Inducing Impacts

SIGNIFICANT ENVRIONMENTAL EFFECTS WHICH CANNOT BE AVOIDED IF THE PROPOSED PROJECT IS IMPLEMENTED

Rule 1168 is being amended primarily because PVC and CPVC welding cements and primers and non-methylene chloride welding solvents for hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrication do not meet industry standards for bond strength and other performance standards. To date, the results of the technology assessment for these adhesives show that industry is experiencing difficulties with the workability and performance of the low-VOC products. Consequently, there are no measures available to mitigate significant adverse air quality impacts from the proposed project. If the amendments to PAR 1168 are adopted as proposed, the expected to result in VOC emission reductions foregone would total approximately 1.05 ton (2,096 pounds) of VOC per day between January 1, 2005 and July 1, 2005, ~~0.82~~ 0.81 ton (2,096 pounds) of VOC per day between ~~January~~ July 1, 2005 and January 1, 2007, then approximately 0.61 tons (~~1,220~~ 1,206 pounds) of VOC per day after January 1, 2007. The VOC emission reductions foregone would exceed the SCAQMD's VOC significance threshold of 55 pounds per day. Therefore, PAR 1168, if implemented, has the potential to generate unavoidable significant adverse air quality impacts.

SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES

CEQA Guidelines §§15126(c) and 15126.2(c) require an environmental analysis to consider "any significant irreversible environmental changes which would be involved if the proposed action should be implemented." In the NOP/IS and Final EA for the 2002 amendments to Rule 1168, documents upon which PAR 1168 is based, air quality was the only environmental area identified as potentially adversely affected by the proposed project.

The proposed changes to PAR 1168 would generate 1.05 tons (2,096 pounds) of VOC emissions foregone per day between January 1, 2005 to July 1, 2005, ~~0.82~~ 0.81 ton (2,096 pounds) of VOC emissions foregone per day between ~~January~~ July 1, 2005 and January 1, 2007, then approximately 0.61 tons (~~1,220~~ 1,206 pounds) per day of VOC emission reductions foregone after January 1, 2007; and reduce methylene chloride use to acceptable carcinogenic and noncarcinogenic risk. As stated earlier emissions reductions foregone would not increase existing emissions, but prevent future emissions reductions. The new VOC content limits would reduce the emissions forgone, and therefore after January 1, 2005 would reduce existing emissions by ~~480~~ 476 pounds (~~2,120~~ 2,096 – ~~1,640~~ 1,620) of VOC per day. The proposed limits of methylene chloride concentration and single facility usage would keep existing acceptable carcinogenic and noncarcinogenic risk to below significance. As a result, PAR 1168 would provide human health benefits by reducing population exposures to existing VOC emissions and methylene chloride concentrations, but not in the same quantities as proposed in the 2002 FEA.

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

POTENTIAL GROWTH-INDUCING IMPACTS

CEQA Guidelines §§15126(d) and 15126.2(d) require an environmental analysis to consider the "growth-inducing impact of the proposed action." Implementing PAR 1168 will not, by

itself, have any direct or indirect growth-inducing impacts on businesses in the SCAQMD's jurisdiction because it is not expected to foster economic or population growth or the construction of additional housing and primarily affects existing adhesive formulation companies.

APPENDIX A

PROPOSED AMENDED RULE 1168

In order to save space and avoid repetition, please refer to the final version of the proposed amended Rule 1168 located elsewhere in the rule package.

Version "PAR 1168" (November 4, 2004) of the proposed amended rule was circulated with the Revised Draft Subsequent Environmental Assessment that was released on December 5, 2004 for a 45-day public review and comment period ending December 21, 2004.

Original hard copies of the Revised Draft SEA, which include the version "PAR 1168" (November 4, 2004) of the proposed amended rule, can be obtained through the SCAQMD Public Information Center at the Diamond Bar headquarters or by calling (909) 396-2039.

APPENDIX B

ASSUMPTIONS AND CALCULATIONS

VOC Emissions and Emission Reduction Assumptions and Calculations

The VOC emissions and reductions in Table 4-2 of the 2002 FEA lists the baseline emissions and reductions as estimated from actual data collected in 1998; however, the 2002 FEA baseline was actually based on the October 1992 Staff Report for Proposed Amended Rule 1168 ~~1993 emissions inventory used in the April 11, 1997 Final Staff Report for Proposed Amended Rule 1168 – Control of Volatile Organic Compound Emissions from Adhesive Applications~~, which was also reported in the April 11, 1997 Final Staff Report for Proposed Amended Rule 1168 – Control of Volatile Organic Compound Emissions from Adhesive Applications and associated Final Supplemental Environmental Assessment (SEA) dated March 1997. The 2002 FEA baseline inventory was developed by applying a two percent per year growth factor, a 75 percent solids content factor and various VOC content limits established between 1993 and 1998. The solids factor was included because at that time staff assumed that solvent usage would increase with an increase of solids when sprayed. VOC emissions and reductions foregone from the January 1, 2005 VOC content limits presented in the FEA were assumed to be the same as those presented in the April 11, 1997 Final SEA, which were estimated for January 1, 2003, since the emission reductions foregone represents the difference between the emissions before and after the VOC content limit requirements.

The VOC emissions and emissions reductions utilized in the 2004 Draft SEA were taken from the Preliminary Draft Staff Report for Proposed Amended Rule 1168 – Adhesive and Sealant Applications dated June 2004. The VOC emissions and reductions presented in the 2004 Preliminary Draft Staff Report were developed from the same 1993 emissions inventory used in the FEA, but solids contact factor was removed, because staff realized that hand applications of cement do not necessarily reflect an increase in solvent usage as assumed in spray applications. However, the emissions reductions foregone are determined by the difference between the emissions based on the proposed VOC content limits and emissions based on existing VOC content limits, which remains the same with or without the solids content factor; therefore, the amount of emission reductions are the same regardless of whether the solids content factor is used. Additionally, the VOC emissions and emission reductions presented in the 2004 Preliminary Draft Staff Report were also projected to January 1, 2005.

~~The 2004 Draft SEA VOC emissions reductions foregone from rescinding the VOC content limits for PVC and CPVC welding and primers were estimated to be 0.85 tons (1,700 pounds) per day. The VOC emissions reductions foregone with the proposed VOC content limits for PVC and CPVC primers and ABS welding were estimated to be 0.61 tons (1,220 pounds)of VOC per day. Table A-1 presents the VOC emissions and emissions reductions presented in the 2004 Preliminary Draft Staff Report.~~

~~After the 2004 Draft SEA was released, staff found that the January 1, 2005 implementation of the final 250 grams VOC content per liter standard for top and trim adhesives is not feasible, because of difficulties with open time, reposition ability, and high temperature and stain resistance. Therefore, staff proposes to delay the final VOC content standard for top and trim adhesives from January 1, 2005, to January 1, 2007. Therefore, the 2004 Draft SEA was rescinded and this a Revised Draft SEA was prepared. The 2003 Final SEA estimated that 0.21 ton (414 pounds) of VOC emission reductions per day were delayed by postponing the 250 grams VOC content per liter standard for top and trim adhesives to January 1, 2005. The delay in the final VOC content standard for top and trim adhesives from January 1, 2005, to January 1, 2007 continue the delay of that 0.21 ton (414 pounds) of VOC emission reductions per day until~~

~~January 1, 2007. After January 1, 2007, the final VOC content standard would become effective and the 0.21 ton (414 pounds) of VOC emission reductions would occur. The emission reductions delayed are presented in Table 4-2.~~

Table A-1 presents the VOC emissions and emissions reductions presented in the 2004 Staff Report. The emission reductions delayed from top and trim adhesives from the 2003 Final SEA are presented in Table 4-2.

~~Therefore,~~ ~~b~~Between January 1, 2005 and July 1, 2007, the 1.05 tons (2,096 pounds) of VOC emission reductions foregone are as sum of the of the 0.60 ton (1,206 pounds) of VOC per day emission reductions foregone from the top and trim adhesive, and PVC and CPVC welding and primers. Between ~~January~~ July 1, 2005, to January 1, 2007, the proposed 0.82 ton (1,640 pounds) of VOC per day of total emission reductions forgone is the sum of the ~~0.61~~ 0.60 ton (~~1,220~~ 1,206 pounds) of VOC per day emission reductions foregone from the PVC and CPVC welding ~~and primers~~ minus the emission reductions gained by new PVC and CPVC primers and ABS welding VOC content limits; and the 0.21 ton (414 pounds) of VOC emission reductions per day of emission reductions delayed by extending the interim VOC content limit for top and trim adhesives. After January 1, 2007 when the final VOC content limit for top and trim becomes effective, the total emission reductions foregone would be ~~0.61~~ 0.60 ton (~~1,220~~ 1,206 pounds) of VOC per day. VOC emission reductions foregone exceed the VOC significance threshold of 55 tons per day. Therefore, the project is significant for VOC emissions during operation. A summary of the emissions foregone is presented in Table B-3.

Methylene Chloride Risk Assessment Assumptions and Calculations

The revision to the top and trim adhesive VOC content limit effective date does not affect the methylene chloride analyses that were developed for the previously prepared 2004 Draft SEA. Methylene chloride risk from rescinding the prohibition of methylene chloride in welding formulations used to bond hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications and establishing concentration restrictions of 60 percent by weight and limiting the purchase of all methylene chloride welding products to 20 gallons per calendar year at a single facility were estimated and presented in the 2004 Preliminary Draft Staff Report. The risk was determined by estimating amount of methylene chloride emissions a facility would emit if it used 20 gallons of hard plastic sheet welding projects with 60 percent methylene chloride by weight.

Emissions, lb/year = usage, gal/year x density, lb/gal x methylene chloride weight fraction
Emissions, lb/year = 20 gal/year x 11 lb/gal x 0.60
Emissions, lb/year = 132 lb/yr of methylene chloride
Emissions, tons/year = (132 lb/yr)/(2,000 lb/ton) = 0.7 ton/yr

A Tier II risk assessment based on the SCAQMD Risk Assessment Procedures for Rules 1401 and 222, version 2.0 and Attachment K for facilities emitting 0.7 ton per year of methylene chloride for each source receptor area in the Basin. The maximum carcinogenic risk was estimated to be three in a million for residential receptors (Table B-4) in the West Los Angeles source receptor area. The noncarcinogenic hazard indices were estimated to be less than 1.0 (Table B-4). The significance threshold for carcinogenic risk is ten in a million. The significance threshold for noncarcinogenic risk is a hazard index greater than 1.0. Therefore, the proposed project is not significant for risk from methylene chloride.

Based on the 2004 Preliminary Draft Staff Report the maximum methylene chloride content in the existing welding formulations used to bond hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications is 91 percent. Staff assumed that a maximum of 20 gallons per year are currently used at any single facility per year. Based on this the maximum carcinogenic risk from methylene chloride emitted from any single facility is four in a million (Table B-5) and the noncarcinogenic acute and hazard indices are below 1.0 (Table B-6).

TABLE B-1
Estimated VOC Emissions Inventories and Emissions Foregone

	VOC content limits				VOC Emissions Inventory				Emissions Foregone	
Plastic Welding Type	**1/1/1993 VOC content limits (gram/liter)**	**Current VOC content limits (gram/liter)**	**1/1/2005 FEA VOC content limits (gram/liter)**	**Proposed VOC content limits (gram/liter)**	**1/1/1993 Emission Inventory (ton/day)**	**Current Emission Inventory (ton/day)**	**Future Emissions Inventory Based on 1/1/2005 FEA VOC content limits (ton/day)**	**Future Emission Inventory Based on 1/1/2005 Proposed Limits (ton/day)**	**Emissions Foregone Based on Rescinding FEA VOC content limits (ton/day)**	**Emissions Foregone Based on Proposed VOC content limits (ton/day)**
PVC	850	510	285	510	0.569	0.569	0.318	-0.251	-0.251	0.569
CPVC	850	490	270	490	0.174	0.174	0.096	-0.078	-0.078	0.174
ABS	850	400	400	325	0.588	0.478	0.588	0.000	0.110	0.588
Primer	650	650	250	550	0.832	0.704	0.320	-0.512	-0.384	0.832
Totals					2.163	1.925	1.322	-0.840	-0.600	2.163

~~1/1/1993 Emissions Inventory - Table 2, SCAQMD, Final Staff Report for Proposed Amended Rule 1168 - Control of Volatile Organic Compound Emissions from Adhesive Applications, April 11, 1997.~~

SCAQMD, Staff Report for Proposed Amended Rule 1168, SCAQMD No: 921021MG, Attachment 1 VOC Emission Inventory For Affected Industries, October 1992.

Current emission inventory, ton/day = 1/1/1993 Emissions Inventory x (Current VOC content limits/1/1/93 VOC content limits) x $((100\% + 2\%)/100\%)^{\text{no of years}}$

Future emission inventory based on 1/1/2005 FEA VOC content limits, ton/day = Current emissions inventory x ((Proposed VOC content limits)/(Current VOC content limits))

Future emission inventory based on 1/1/2005 Proposed VOC content limits, ton/day = Current emissions inventory x ((1/1/2005 FEA VOC content limits)/(Current VOC content limits))

Emissions foregone based rescinding FEA VOC limits (tons/day) = Future Emission Inventory Based on 1/1/2005 Proposed Limits (ton/day) - Current Emission Inventory (ton/day)

Emissions foregone based proposed VOC limits (tons/day) = Future Emission Inventory Based on 1/1/2005 Proposed Limits (ton/day) - Future Emissions Inventory Based on 1/1/2005 FEA VOC Limits (ton/day)

Table B-2
Estimated Top and Trim Adhesives Inventory and VOC Emission Reductions Delayed

Adhesive Type Based on Range of VOC Content	**VOC Content of Material** less water/exempt compounds		**VOC Content of Material, As Applied** less water/exempt compounds		**Adhesive Coverage**	**Estimated Annual Adhesive Inventory Based on Coverage** [a]	**Estimated VOC Emissions** [b]	
	grams /liter	lb/gal	grams /liter	lb/gal	sq. ft./gal	gal/yr	lb/day	ton/day
Original VOC Limit (Pre-June 2002)	616	5.14	616	5.14	237	85,000	1,196	0.598
Interim VOC Limit (Current limit post-June 2002)	540	4.50	340	2.83	309	65,194	506	0.253
Final VOC Limit (To be in effect January 1, 2007)	250	2.08	125	1.04	625	32,232	92	0.046
Total Estimated VOC Emission Reductions Delayed [c]							**414**	**0.21**

[a] To calculate the estimated annual adhesives usage based on adhesive coverage data, multiply the 'Original VOC Limit' adhesive inventory by a ratio of the high VOC adhesive coverage to the coverage for the material in question. For example, the calculation of the estimated annual adhesive usage for a compliant adhesive is as follows:
85,000 gal/yr x (237 sq. ft./gal / 625 sq. ft./gal) = 65,194 gal/yr of compliant adhesive

[b] To calculate the 'Estimated VOC Emissions', multiply the 'VOC Content of Material, As Applied' by the 'Estimated Annual Adhesive Inventory Based on Coverage' and adjust for days and tons, as applicable. For example, for the 'Original VOC Limit' adhesive category, the calculation of estimated VOC emissions is as follows:
5.14 lb VOC/gal x 85,000 gal/yr x 1 yr/365 days = 1,196 lb VOC/day x (1 ton/2000 lb) = 0.598 tons VOC / day

[c] To calculate the 'Total Estimated VOC Emission Reductions Delayed', subtract the estimated VOC emissions for Final VOC Limit adhesives from the estimated VOC emissions for Interim VOC adhesives as follows: 506 lb VOC/day - 92 lb VOC/day = 414 lb VOC/day of emissions reductions delayed

~~Table B-3~~
~~Summary of Daily VOC Emissions Foregone~~

	~~Emissions Foregone in Tons per Day~~			~~Emissions Foregone in Pounds per Day~~		
~~Plastic Welding Type~~	~~Emissions Foregone Based on Rescinding FEA VOC Content Limits (ton/day)~~	~~Emissions Foregone Based on Proposed VOC Content Limits after January 1, 2005 (ton/day)~~	~~Emissions Foregone Based on Proposed VOC Content Limits after January 1, 2007 (ton/day)~~	~~Emissions Foregone Based on Rescinding FEA VOC Content Limits (lb/day)~~	~~Emissions Foregone Based on Proposed VOC Content Limits after January 1, 2005 (lb/day)~~	~~Emissions Foregone Based on Proposed VOC Content Limits after January 1, 2007 (lb/day)~~
~~Top and Trim Adhesives~~	~~0.21~~	~~0.21~~	~~0~~	~~420~~	~~420~~	~~0~~
~~PVC Welding~~	~~0.25~~	~~0.25~~	~~0.25~~	~~500~~	~~500~~	~~500~~
~~CPVC Welding~~	~~0.08~~	~~0.08~~	~~0.08~~	~~160~~	~~160~~	~~160~~
~~ABS Welding~~	~~0~~	~~0.11~~	~~0.11~~	~~0~~	~~220~~	~~220~~
~~PVC and CPVC Primer~~	~~0.52~~	~~0.39~~	~~0.39~~	~~1,040~~	~~780~~	~~780~~
~~Totals~~	~~1.06~~	~~0.82~~	~~0.61~~	~~2,120~~	~~1,640~~	~~1,220~~
~~Significance Threshold~~	~~0.028~~	~~0.028~~	~~0.028~~	~~55~~	~~55~~	~~55~~
~~Significant~~	~~Yes~~	~~Yes~~	~~Yes~~	~~Yes~~	~~Yes~~	~~Yes~~

Table B-3
Summary of Daily VOC Emissions Foregone

Plastic Welding Type	Emissions Foregone in Tons per Day[a]				Emissions Foregone in Pounds per Day[b]			
	Emissions Foregone Based on Rescinding FEA VOC Content Limits (ton/day)	Emissions Foregone Based on Proposed VOC Content Limits after January 1, 2005 (ton/day)	Emissions Foregone Based on Proposed VOC Content Limits after July 1, 2005 (ton/day)	Emissions Foregone Based on Proposed VOC Content Limits after January 1, 2007 (ton/day)	Emissions Foregone Based on Rescinding FEA VOC Content Limits (lb/day)	Emissions Foregone Based on Proposed VOC Content Limits after January 1, 2005 (lb/day)	Emissions Foregone Based on Proposed VOC Content Limits after July 1, 2005 (lb/day)	Emissions Foregone Based on Proposed VOC Content Limits after January 1, 2007 (lb/day)
Top and Trim Adhesives	-0.207	-0.207	-0.207	0	-414	-414	-414	0
PVC Welding	-0.251	-0.251	-0.251	-0.251	-502	-502	-502	-502
CPVC Welding	-0.078	-0.078	-0.078	-0.078	-156	-156	-156	-156
ABS Welding	0.000	0.000	0.110	0.110	0	0	220	220
PVC and CPVC Primer	-0.512	-0.512	-0.384	-0.384	-1,024	-1,024	-768	-768
Totals	**-1.048**	**-1.048**	**-0.810**	**-0.603**	**-2,096**	**-2,096**	**-1,620**	**-1,206**
Significance Threshold	-	-	-	-	55	55	55	55
Significant	-	-	-	-	**Yes**	**Yes**	**Yes**	**Yes**

a) Emissions foregone in tons per day were estimated in Tables 4-2 and 4-3.
b) Emissions foregone in tons per day were calculated by multiplying emissions foregone in tons per day by 2,000 pounds per ton.

TABLE B-4
Carcinogenic Risk from Methylene Chloride Welding of Acrylic, Polycarbonate and Polyethylene Terephalate Glycol Plastic Fabrications with Proposed Concentration and Facility Limits

Air Monitoring Station	Q (ton/yr)	X/Q at 25 ft ($\mu g/m^3$)/ (ton/yr)	MET	U $(\mu g/m^3)^{-1}$	MP Worst Case	LEA Resi-dential	LEA Worker	MICR Resi-dental at 25ft	MICR Worker at 25 ft
Anaheim	0.07	41.45	0.86	1.00E-06	1	1	0.66	2.35E-06	1.55E-06
Azusa	0.07	41.45	0.80	1.00E-06	1	1	0.66	2.19E-06	1.44E-06
Banning	0.07	41.45	0.54	1.00E-06	1	1	0.66	1.48E-06	9.75E-07
Burbank	0.07	41.45	0.60	1.00E-06	1	1	0.66	1.64E-06	1.08E-06
Canoga Park	0.07	41.45	0.68	1.00E-06	1	1	0.66	1.86E-06	1.23E-06
Compton	0.07	41.45	0.63	1.00E-06	1	1	0.66	1.72E-06	1.14E-06
Costa Mesa	0.07	41.45	0.71	1.00E-06	1	1	0.66	1.94E-06	1.28E-06
Downtown L.A.	0.07	41.45	0.51	1.00E-06	1	1	0.66	1.40E-06	9.21E-07
El Toro	0.07	41.45	0.68	1.00E-06	1	1	0.66	1.86E-06	1.23E-06
Fontana	0.07	41.45	0.80	1.00E-06	1	1	0.66	2.19E-06	1.44E-06
Indio	0.07	41.45	0.72	1.00E-06	1	1	0.66	1.97E-06	1.30E-06
King Harbor	0.07	41.45	0.63	1.00E-06	1	1	0.66	1.72E-06	1.14E-06
La Canada	0.07	41.45	0.81	1.00E-06	1	1	0.66	2.22E-06	1.46E-06
Lancaster	0.07	41.45	0.49	1.00E-06	1	1	0.66	1.34E-06	8.85E-07
Lennox	0.07	41.45	0.66	1.00E-06	1	1	0.66	1.81E-06	1.19E-06
Long Beach	0.07	41.45	0.58	1.00E-06	1	1	0.66	1.59E-06	1.05E-06
Los Alamitos	0.07	41.45	0.64	1.00E-06	1	1	0.66	1.75E-06	1.16E-06
Lynwood	0.07	41.45	0.63	1.00E-06	1	1	0.66	1.72E-06	1.14E-06
Malibu	0.07	41.45	0.88	1.00E-06	1	1	0.66	2.41E-06	1.59E-06
Newhall	0.07	41.45	0.53	1.00E-06	1	1	0.66	1.45E-06	9.57E-07
Norco	0.07	41.45	0.75	1.00E-06	1	1	0.66	2.05E-06	1.35E-06
Palm Springs	0.07	41.45	0.60	1.00E-06	1	1	0.66	1.64E-06	1.08E-06
Pasadena	0.07	41.45	0.75	1.00E-06	1	1	0.66	2.05E-06	1.35E-06
Pico Rivera	0.07	41.45	0.70	1.00E-06	1	1	0.66	1.91E-06	1.26E-06
Pomona	0.07	41.45	0.91	1.00E-06	1	1	0.66	2.49E-06	1.64E-06
Redlands	0.07	41.45	0.90	1.00E-06	1	1	0.66	2.46E-06	1.63E-06
Reseda	0.07	41.45	0.71	1.00E-06	1	1	0.66	1.94E-06	1.28E-06
Riverside	0.07	41.45	0.82	1.00E-06	1	1	0.66	2.24E-06	1.48E-06
Santa Ana Cyn	0.07	41.45	0.92	1.00E-06	1	1	0.66	2.52E-06	1.66E-06
Upland	0.07	41.45	0.62	1.00E-06	1	1	0.66	1.70E-06	1.12E-06
Vernon	0.07	41.45	0.55	1.00E-06	1	1	0.66	1.50E-06	9.93E-07
Walnut	0.07	41.45	0.63	1.00E-06	1	1	0.66	1.72E-06	1.14E-06
West L.A.	0.07	41.45	1.00	1.00E-06	1	1	0.66	2.74E-06	1.81E-06
Whittier	0.07	41.45	0.66	1.00E-06	1	1	0.66	1.81E-06	1.19E-06
Maximum								2.74E-06	1.81E-06

Maximum Individual Cancer Risk (MICR)

Maximum emission rate (Q)

Dispersion factor (X/Q) - Table 4A, SCAQMD Risk Assessment Procedures for Rules 1401 & 212, Version 6.0

Meterological correction factor (MET) - Table 4B, SCAQMD Risk Assessment Procedures for Rules 1401 & 212, Version 6.0

Unit Risk Factor (U) - Table 8A, SCAQMD Risk Assessment Procedures for Rules 1401 & 212, Version 6.0

Multi-pathway factor (MP) - Table 8, SCAQMD Risk Assessment Procedures for Rules 1401 & 212, Version 6.0

Lifetime exposure adjustment factor (LEA) - Table 9, SCAQMD Risk Assessment Procedures for Rules 1401 & 212, Version 6.0

MICR = Q, ton/yr x (X/Q) x MET x U x MP x LEA

TABLE B-5
Noncarcinogenic Risk from Methylene Chloride Welding of Acrylic, Polycarbonate and Polyethylene Terephalate Glycol Plastic Fabrications with Proposed Concentration and Facility Limits

Air Monitoring Station	Q (ton/yr)	Q_{hr} (lb/hr)	X/Q at 25 ft ($\mu g/m^3$)/ (ton/yr)	X/Q_{hr} at 25 ft ($\mu g/m^3$)/ (lb/hr)	MET	MP (Worst Case)	Chronic REL	Acute REL	HIA	HIC
Anaheim	0.07	6.00	41.45	1,532	0.86	1	400	14,000	0.66	0.0059
Azusa	0.07	6.00	41.45	1,532	0.80	1	400	14,000	0.66	0.0055
Banning	0.07	6.00	41.45	1,532	0.54	1	400	14,000	0.66	0.0037
Burbank	0.07	6.00	41.45	1,532	0.60	1	400	14,000	0.66	0.0041
Canoga Park	0.07	6.00	41.45	1,532	0.68	1	400	14,000	0.66	0.0047
Compton	0.07	6.00	41.45	1,532	0.63	1	400	14,000	0.66	0.0043
Costa Mesa	0.07	6.00	41.45	1,532	0.71	1	400	14,000	0.66	0.0049
Downtown L.A.	0.07	6.00	41.45	1,532	0.51	1	400	14,000	0.66	0.0035
El Toro	0.07	6.00	41.45	1,532	0.68	1	400	14,000	0.66	0.0047
Fontana	0.07	6.00	41.45	1,532	0.80	1	400	14,000	0.66	0.0055
Indio	0.07	6.00	41.45	1,532	0.72	1	400	14,000	0.66	0.0049
King Harbor	0.07	6.00	41.45	1,532	0.63	1	400	14,000	0.66	0.0043
La Canada	0.07	6.00	41.45	1,532	0.81	1	400	14,000	0.66	0.0055
Lancaster	0.07	6.00	41.45	1,532	0.49	1	400	14,000	0.66	0.0034
Lennox	0.07	6.00	41.45	1,532	0.66	1	400	14,000	0.66	0.0045
Long Beach	0.07	6.00	41.45	1,532	0.58	1	400	14,000	0.66	0.0040
Los Alamitos	0.07	6.00	41.45	1,532	0.64	1	400	14,000	0.66	0.0044
Lynwood	0.07	6.00	41.45	1,532	0.63	1	400	14,000	0.66	0.0043
Malibu	0.07	6.00	41.45	1,532	0.88	1	400	14,000	0.66	0.0060
Newhall	0.07	6.00	41.45	1,532	0.53	1	400	14,000	0.66	0.0036
Norco	0.07	6.00	41.45	1,532	0.75	1	400	14,000	0.66	0.0051
Palm Springs	0.07	6.00	41.45	1,532	0.60	1	400	14,000	0.66	0.0041
Pasadena	0.07	6.00	41.45	1,532	0.75	1	400	14,000	0.66	0.0051
Pico Rivera	0.07	6.00	41.45	1,532	0.70	1	400	14,000	0.66	0.0048
Pomona	0.07	6.00	41.45	1,532	0.91	1	400	14,000	0.66	0.0062
Redlands	0.07	6.00	41.45	1,532	0.90	1	400	14,000	0.66	0.0062
Reseda	0.07	6.00	41.45	1,532	0.71	1	400	14,000	0.66	0.0049
Riverside	0.07	6.00	41.45	1,532	0.82	1	400	14,000	0.66	0.0056
Santa Ana Cyn	0.07	6.00	41.45	1,532	0.92	1	400	14,000	0.66	0.0063
Upland	0.07	6.00	41.45	1,532	0.62	1	400	14,000	0.66	0.0042
Vernon	0.07	6.00	41.45	1,532	0.55	1	400	14,000	0.66	0.0038
Walnut	0.07	6.00	41.45	1,532	0.63	1	400	14,000	0.66	0.0043
West L.A.	0.07	6.00	41.45	1,532	1.00	1	400	14,000	0.66	0.0068
Whittier	0.07	6.00	41.45	1,532	0.66	1	400	14,000	0.66	0.0045

Maximum emission rate (Q) in tons per year

Maximum emission rate (Q_{hr}) in pounds per hour

Dispersion factor (X/Q) - Table 4A, SCAQMD Risk Assessment Procedures for Rules 1401 & 212, Version 6.0

Dispersion factor $(X/Q)_{hr}$ - Table 7, SCAQMD Risk Assessment Procedures for Rules 1401 & 212, Version 6.1

Meterological correction factor (MET) - Table 4B, SCAQMD Risk Assessment Procedures for Rules 1401 & 212, Version 6.0

Multi-pathway factor (MP) - Table 8, SCAQMD Risk Assessment Procedures for Rules 1401 & 212, Version 6.0

Reference exposure level - Table 8A, SCAQMD Risk Assessment Procedures for Rules 1401 & 212, Version 6.0

Acute hazard index (HIA)

Chronic hazard index (HIC)

Total $HIA_{target\ organ} = \{\Sigma[Qhr \times (X/Q)_{hr}]/Acute\ REL\}_{target\ organ}$

Total $HIC_{target\ organ} = \{\ \Sigma[Qyr \times (X/Q) \times MET \times MP]/Chronic\ REL\}_{target\ organ}$

TABLE B-6
Existing Carcinogenic Risk from Methylene Chloride Welding of Acrylic, Polycarbonate and Polyethylene Terephalate Glycol Plastic Fabrications

Air Monitoring Station	Q (ton/yr)	X/Q at 25 ft ($\mu g/m^3$)/ (ton/yr)	MET	U $(\mu g/m^3)^{-1}$	MP Worst Case	LEA Resi-dential	LEA Worker	MICR Resi-dental at 25ft	MICR Worker at 25 ft
Anaheim	0.10	41.45	0.86	1.00E-06	1	1	0.66	3.56E-06	2.35E-06
Azusa	0.10	41.45	0.80	1.00E-06	1	1	0.66	3.32E-06	2.19E-06
Banning	0.10	41.45	0.54	1.00E-06	1	1	0.66	2.24E-06	1.48E-06
Burbank	0.10	41.45	0.60	1.00E-06	1	1	0.66	2.49E-06	1.64E-06
Canoga Park	0.10	41.45	0.68	1.00E-06	1	1	0.66	2.82E-06	1.86E-06
Compton	0.10	41.45	0.63	1.00E-06	1	1	0.66	2.61E-06	1.72E-06
Costa Mesa	0.10	41.45	0.71	1.00E-06	1	1	0.66	2.94E-06	1.94E-06
Downtown L.A.	0.10	41.45	0.51	1.00E-06	1	1	0.66	2.11E-06	1.40E-06
El Toro	0.10	41.45	0.68	1.00E-06	1	1	0.66	2.82E-06	1.86E-06
Fontana	0.10	41.45	0.80	1.00E-06	1	1	0.66	3.32E-06	2.19E-06
Indio	0.10	41.45	0.72	1.00E-06	1	1	0.66	2.98E-06	1.97E-06
King Harbor	0.10	41.45	0.63	1.00E-06	1	1	0.66	2.61E-06	1.72E-06
La Canada	0.10	41.45	0.81	1.00E-06	1	1	0.66	3.36E-06	2.22E-06
Lancaster	0.10	41.45	0.49	1.00E-06	1	1	0.66	2.03E-06	1.34E-06
Lennox	0.10	41.45	0.66	1.00E-06	1	1	0.66	2.74E-06	1.81E-06
Long Beach	0.10	41.45	0.58	1.00E-06	1	1	0.66	2.40E-06	1.59E-06
Los Alamitos	0.10	41.45	0.64	1.00E-06	1	1	0.66	2.65E-06	1.75E-06
Lynwood	0.10	41.45	0.63	1.00E-06	1	1	0.66	2.61E-06	1.72E-06
Malibu	0.10	41.45	0.88	1.00E-06	1	1	0.66	3.65E-06	2.41E-06
Newhall	0.10	41.45	0.53	1.00E-06	1	1	0.66	2.20E-06	1.45E-06
Norco	0.10	41.45	0.75	1.00E-06	1	1	0.66	3.11E-06	2.05E-06
Palm Springs	0.10	41.45	0.60	1.00E-06	1	1	0.66	2.49E-06	1.64E-06
Pasadena	0.10	41.45	0.75	1.00E-06	1	1	0.66	3.11E-06	2.05E-06
Pico Rivera	0.10	41.45	0.70	1.00E-06	1	1	0.66	2.90E-06	1.91E-06
Pomona	0.10	41.45	0.91	1.00E-06	1	1	0.66	3.77E-06	2.49E-06
Redlands	0.10	41.45	0.90	1.00E-06	1	1	0.66	3.73E-06	2.46E-06
Reseda	0.10	41.45	0.71	1.00E-06	1	1	0.66	2.94E-06	1.94E-06
Riverside	0.10	41.45	0.82	1.00E-06	1	1	0.66	3.40E-06	2.24E-06
Santa Ana Cyn	0.10	41.45	0.92	1.00E-06	1	1	0.66	3.81E-06	2.52E-06
Upland	0.10	41.45	0.62	1.00E-06	1	1	0.66	2.57E-06	1.70E-06
Vernon	0.10	41.45	0.55	1.00E-06	1	1	0.66	2.28E-06	1.50E-06
Walnut	0.10	41.45	0.63	1.00E-06	1	1	0.66	2.61E-06	1.72E-06
West L.A.	0.10	41.45	1.00	1.00E-06	1	1	0.66	4.15E-06	2.74E-06
Whittier	0.10	41.45	0.66	1.00E-06	1	1	0.66	2.74E-06	1.81E-06
Total								4.15E-06	2.74E-06

Maximum Individual Cancer Risk (MICR)

Maximum emission rate (Q)

Dispersion factor (X/Q) - Table 4A, SCAQMD Risk Assessment Procedures for Rules 1401 & 212, Version 6.0

Meteorological correction factor (MET) - Table 4B, SCAQMD Risk Assessment Procedures for Rules 1401 & 212, Version 6.0

Unit Risk Factor (U) - Table 8A, SCAQMD Risk Assessment Procedures for Rules 1401 & 212, Version 6.0

Multi-pathway factor (MP) - Table 8, SCAQMD Risk Assessment Procedures for Rules 1401 & 212, Version 6.0

Lifetime exposure adjustment factor (LEA) - Table 9, SCAQMD Risk Assessment Procedures for Rules 1401 & 212, Version 6.0

MICR = Q, ton/yr x (X/Q) x MET x U x MP x LEA

TABLE B-7
Existing NonCarcinogenic Risk from Methylene Chloride Welding of Acrylic, Polycarbonate and Polyethylene Terephalate Glycol Plastic Fabrications

Air Monitoring Station	Q (ton/yr)	Q_{hr} (lb/hr)	X/Q at 25 ft ($\mu g/m^3$)/ (ton/yr)	X/Q_{hr} at 25 ft ($\mu g/m^3$)/ (lb/hr)	MET	MP (Worst Case)	Chronic REL	Acute REL	HIA	HIC
Anaheim	0.10	6.00	41.45	1,532	0.86	1	400	14,000	0.66	0.0089
Azusa	0.10	6.00	41.45	1,532	0.80	1	400	14,000	0.66	0.0083
Banning	0.10	6.00	41.45	1,532	0.54	1	400	14,000	0.66	0.0056
Burbank	0.10	6.00	41.45	1,532	0.60	1	400	14,000	0.66	0.0062
Canoga Park	0.10	6.00	41.45	1,532	0.68	1	400	14,000	0.66	0.0070
Compton	0.10	6.00	41.45	1,532	0.63	1	400	14,000	0.66	0.0065
Costa Mesa	0.10	6.00	41.45	1,532	0.71	1	400	14,000	0.66	0.0074
Downtown L.A.	0.10	6.00	41.45	1,532	0.51	1	400	14,000	0.66	0.0053
El Toro	0.10	6.00	41.45	1,532	0.68	1	400	14,000	0.66	0.0070
Fontana	0.10	6.00	41.45	1,532	0.80	1	400	14,000	0.66	0.0083
Indio	0.10	6.00	41.45	1,532	0.72	1	400	14,000	0.66	0.0075
King Harbor	0.10	6.00	41.45	1,532	0.63	1	400	14,000	0.66	0.0065
La Canada	0.10	6.00	41.45	1,532	0.81	1	400	14,000	0.66	0.0084
Lancaster	0.10	6.00	41.45	1,532	0.49	1	400	14,000	0.66	0.0051
Lennox	0.10	6.00	41.45	1,532	0.66	1	400	14,000	0.66	0.0068
Long Beach	0.10	6.00	41.45	1,532	0.58	1	400	14,000	0.66	0.0060
Los Alamitos	0.10	6.00	41.45	1,532	0.64	1	400	14,000	0.66	0.0066
Lynwood	0.10	6.00	41.45	1,532	0.63	1	400	14,000	0.66	0.0065
Malibu	0.10	6.00	41.45	1,532	0.88	1	400	14,000	0.66	0.0091
Newhall	0.10	6.00	41.45	1,532	0.53	1	400	14,000	0.66	0.0055
Norco	0.10	6.00	41.45	1,532	0.75	1	400	14,000	0.66	0.0078
Palm Springs	0.10	6.00	41.45	1,532	0.60	1	400	14,000	0.66	0.0062
Pasadena	0.10	6.00	41.45	1,532	0.75	1	400	14,000	0.66	0.0078
Pico Rivera	0.10	6.00	41.45	1,532	0.70	1	400	14,000	0.66	0.0073
Pomona	0.10	6.00	41.45	1,532	0.91	1	400	14,000	0.66	0.0094
Redlands	0.10	6.00	41.45	1,532	0.90	1	400	14,000	0.66	0.0093
Reseda	0.10	6.00	41.45	1,532	0.71	1	400	14,000	0.66	0.0074
Riverside	0.10	6.00	41.45	1,532	0.82	1	400	14,000	0.66	0.0085
Santa Ana Cyn	0.10	6.00	41.45	1,532	0.92	1	400	14,000	0.66	0.0095
Upland	0.10	6.00	41.45	1,532	0.62	1	400	14,000	0.66	0.0064
Vernon	0.10	6.00	41.45	1,532	0.55	1	400	14,000	0.66	0.0057
Walnut	0.10	6.00	41.45	1,532	0.63	1	400	14,000	0.66	0.0065
West L.A.	0.10	6.00	41.45	1,532	1.00	1	400	14,000	0.66	0.0104
Whittier	0.10	6.00	41.45	1,532	0.66	1	400	14,000	0.66	0.0068

Maximum emission rate (Q) in tons per year

Maximum emission rate (Q_{hr}) in pounds per hour

Dispersion factor (X/Q) - Table 4A, SCAQMD Risk Assessment Procedures for Rules 1401 & 212, Version 6.0

Dispersion factor $(X/Q)_{hr}$ - Table 7, SCAQMD Risk Assessment Procedures for Rules 1401 & 212, Version 6.1

Meteorological correction factor (MET) - Table 4B, SCAQMD Risk Assessment Procedures for Rules 1401 & 212, Version 6.0

Multi-pathway factor (MP) - Table 8, SCAQMD Risk Assessment Procedures for Rules 1401 & 212, Version 6.0

Reference exposure level - Table 8A, SCAQMD Risk Assessment Procedures for Rules 1401 & 212, Version 6.0

Acute hazard index (HIA)

Chronic hazard index (HIC)

Total $HIA_{target\ organ} = \{ \Sigma[Qhr \times (X/Q)_{hr}]/Acute\ REL\}_{target\ organ}$

Total $HIC_{target\ organ} = \{ \Sigma[Qyr \times (X/Q) \times MET \times MP]/Chronic\ REL\}_{target\ organ}$

APPENDIX C

COMMENT LETTER ON THE DRAFT SUBSEQUENT ENVIRONMENTAL ASSESSMENT AND RESPONSE TO THE COMMENT LETTER

SOUTHERN CALIFORNIA

ASSOCIATION of GOVERNMENTS

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Riverside County Transportation Commission: Robin Lowe, Hemet

Ventura County Transportation Commission: Bill Davis, Simi Valley

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October 25, 2004

Mr. James Koizumi
SCAQMD
21865 E. Copley Drive
Diamond Bar, CA 91765-4182

RE: SCAG Clearinghouse No. I20040694 Proposed Amended Rule 1168

Dear Mr. Koizumi:

Thank you for submitting the **Proposed Amended Rule 1168** for review and comment. As areawide clearinghouse for regionally significant projects, SCAG reviews the consistency of local plans, projects and programs with regional plans. This activity is based on SCAG's responsibilities as a regional planning organization pursuant to state and federal laws and regulations. Guidance provided by these reviews is intended to assist local agencies and project sponsors to take actions that contribute to the attainment of regional goals and policies.

We have reviewed the **Proposed Amended Rule 1168**, and have determined that the proposed Project is not regionally significant per SCAG Intergovernmental Review (IGR) Criteria and California Environmental Quality Act (CEQA) Guidelines (Section 15206). Therefore, the proposed Project does not warrant comments at this time. Should there be a change in the scope of the proposed Project, we would appreciate the opportunity to review and comment at that time.

A description of the proposed Project was published in SCAG's **October 1-15, 2004** Intergovernmental Review Clearinghouse Report for public for review and comment.

The project title and SCAG Clearinghouse number should be used in all correspondence with SCAG concerning this Project. Correspondence should be sent to the attention of the Clearinghouse Coordinator. If you have any questions, please contact me at (213) 236-1867. Thank you.

Sincerely,

JEFFREY M. SMITH, AICP
Senior Regional Planner
Intergovernmental Review

Responses to Comment Letter
Southern California Association of Governments
October 25, 2004

Response
SCAQMD agrees with the SCAG that PAR 1168 is not regionally significant.

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4182
(909) 396-2000 • http://www.aqmd.gov

SUBJECT: **NOTICE OF COMPLETION OF A DRAFT SUBSEQUENT ENVIRONMENTAL ASSESSMENT**

PROJECT TITLE: **PROPOSED AMENDMENTS TO RULE 1171 – SOLVENT CLEANING OPERATIONS**

In accordance with the California Environmental Quality Act (CEQA), the South Coast Air Quality Management District (SCAQMD), as the Lead Agency, prepared this Draft Subsequent Environmental Assessment (SEA) which assesses potential environmental impacts that may result from implementing the proposed project identified above pursuant to its certified regulatory program (SCAQMD Rule 110).

This letter, the Notice of Completion (NOC) and the attached Draft SEA are not SCAQMD applications or forms requiring a response from you. Their purpose is simply to provide information to you on the above project. If the proposed project has no bearing on you or your organization, no action on your part is necessary. The project's description, location, and potential environmental impacts are described in the NOC.

Comments focusing on your area of expertise, your agency's area of jurisdiction, or issues relative to the environmental analysis should be addressed to Mr. Michael Krause (c/o CEQA) at the address shown above, or sent by FAX to (909) 396-3324 or by e-mail to mkrause@aqmd.gov. Comments must be received no later than 5:00 PM on March 25, 2005. Please include the name and phone number of the contact person for your agency. Questions relative to the rule amendments should be directed to Mr. Rizaldy Calungcagin at (909) 396-2315.

The Public Hearing for the proposed amendments is scheduled for May 6, 2005. (Note: This public meeting date is subject to change).

Date: February 9, 2005 **Signature:** Steve Smith

Steve Smith, Ph.D.
Program Supervisor
Planning, Rules, and Area Sources

Reference: California Code of Regulations, Title 14, Sections 15082(a), 15103, and 15375

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 Copley Drive, Diamond Bar, CA 91765-4182

NOTICE OF COMPLETION OF A DRAFT SUBSEQUENT ENVIRONMENTAL ASSESSMENT

Project Title:
Draft Subsequent Environmental Assessment (SEA): Proposed Amended Rule 1171 – Solvent Cleaning Operations

Project Location:
South Coast Air Quality Management District (SCAQMD) area of jurisdiction consisting of the four-county South Coast Air Basin (Orange County and the non-desert portions of Los Angeles, Riverside and San Bernardino counties), and the Riverside County portions of the Salton Sea Air Basin and the Mojave Desert Air Basin

Description of Nature, Purpose, and Beneficiaries of Project:
Proposed amended Rule (PAR) 1171 – Solvent Cleaning Operations, will implement the recommendations in the technology assessments for those cleaning applications where studies have been completed. Because the technology assessment for the cleaning of screen printing, lithographic/letterpress, and ultraviolet or electron beam ink application equipment is still on-going and not expected to be completed until the end of November 2005, SCAQMD staff is proposing a one-year delay in the implementation of low-VOC limits originally scheduled for July 1, 2005 for these cleaning applications. An interim VOC limit is being proposed for these cleaning applications to take advantage of existing products in the market, which have lower VOC content limits than the current rule limit. Other amendments include: eliminating the exemption for cleaning of solar cells, laser hardware, scientific instruments, and high-precision optics; extending the exemption for the cleaning of stereolithography equipment and models and UV lamps used for curing UV inks or coatings; modifying the rule language to include the most current test methods for determining the efficiency of an emission control system; and eliminating the general prohibition exemption for methylene chloride and perchloroethylene.

Lead Agency:
South Coast Air Quality Management District

Division:
Planning, Rule Development and Area Sources

Draft SEA and all supporting documentation are available at:
SCAQMD Headquarters
21865 Copley Drive
Diamond Bar, CA 91765

or by calling:
(909) 396-2039

or by accessing the SCAQMD's website at:
http://www.aqmd.gov/ceqa/aqmd.html

The Public Notice of Completion is provided through the following:

☑ Los Angeles Times (February 9, 2005) ☑ AQMD Website ☑ AQMD Mailing List

Draft SEA Review Period:
February 9, 2005 – March 25, 2005

Scheduled Public Meeting Dates:
SCAQMD Governing Board Hearing: May 6, 2005, 9:00 a.m.; SCAQMD Headquarters

The proposed project will have a regional and areawide significance, therefore, a CEQA scoping meeting is required (pursuant to Public Resources Code §21083.9(a)(2)) and was held on January 27, 2005 for the proposed project.

CEQA Contact Person:	Phone Number:	Fax Number:	Email:
Mr. Michael Krause	(909) 396-2706	(909) 396-3324	<mkrause@aqmd.gov>

Direct Questions on Proposed Amendments to:	Phone Number:	Fax Number:	Email:
Mr. Rizaldy Calungcagin	(909) 396-2315	(909) 396-3324	<rcalungcagin@aqmd.gov>

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Draft Subsequent Environmental Assessment for:

Proposed Amended Rule 1171 – Solvent Cleaning Operations

SCAQMD No. 050209MK

February 9, 2005

Executive Officer
Barry R. Wallerstein, D.Env.

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INTRODUCTION

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

The CEQA Guidelines state that the degree of specificity required in a CEQA document depends on the type of project being proposed (CEQA Guidelines §15146). The detail of the environmental analysis for certain types of projects cannot be as great as for others. For example, the environmental document for projects, such as the adoption or amendment of a comprehensive zoning ordinance or a local general plan, should focus on the secondary effects that can be expected to follow from the adoption or amendment, but the analysis need not be as detailed as the analysis of the specific construction projects that might follow. As a result, this Draft SEA analyzes impacts on a regional level and impacts on the level of individual industries or individual facilities where feasible.

The categories of environmental impacts recommended for evaluation in a CEQA document are established by CEQA (Public Resources Code, §21000 et seq.) and the CEQA Guidelines as promulgated by the State of California Secretary of Resources. Under the CEQA Guidelines, there are 17 environmental categories in which potential adverse impacts from a project are evaluated. Projects are evaluated against the environmental categories in an environmental checklist and those environmental categories that may be adversely affected by the project are further analyzed in the appropriate CEQA document.

POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A Notice of Preparation and an Initial Study (NOP/IS), including an environmental checklist, were prepared for the 1999 amendments to Rule 1171 when the VOC content limit for the affected solvent cleaning categories were originally adopted to be lowered. The proposed amendments represent a modification of the Rule 1171 amendments adopted in 1999 that delay the final compliance date for specified cleaning solvents and no new requirements are proposed. that would trigger the need to solicit guidance from responsible and/or trustee parties. SCAQMD's review of the proposed project shows that the project would have a significant adverse effect on the environment. The following sections include the analyses of the potential adverse environmental impacts of implementing the proposed amendments.

Only one environmental impact area, air quality, was identified as a potentially significant adverse effect of implementing the proposed project. The environmental impact analysis incorporates a "worst-case" approach. This entails the premise that whenever the analysis requires that assumptions be made, those assumptions that result in the greatest adverse impacts are typically chosen. This method ensures that all potential effects of the proposed project are documented for the decision-makers and the public.

Accordingly, the following analyses use a conservative or "worst-case" approach for analyzing the potentially significant adverse environmental impacts associated with the implementation of the proposed project.

Air Quality

Significance Criteria

The project will be considered to have significant adverse air quality impacts if any one of the thresholds in Table 4-1 are equaled or exceeded.

TABLE 4-1

SCAQMD Air Quality Significance Thresholds

Mass Daily Thresholds		
Pollutant	**Construction**	**Operational**
NO_x	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM10	150 lbs/day	150 lbs/day
SOx	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Lead	3 lbs/day	3 lbs/day
Toxic Air Contaminants (TACs) and Odor Thresholds		
TACs (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk ≥ 10 in 1 million Hazard Index ≥ 1.0 (project increment) Hazard Index ≥ 3.0 (facility-wide)	
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402	
Ambient Air Quality for Criteria Pollutants [a]		
NO2 1-hour average annual average	In attainment; significant if project causes or contributes to an exceedance of any standard: 0.25 ppm (state) 0.053 ppm (federal)	

TABLE 4-1 (CONCLUDED)

SCAQMD Air Quality Significance Thresholds

Ambient Air Quality for Criteria Pollutants [a]	
PM10 24-hour average annual geometric average annual arithmetic mean	10.4 $\mu g/m^3$ (recommended for construction) [b] 2.5 $\mu g/m^3$ (operation) 1.0 $\mu g/m^3$ 20 $\mu g/m^3$
Sulfate 24-hour average	1 $\mu g/m^3$
CO 1-hour average 8-hour average	In attainment; significant if project causes or contributes to an exceedance of any standard: 20 ppm (state) 9.0 ppm (state/federal)

[a] Ambient air quality thresholds for criteria pollutants based on SCAQMD Rule 1303, Table A-2 unless otherwise stated.

[b] Ambient air quality threshold based on SCAQMD Rule 403.

ppm = parts per million; $\mu g/m^3$ = microgram per cubic meter; lbs/day = pounds per day;
$\geq$ greater than or equal to

Construction Emissions

PROJECT-SPECIFIC IMPACT: The Final EA prepared for the 1999 amendments to Rule 1171 did not require construction because the affected operators were simply using different cleaning solvents. Since the final VOC content limit does not change in this PAR 1171, implementing the proposed project will also not trigger any construction activity. Cleaning solvents that already comply with the proposed interim VOC content limit are currently available and are expected to be used until the final VOC content limit becomes effective in 2006. As a result, it is not anticipated that PAR 1171 will require process or equipment alteration at affected facilities. Therefore, no add-on control equipment or additional employees will be required from the implementation of the proposed amendments. Thus, no construction emissions or adverse air quality impacts from construction are expected as a result of implementing the proposed project.

Operational Emissions

PROJECT-SPECIFIC IMPACT: Three potential air quality issues arise relative to the implementing PAR 1171. Due to the proposed amendments, the following has potential to occur: 1) a delay of originally anticipated VOC emission reductions due to an extension in complying with the final VOC content limit for certain solvent cleaning categories and a extension of the sunset date for two existing exemptions; 2) permanent forgone emission reductions from establishing three new limited exemptions for certain applications that would not have otherwise occurred under the current Rule 1171 requirements; or 3) the creation of adverse localized effects such as increased exposure to toxics. There will be a new air

quality benefit from the proposed project as the current exemption from the rule requirements for the cleaning of solar cells, laser hardware, scientific instruments and high precision optics will be lifted as of the date of adoption.

Delay in VOC Emission Reductions and Forgone Emission Reductions

Emission reductions from PAR 1171 and the delay of emission reductions result from the proposed amendments to the requirements for certain solvent cleaning applications. Emission reductions are achieved on July 1, 2005, from solvent cleaning activities implementing final VOC content limits (e.g., electrical apparatus components/electronic components, coatings/adhesives application equipment, specialty flexographic printing). Also on July 1, 2005, certain solvent cleaning applications (e.g., lithographic/letterpress ink application equipment, screen printing ink application equipment, UV/EB ink application equipment) will be required to comply with an interim VOC content limit which will result in emission reductions compared to the existing emissions from these categories. PAR 1171 would allow these latter solvent cleaning categories an additional year to comply with the final VOC content limits providing all originally anticipated emission reductions by July 1, 2006. Table 4-2 outlines the emission reductions achieved from implementing PAR 1171 on July 1, 2005 and on July 1, 2006.

To calculate interim and final emission reductions shown in Table 4-2, the following equations were used:

INTERIM EMISSION REDUCTION EQUATION

Interim 2005 Emission Reduction *(tons per day)* =

2004 VOC emissions x [1 – (interim limit / current limit)]

Example of Interim Emission Reduction *(using lithographic roller wash, step 1):*

0.27 tons/day x [1 – (500 g/l / 600 g/l)] = 0.05 tons/day

FINAL EMISSION REDUCTION EQUATION

Final 2006 Emission Reduction *(tons per day)* =

(2004 VOC emissions – interim emission reduction) x [1 – (final limit / interim limit)]

Example of Final Emission Reduction *(using lithographic roller wash, step 1):*

(0.27 tons/day - 0.05 tons/day) x [1 – (100 g/l / 500 g/l)] = 0.18 tons/day

As depicted in both Tables 4-2 and 4-3, extending the final compliance date for certain solvent cleaning applications will cause a delay in emission reductions of 2.52 tons per day, or 5,040 pounds of VOC per day. In addition, the proposed project will establish three new limited exemptions and extend two existing exemptions, listed in Table 4-3 which will further add to a delay in emission reductions projected in the 1999 amendments to Rule 1171 as well as generate new foregone emission reductions.

TABLE 4-2

Rule 1171 VOC Emissions Reductions (tons per day) from Affected Solvent Cleaning Categories

Solvent Cleaning Category	2004 VOC Emission (tons per day)	Current VOC Content Limit (grams per liter)	2005 VOC Content Limit (grams per liter)	2005 Emission Reduction (tons per day)	2006 VOC Content Limit (grams per liter)	Delayed 2006 Emission Reductions (tons per day)
WILL DELAY FINAL COMPLIANCE DATE AND COMPLY WITH INTERIM LIMIT						
Litho/Letterpress: Roller Wash–Step 1	0.27	600	500	**0.05**	100	**0.18**
Litho/Letterpress: Roller Wash-Step 2/Blanket Wash & On-Press Components	3.37	800	500	**1.26**	100	**1.69**
Screen Printing Ink App.	1.06	750	500	**0.35**	100	**0.57**
UV/EB Ink Application	0.16	800	500	**0.06**	100	**0.08**
WILL MAINTAIN FINAL COMPLIANCE DATE						
Product Cleaning & Surface Preparation: Electrical/ Electronic Apparatus & Components	0.51	500	100	**0.41**	n/a	n/a
Repair & Maintenance: Electrical/ Electronic Apparatus & Components	0.10	900	100	**0.09**	n/a	n/a
Coating/Adhesive Application Equipment (excluding Architectural Coating Equipment)	3.10	550	25	**2.96**	n/a	n/a
Architectural Coating Equipment	8.78	550	25	**7.59**	n/a	n/a
Specialty Flexography Printing	0.11	600	100	**0.09**	n/a	n/a
			Emission Reductions (tons per day)	**12.86**		**2.52**

As shown in Table 4-3, these emissions total approximately three tons per day of delayed VOC emission reductions from extending the final compliance date and exemption dates, and 0.021 tons per day (or 42 pounds per day) of permanently foregone VOC emission reductions.

A VOC emission reduction delay of approximately three tons per day (6,050 pounds per day) exceeds the SCAQMD's CEQA significance operational threshold for VOCs of 55 pounds per day, thus, the proposed project will have a significant adverse air quality impact on the environment. Table 4-3 outlines the specific foregone and delayed emission reductions and expected final compliance dates. Not listed in Table 4-3 is the air quality benefit from removing the exemption for the cleaning of solar cells, laser hardware, scientific instruments and high-precision optics. It is expected that the overall VOC emissions reduced from eliminating the exemption is approximately two pounds per day.

TABLE 4-3

Delay of Emission Reductions and Expected Final Compliance Dates from PAR 1171

Solvent Cleaning Category	July 1, 2006 Emission Reductions (tons per day)	June 30, 2006 Emission Reductions (tons per day)	December 31, 2008 Emission Reductions (tons per day)	Forgone Emission Reductions (tons per day)
EXTENDED FINAL COMPLIANCE DATE				
Litho/Letterpress: Roller Wash–Step 1	0.18	--	--	--
Litho/Letterpress: Roller Wash-Step 2/Blanket Wash & On-Press Components	1.69	--	--	--
Screen Printing Ink App.	0.57	--	--	--
UV/EB Ink Application	0.08	--	--	--
LIMITED EXEMPTIONS (WITH SUNSET DATES)				
UV Lamps	--	0.005	--	--
Metering rollers, dampening rollers, printing plates (at 800 grams per liter)	--	0.5	--	--
Photocurable resins from stereolithography equipment and models	--	--	0.00025	--
PERMANENT LIMITED EXEMPTIONS				
Adhesive application equipment used for thin metal laminating operations (at 950 grams per liter)	--	--	--	0.0015
Electronic or electrical cable (at 400 grams per liter)	--	--	--	0.0195
TOTAL FOREGONE AND DELAYED EMISSION REDUCTIONS (tons per day)	**2.52**	**0.505**	**0.00025**	**0.021**

Potential Toxic Impacts – From Maintaining Compliance Dates

The Final EA prepared for the 1999 amendments evaluated exposure to TACs resulting from reformulating conventional cleaning solvents with replacement cleaning solvents to comply with the final VOC content limits currently in Rule 1171. That analysis concluded that replacement cleaning solvents are generally less toxic than conventional cleaning solvents. As a result, human health impacts from reformulating cleaning solvents with replacement solvent would not be significant. Since the main effect of PAR 1171 is to delay the final compliance date for specified cleaning solvents and no additional requirements regarding the VOC content limits of these cleaning solvents are being proposed, the conclusion from the Final EA for the 1999 amendments to Rule 1171 that human health impact from formulating cleaning solvents with replacements solvents will not create significant adverse impacts continues to apply.

The final EA for PAR 1171 in 1999 concluded there is no substantive evidence that shows the use of those solvents identified as possible replacements would result in significant adverse toxic air contaminant impacts. The replacement solvents are for the most part common chemicals used in a wide variety of industrial and even consumer applications. Their widespread use is assumed to be indicative of the ability to use these compounds in a safe manner. Current cleaning formulations contain materials that are as toxic, or more toxic, than formulations expected to be used to comply with the proposed amendments. Thus, the possible increased use of toxics in reformulated cleaners will generally be balanced by a concurrent decrease in the use of toxic materials in currently used cleaners, and toxic air contaminant impacts would not be expected to change significantly from existing conditions. According to the latest studies conducted for the technological assessment, the new compliant cleaners are being formulated with water-based solutions, soy-based (composed of methyl esters), acetone, methyl acetate, and isopropyl alcohol (IPA) blends with acetone and water.

Potential Toxic Impacts – From Requiring Interim Compliance Dates

Proposed interim VOC content limits can be complied with existing products and will, therefore, not require a change in the process or equipment at the affected facilities. Generally, the interim formulations will use similar alternative solvents as currently being tested to comply with the final compliance VOC content limits. Since the new interim limits do not require as low a VOC content limit, the formulations do not require as much of an alternative solvent to comply with the rule. As noted in Chapter 2, the solvent cleaners that will comply with the interim VOC content limits are being formulated with such chemicals as propylene glycol monomethyl ethers, di-propylene glycol monomethyl ethers (DPM), methyl esters (soy-based), acetone, 3-ethoxypropanoic acid which is an ethyl ester, and possibly IPA blends. According to the State of California, Department of Health Services, Hazard Evaluation System & Information Services (HESIS), esters used in soy cleaners, based on available data and their structure, were likely to have low toxicity. With regards to

the remaining solvent alternatives, the following toxicity information is known.

Propylene Glycol Monomethyl Ethers

Propylene glycol monomethyl ether (PGME) is a colorless liquid whch has critical liver effects in rats and the hazard index target is the alimentary system (liver). Propylene glycol is used as a solvent for cellulose, acrylics, dyes inks and stains. Thus, the primary use of PGME is in lacquers and paints. Toxicity of propylene glycol ether is lower than ethylene glycol ether, and thus, it can be regarded as relatively innocuous or low toxic. It can be used as or for chemical intermediate, brake liquid, detergent, frost resistant solvent as well as solvent for high grade paint. Use of PGME is anticipated to increase due to its low systemic toxicity.

No reports or studies of human toxicity following chronic exposure to PGME were located in the literature. Slight eye irritation was reported by two of six human volunteers exposed to 100 ppm PGME for 2 hours. These subjects were exposed for a total of three and a half hours during which no decrement in visual acuity, coordinatoion, neurological responses or reaction time measured.

Ethylene glycol momomethyl ethers (EGME), a structurally related compound to PGME, exerts considerable toxicity on the blood, thymus, testes, and developing fetus. The toxicity of EGME has been linked to its primary metabolite, methoxyacetic acid. Recent comparative toxicity and metabolism studies, however, indicate that the relatively low systemic toxicity exerted by PGME is due to its different metabolites.

Acetone

Acetone is a manufactured chemical that is also found naturally in the environment. It occurs naturally in plants, trees, volcanic gases, forest fires, and as a product of the breakdown of body fat. It is present in vehicle exhaust, tobacco smoke, and landfill sites. Acetone is used to make plastic, fibers, drugs, and other chemicals. It is also used to dissolve other substances. Industrial processes contribute more acetone to the environment than natural processes.

Acetone is absorbed into the bloodstream and carried to all the organs in the body. If it is a small amount, the liver breaks it down to chemicals that are not harmful and uses these chemicals to make energy for normal body functions. Breathing moderate-to-high levels of acetone for short periods of time, however, can cause nose, throat, lung, and eye irritation; headaches; light-headedness; confusion; increased pulse rate; effects on blood; nausea; vomiting; unconsciousness and possibly coma; and shortening of the menstrual cycle in women. Swallowing very high levels of acetone can result in unconsciousness and damage to the skin in the mouth. Skin contact can result in irritation and damage to your skin.

South Coast Air Quality Management District

21865 Copley Drive, Diamond Bar, CA 91765-4182
(909) 396-2000 • http://www.aqmd.gov

SUBJECT: **NOTICE OF COMPLETION OF A DRAFT ENVIRONMENTAL ASSESSMENT**

PROJECT TITLE: **PROPOSED AMENDMENTS TO RULE 1162 – POLYESTER RESIN OPERATIONS**

In accordance with the California Environmental Quality Act (CEQA), the South Coast Air Quality Management District (SCAQMD) is the Lead Agency and has prepared a *Draft Subsequent Environmental Assessment* (*SEA*) to analyze environmental impacts from the project identified above pursuant to its certified regulatory program (SCAQMD Rule 110). The Draft SEA includes a project description and analysis of potential adverse environmental impacts that could be generated from the proposed project. The purpose of this letter and the attached Notice of Completion (NOC) and Draft SEA is to allow public agencies and the public the opportunity to obtain, review and comment on the environmental analysis.

This letter, the attached NOC, and the *Draft SEA* are not SCAQMD applications or forms requiring a response from you. Their purpose is simply to provide information to you on the above project. If the proposed project has no bearing on you or your organization, no action on your part is necessary.

Comments focusing on issues relative to the environmental analysis for the proposed project will be accepted during a 45-day public review and comment period beginning March 17, 2005, and ending 5 p.m. on May 3, 2005. **Please send any comments to Mr. James Koizumi (c/o Office of Planning, Rule Development, and Area Sources) at the address shown above**. Comments can also be sent via facsimile to (909) 396-3324 or e-mail at jkoizumi@aqmd.gov. Mr. Koizumi can be reached by calling (909) 396-3234. Please include the name and phone number of the contact person for your agency. Questions regarding the proposed amendments should be directed to Dr. Helmy Sultan at (909) 396-2362.

The Public Hearing for the proposed project is scheduled for June 3, 2005. (Note: Public meeting dates are subject to change.)

Date: March 16, 2005

Signature: Steve Smith

Title: Steve Smith, Ph.D.
Program Supervisor

Telephone: (909) 396-3054

Reference: California Code of Regulations, Title 14, §§15082(a), 15103, and 15375

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 Copley Drive, Diamond Bar, CA 91765-4182

NOTICE OF COMPLETION OF A DRAFT SUBSEQUENT ENVIRONMETNAL ASSESSMENT

Project Title:
Notice of Completion of a *Draft Subsequent Environmental Assessment* (SEA) for Proposed Amended Rule (PAR) 1162 - Polyester Resin Operations

Project Location:
PAR 1162 applies to the South Coast Air Basin, which includes all of Orange County, and the non-desert portions of Los Angeles, Riverside and San Bernardino counties and the Riverside County portions of the Salton Sea Air Basin and the Mojave Desert Air Basin.

Description of Nature, Purpose, and Beneficiaries of Project:
The proposed project would affect composite fabricators that apply gel coats to an open molding surface. The existing rule requires that gel coat operators apply gel coats with nonatomizing techniques by July 1, 2005. Field testing of nonatomizing gel coat application techniques has determined that the styrene emission limits are infeasible. Styrene is considered both a volatile organic compound (VOC) and toxic air contaminate. Because this is a modification to the previously approved project, a draft subsequent Environmental Assessment is proposed. The project would permanently forego approximately 853 pounds of styrene emission reductions per day, which exceeds the SCAQMD VOC significance threshold of 55 pound per day. In addition, acute and chronic noncarcinogenic risk associated with styrene emissions would exceed the SCAQMD's hazard indices significance thresholds. This *Draft (SEA)* analyzes potential adverse environmental impacts from rescinding the implementation of the nonatomizing gel coat application technique requirement and associated Unified Emission Factors for Open Molding of Composites. The only environmental topic where significant adverse impacts were identified was air quality.

Lead Agency:	**Division:**
South Coast Air Quality Management District	Planning, Rule Development and Area Sources- CEQA

The Draft SEA and all supporting documentation are available and may be examined at:	**or by calling:**	**The Draft SEA may be examined by accessing the SCAQMD's website at:**
SCAQMD Headquarters 21865 Copley Drive Diamond Bar, CA 91765	(909) 396-2039	http://www.aqmd.gov/ceqa/aqmd.html

The Public Notice of Completion of a Draft SEA is provided through the following:

☒ Los Angeles Times (March 17, 2005) ☒ SCAQMD Website ☒ SCAQMD Mailing List

Draft SEA Review Period:
March 17, 2005 to May 3, 2005

Scheduled Public Meeting Dates
Public Hearing: June 3, 2005

[Please note that meeting dates are subject to change. Refer to the SCAQMD website Calendar of Events for current schedule - www.SCAQMD.gov.]

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SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Draft Subsequent Environmental Assessment for:

Proposed Amended Rule 1162 – Polyester Resin Operations

SCAQMD No. 050316JK

March 16, 2005

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CHAPTER 1

EXECUTIVE SUMMARY

Introduction
California Environmental Quality Act
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INTRODUCTION

The California Legislature created the South Coast Air Quality Management District (SCAQMD) in 1977[1] as the agency responsible for developing and enforcing air pollution control rules and regulations in the South Coast Air Basin (Basin) and portions of the Salton Sea Air Basin and Mojave Desert Air Basin (collectively known as the "district"). By statute, the SCAQMD is required to adopt an air quality management plan (AQMP) demonstrating compliance with all federal and state ambient air quality standards for the district[2]. Furthermore, the SCAQMD must adopt rules and regulations that carry out the AQMP[3]. The *1997 AQMP* as amended in 1999 and the *2003 AQMP* concluded that major reductions in emissions of volatile organic compounds (VOCs) and oxides of nitrogen (NO_x) are necessary to attain the air quality standards for ozone (the key ingredient of smog) and particulate matter (PM10). Ozone, a criteria pollutant, is formed when VOCs react with NO_x in the atmosphere and has been shown to adversely affect human health. VOC emissions also contribute to the formation of PM10.

Because VOC emissions, which contribute to ozone and PM10 formation, reducing the quantity of VOCs in the district has been an on-going priority and effort by the SCAQMD. Because materials used by the polyester resins industry have been considered by SCAQMD as one source where VOC emission reductions can be achieved, in March 1987, Rule 1162 – Polyester Resin Operations, was adopted. Rule 1162 was developed to reduce VOC emissions from all polyester resin operations that involve the fabrication, rework, repair, or touch-up of products used for commercial, military or industrial markets. Polyester resin operations use composite materials that include resins, gel coats, solvents, coatings and adhesives, including reinforcement materials such as fiberglass and fillers. The types of items produced in a polyester resin operation vary, including, but not limited to: boats; tubs; pools; shower enclosures; spas; bathroom fixtures; jigs; tools; molds; building panels; air pollution control equipment; sewage treatment equipment; storage tanks; transportation parts; automotive; aircraft and aerospace components; and other industrial and consumer products. The affected industries include manufacturers of the above-listed items. Currently, there are 81 facilities that are subject to the requirements of Rule 1162.

Rule 1162 has been amended several times, with the most recent amendments occurring in July 9, 2004 to delay part of the implementation of the second phase of the two-phase Control Measures CTS-08 – Further Emission Reductions from Industrial Coating and Solvent Operations, and CTS-09 – Further Emission Reductions from Large Solvent and Coating Sources from the 1997 AQMP.

The air quality objective of both control measures was to further reduce VOCs associated with the use of resins, coatings, solvents, and other VOC-containing materials used in polyester resin operations. Many of the materials used in polyester resin operations are considered toxic air contaminants (TACs); therefore, those TACs associated with the polyester resin operations that are VOCs would be reduced by implemnenting the VOC control measures. Reducing emissions from these sources would help achieve and maintain,

[1] The Lewis-Presley Air Quality Management Act, 1976 Cal. Stats., ch 324 (codified at *Health & Safety Code, §§40400-40540*).
[2] *Health & Safety Code, §40460 (a).*
[3] *Health & Safety Code, §40440 (a).*

with a margin of safety, state and federal ambient air quality standards within SCAQMD's jurisdiction.

November 2001 amendments to Rule 1162 required operators of affected facilities to comply with the latest application techniques, material requirements, and process requirements in order to reduce VOC/ TAC emissions from polyester resin operations. The proposed compliance dates varied between 2002 and 2003, depending on the method of compliance. Rule 1162 also contained updates to the applicability statement, test methods and procedures, new definitions, and other minor changes to improve clarity and promote consistency throughout. It was estimated that the November 2001 amendments to Rule 1162 would remove approximately 5,800 pounds per day of VOC/TAC emissions from the air by July 1, 2003 (approximately 1,380 pounds per day of VOC/TAC emission reductions from gel coat application).

The November 2001 amendments added the definition for the nonatomizing spray application technique to Rule 1162 (b)(19) as recommended by the American Composite Manufacturers Association (ACMA). It was defined as "any application technique in which resin or gel coat flows from the applicator in a steady and observable coherent flow, without droplets, for a minimum distance of three (3) inches from the applicator orifices." However, during the implementation of the Rule 1162 nonatomizing application requirement, composite fabricators encountered difficulties in achieving the required three inches of coherent flow in gel coat operations. SCAQMD staff verified the composite fabricators' difficulties in achieving three inches of coherent flow at the outlet of the spraying guns during a technical assessment study of Rule 1162. Staff recommended additional field testing to develop an appropriate definition of the nonatomizing application techniques for gel coats that would be used as a compliance tool for both composite fabricators and the SCAQMD compliance staff.

Staff began working with industry to develop an appropriate definition. This task was more difficult than anticipated, so Rule 1162 was amended on July 11, 2003, and July 9, 2004 to further delay the implementation of the nonatomizing application techniques from July 1, 2003 to July 1, 2004, then from July 1, 2004, to July 1, 2005, to allow for further field testing of the nonatomizing application techniques. During the July 11, 2003 amendments, staff revised the calculation of emission reductions anticipated from implementation of nonatomizing application techniques based on the latest version of the Unified Emission Factors for Open Molding of Composites available at that time. The revised VOC/TAC emission reductions were estimated to be 853 pounds of VOC/TAC per day. The July 9, 2004 amendments redefined nonatomizing spray application technique of gel coat as "use of application equipment to apply gel coat where test results and parameters document that the use of this application equipment results in VOC emissions that are no greater than the VOC emissions specified in Attachment A - Unified Emission Factors For Open Molding of Composites table of this rule."

Subsequent to July 9, 2004, SCAQMD staff has conducted field tests to verify the conditions under which the UEF provided by the ACMA could be achieved. When nonatomizing gel coat application techniques were tested under the same conditions that the

UEF were developed (i.e., low pressure and low flow), the products did not meet the performance specifications required to maintain product integrity. When tested at operating conditions under which performance standard may be met nonatomizing gel coat application techniques could not achieve the UEF provided by the ACMA. Thus, the nonatomizing spray technology did not develop as anticipated and the rule requirements cannot be met. Thus the UEF emission limits are expected to be infeasible. Based on these results, staff proposes to rescind the nonatomizing gel coat application technique requirement from Rule 1162. Staff has not identified any other feasible control technology that could achieve VOC emission reductions equivalent to those that were originally expected from nonatomizing gel coat application techniques. Since nonatomizing gel coat application techniques were expected to generate 853 pounds per day of VOC emission reductions beyond conventional techniques; these emission reductions are considered to be foregone. These emission reductions foregone would exceed the SCAQMD's operational VOC significance threshold of 55 pounds per day and, therefore are significant. In addition, based on a "worst-case" analysis of a facility with the largest gel coat usage, noncarcinogenic risk reductions foregone would also be significant.

CALIFORNIA ENVIRONMENTAL QUALITY ACT

The proposed amendments to Rule 1162 are a "project" as defined by CEQA (California Public Resources Code §21080.5). SCAQMD is the lead agency for the proposed project and has prepared appropriate an environmental analysis pursuant to its certified regulatory program (SCAQMD Rule 110). California Public Resources Code §21080.5 allows public agencies with regulatory programs to prepare a plan or other written document in lieu of an environmental impact report once the Secretary of the Resources Agency has certified the regulatory program. The SCAQMD's regulatory program was certified by the Secretary of the Resources Agency on March 1, 1989, and is codified as SCAQMD Rule 110.

CEQA requires that the potential adverse environmental impacts of proposed projects be evaluated and that feasible methods to reduce or avoid significant adverse environmental impacts of these projects be identified. To fulfill the purpose and intent of CEQA, the SCAQMD has prepared a Draft SEA to address the potential environmental impacts associated with the currently proposed amendments to Rule 1162. The preparation of a Draft SEA is necessary because the proposed project is a modification to a previously approved project, 2001 amendments to Rule 1162, for which the 2001 Final EA was prepared or relied upon and certified by the Governing Board on November 9, 2001.

Further, in accordance with CEQA Guidelines §15162 (a)(1), this Draft SEA was prepared because the proposed project creates new significant adverse environmental impacts.

CEQA DOCUMENTATION FOR PROPOSED RULE 1162

Rule 1162 was adopted at the public hearing on March 6, 1987. The Staff Report described the proposal to regulate emissions from polyester resin operations. At the time, VOC emissions from this industry were governed by Rule 442, which applies in general to the control of VOCs. Rule 1162 regulates styrene monomer resin materials, VOCs from cleanup solvent, and established recordkeeping requirements.

This *Draft SEA* is a comprehensive environmental document that analyzes potential adverse environmental impacts from implementing PAR 1162. SCAQMD rules, as ongoing regulatory programs, have the potential to be revised over time due to a variety of factors (e.g., regulatory decisions by other agencies, new data, and lack of progress in advancing the effectiveness of control technologies to comply with requirements in technology forcing rules, etc.).

Other CEQA Documents for Rule 1162

Several previous environmental analyses have been prepared to analyze past amendments to Rule 1162 and are listed below. The following summaries of previous CEQA documents are included for information only. These documents can be obtained by contacting the SCAQMD's Public Information Center at (909) 396-2039. Some documents are also available online at www.aqmd.gov/ceqa/aqmd.html.

Reliance on a Previously Proposed CEQA Document, July 9, 2004:
This project relied upon the July 25, 2003 Final EA for Rule 1162, which extended the effective date for nonatomizing gel coat application techniques from July 1, 2004 to July 1, 2004. A Notice to Rely on a Previously Certified Environmental Assessment for a Currently Proposed Project was circulated for 45-days. No letters were received. The Final EA and Statement of Finding and Overriding Considerations were certified on July 9, 2004.

Final Environmental Assessment for Proposed Amended Rule 1162, July 25, 2003:
The *Final EA* for the proposed amendments to Rule 1162 was completed and available to the public prior to the public hearing for proposed amended Rule 1162 on July 11, 2003. No comment letters were received from the public on the *Draft EA*. The *Draft EA* was released for a 45-day public review and comment period from May 6, 2003 to June 19, 2003. The *Draft EA* and associated *Initial Study* analyzed adverse environmental impacts from proposed amendments and "air quality" was identified as the only environmental topic that would be adversely affected by the proposed rule. The July 11, 2003 amendment delayed the compliance date for nonatomizing gel coat application techniques from July 1, 2003 to July 1, 2004 to allow additional time for field testing to develop a more effective definition for nonatomizing spray application techniques. Emission reductions from nonatomizing application techniques in the Final EA were revised with the latest version of the Unified Emission Factors for Open Molding of Composites (July 23, 2001) available at that time. The revised VOC emission reductions were estimated to be 853 pounds of VOC per day, which exceeds the VOC significance threshold of 55 pounds per day. No mitigation was identified so no mitigation monitoring plan was required or prepared. Because the project was deemed significant for air quality a Statement of Finding and Overriding Considerations was prepared and adopted.

***Final Environmental Assessment for Proposed Amended Rule 1162*, October 24, 2001:**
The *Final EA* for the proposed amendments to Rule 1162 was completed and available to the public prior to the public hearing for proposed amended Rule 1162 on November 9, 2001. The *Final EA* contained one comment letter received from the public on the *Draft EA* and responses to that comment letter. The *Draft EA* was released for a 30-day public review and comment period from September 18, 2001 to October 17, 2001. The

Draft EA analyzed adverse environmental impacts from the proposed amendments. The amendments required affected facilities to comply with the latest application techniques, material requirements, and process requirements in order to reduce VOC and TAC emissions from polyester resin operations. The proposed compliance dates varied between 2002 and 2003, depending on the method of compliance. Amendments included: broadened applicability; new definitions; changes in styrene monomer content in resin materials; replacement of atomizing application techniques with nonatomizing application techniques for open mold surface operations; process requirements for closed molding systems, pultrusion operations, touch-up and repair activities, storage specifications and solvent cleaning; control systems with a control efficiency of 90 percent; recordkeeping requirements; reorganization and update of test methods and procedures; and the addition of an alterative compliance option. Staff predicted that the amendments would reduce VOC emission by 3.4 tons per day; therefore, no significant impacts were expected.

***Final Environmental Assessment for Proposed Amended Rules 219 - Equipment Not Requiring a Written Permit Pursuant to Regulation II, 481 - Spray Coating Operations, 1107 - Coating of Metal Parts and Products; 1141 - Control of Volatile Organic Compound Emissions from Resin Manufacturing; 1141.1 - Coatings and Ink Manufacturing, 1141.2 - Surfactant Manufacturing and 1162 - Polyester Resin Operations*, November 9, 2000:** The *Final EA* for the proposed amendments to Rules 219 - Equipment Not Requiring a Written Permit Pursuant to Regulation II, 481 - Spray Coating Operations, 1107 - Coating of Metal Parts and Products; 1141 - Control of Volatile Organic Compound Emissions from Resin Manufacturing; 1141.1 - Coatings and Ink Manufacturing, 1141.2 - Surfactant Manufacturing and 1162 - Polyester Resin Operations was completed and available to the public prior to the public hearing for the proposed amended rules on November 17, 2000. No comment letters were received from the public. The *Draft EA* was released for a 30-day public review and comment period from October 10, 2000, to November 8, 2000. Rule 219 was amended to use monthly limits for permit exemptions. Rules 481, 1107, 1141, 1141.1, 1141.2, and 1162 were amended in order to allow more owners/operators to take advantage of monthly recordkeeping. Optional monthly recordkeeping was added to the rules where there was only daily recordkeeping. The monthly limits were based on multiplying the daily limit times 22, rather than 30, because most businesses operate on a five-day week. Multiplying the daily limits by 30 could have allowed five-day operations to increase their emissions. Staff concluded that amendments only affected recordkeeping requirements for Rule 1162; therefore, did not impact emissions.

***Final Supplemental Environmental Assessment for Proposed Amended Rule 1162*, April 1, 1994 (SCAQMD No. 931218SG):** The *Final Supplemental EA* (*SEA*) completed for the amendments to the rule was available to the public prior to the public hearing on May 13, 1992. The *Draft SEA* was released for a 45-day public review and comment period from December 22, 1993, to February 9, 1994. Three comment letters were received from other agencies; however, no new or additional information was received that required reassessment or modification of the *Draft SEA*. The rule amendments changed monomer content requirements for resins and added monomer content requirements for gel coats. Solvent cleaning and recordkeeping requirements were removed to prevent redundancy with

Rules 1171 and 109. EPA recordkeeping requirements were added. Definitions and rule language were added to clarify and enhance rule implementation and enforceability. Requirements were added for pultrusion operations. Technology was not available for producing corrosion-resistant and high strength materials with monomer contents of 30 percent. Therefore, the amendments increased the monomer requirement for corrosion-resistant and high strength materials from 30 to 48 percent. Staff estimated that this increase in monomer content would result in 20 to 60 pounds per day of VOC emissions permanently foregone. Because the emissions foregone could exceed the regional operational significant impact thresholds, the amendments were anticipated to generate potential significant impacts.

***Final Environmental Assessment* for Proposed Amended Rule 1162, June 30, 1992:** The *Final EA* completed for the amendments to the rule was available to the public prior to the public hearing on July 10, 1992. At the time, Rule 1162 contained an exemption for corrosion-resistant and high strength materials until July 1, 1992 to allow for continuing development of a compliant product. The proposed amendments delayed the exemption for corrosion-resistant and high strength materials until July 1, 1994. Staff estimated that the delayed reductions would be 0.7 ton per day. These emission estimates exceeded the 75 pounds per day threshold of significance defined in the *SCAQMD Air Quality Handbook for Preparing Environmental Impact Reports* (April 1987); therefore, the amendments were considered significant under CEQA. A statement of overriding considerations was prepared. Additionally, the amendments corrected *SIP* deficiencies by clarifying the VOC definition and the exempt compounds definition, and added applicable test method numbers. The *Final EA* contained a summary of the environmental analysis and responses to comments received on the May 28, 1992 *Draft EA*. The *Draft EA* contained a complete description of the proposed amendments and discussions of the following: environmental setting; alternatives to the proposed amendments; the relationship between short-term uses and long-term productivity; the potential irreversible environmental changes; growth inducing impacts; cumulative impacts from the proposed amendments and other AQMP control measures; and effects not found to be significant. The core of the *Draft EA* was the discussion of potential environmental impacts and mitigation measures. The analysis of potential environmental impacts included the following topics: air quality, water quality, noise, risk of upset, transportation/circulation, public services, energy, solid waste, human health, and economics.

Notices of Exemption for Other Rule 1162 Amendments

Rule 1162 has been amended a number of times since January 1987, as summarized in the following bullet points. Each amendment described below was exempt from CEQA, so a Notice of Exemption (NOE) was prepared.

- ***Notice of Exemption for Proposed Amended Rule 1162*, July 1992:** Amendments were proposed to allow time for corrosion-resistant technology to develop to meet the rule requirements. An *NOE* which extended the rule requirements for corrosion resistant material application from the original date of July 1, 1992, until July 1, 1994, was approved in a public hearing on August 2, 1991.

- ***Notice of Exemption for Proposed Amended Rule 1162*, December 1990:** The proposed amendments were administrative changes to improve the clarity, consistency and enforceability of the rule. A *NOE* was prepared to correct inconsistencies and deficiencies in a number of SCAQMD source specific volatile organic compound control rules. The amendments were adopted at a public hearing on December 7, 1990.

- ***Notice of Exemption for Proposed Amended Rule 1162*, July 1990:** At the time, corrosion-resistant materials could not attain the monomer requirements of Rule 1162. This *NOE* was prepared to allow corrosion-resistant materials to meet the monomer requirements. The *NOE* was approved extending the rule requirements for corrosion resistant material application from the original date of July 1, 1990 until July 1, 1992 at the public hearing on August 3, 1990.

INTENDED USES OF THIS DOCUMENT

In general, a CEQA document is an informational document that informs a public agency's decision-makers and the public generally of potentially significant adverse environmental effects of a project, identifies possible ways to avoid or minimize the significant effects, and describes reasonable alternatives to the project (*CEQA Guidelines §15121*). A public agency's decision-makers must consider the information in a CEQA document prior to making a decision on the project. Accordingly, this *Draft SEA* is intended to: (a) provide the SCAQMD Governing Board and the public with information on the environmental effects of the proposed project; and, (b) be used as a tool by the SCAQMD Governing Board to facilitate decision making on the proposed project.

Additionally, CEQA Guidelines §15124(d)(1) requires a public agency to identify the following specific types of intended uses of a CEQA document:

1. A list of the agencies that are expected to use the *EA* in their decision-making;
2. A list of permits and other approvals required to implement the project; and
3. A list of related environmental review and consultation requirements required by federal, state, or local laws, regulations, or policies.

To the extent that local public agencies, such as cities, county planning commissions, etcetera, are responsible for making land use and planning decisions related to projects that must comply with the requirements in PAR 1162, they could possibly rely on this *SEA* during their decision-making process. Similarly, other single purpose public agencies approving projects at facilities complying with PAR 1162 may rely on this *SEA*.

AREAS OF CONTROVERSY

CEQA Guidelines §15124(d)(2) requires a public agency to identify areas of controversy, including issues raised by agencies and the public. The Composites Fabricators Association (CFA) developed the Unified Emission Factors (UEFs), which were used to estimate the emission reductions in the November 2001 FEIR. The UEF were also used to develop the emissions reductions estimated in the *2001* and *2003 Final EAs* and have been utilized in the National Emission Standard for Hazardous Air Pollutants (NESHAP) for Reinforced Plastic Composites Production (40CFR63 Subpart WWWW). CFA developed the UEF emission

factors, but has not yet provided feedback on the results of the SCAQMD nonatomizing spray application technique field tests.

EXECUTIVE SUMMARY

CEQA Guidelines §15123 requires a CEQA document to include a brief summary of the proposed actions and their consequences. In addition, areas of controversy including issues raised by the public must also be included in the executive summary. This *Draft SEA* consists of the following chapters: Chapter 1 – Executive Summary; Chapter 2 – Project Description; Chapter 3 – Existing Setting; Chapter 4 – Potential Environmental Impacts and Mitigation Measures; Chapter 5 – Project Alternatives; Chapter 6 - Other CEQA Topics; and various appendices. The following subsections briefly summarize the contents of each chapter.

Summary of Chapter 1 – Executive Summary

Chapter 1 includes a discussion of the legislative authority that allows the SCAQMD to amend and adopt air pollution control rules, identifies general CEQA requirements and the intended uses of this CEQA document, and summarizes the remaining five chapters that comprise this *Draft SEA*.

Summary of Chapter 2 - Project Description

The objective of PAR 1162 is to rescind the nonatomizing application technique requirement. Field testing of nonatomizing application techniques that attain industry performance standards demonstrated that the UEF estimated 853 pounds of VOC/TAC emissions reductions previously expected from nonatomizing application techniques would not occur. Staff has not identified any control technology that could achieve emission reductions equivalent to the originally expected 853 pounds of VOC/TAC per day. Therefore, these emissions are considered foregone.

Summary of Chapter 3 - Existing Setting

Pursuant to the *CEQA Guidelines §15125*, Chapter 3 – Existing Setting, includes descriptions of those environmental areas that could be adversely affected by PAR 1162. The following briefly highlights the existing setting for air quality, which was the only environmental area identified that could potentially be adversely affected by implementing PAR 1162. The foregone VOCs would add to ozone and PM10 formation.

Air quality in the area of the SCAQMD's jurisdiction has shown substantial improvement over the last two decades. Nevertheless, some federal and state air quality standards are still exceeded frequently and by a wide margin. Of the National Ambient Air Quality Standards (NAAQS) established for six criteria pollutants (ozone, lead, sulfur dioxide, nitrogen dioxide, carbon monoxide and PM10), the area within the SCAQMD's jurisdiction is only designated in attainment for the sulfur dioxide, nitrogen dioxide and lead standards. Chapter 3 provides a brief description of the existing air quality setting for each criteria pollutant, as well as the human health effects resulting from exposure to each criteria pollutant.

Summary of Chapter 4 - Environmental Impacts

CEQA Guidelines §15126(a) requires that a CEQA document, "shall identify and focus on the significant environmental effects of the proposed project. Direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects." The following subsection briefly summarizes the analysis of potential adverse environmental impacts from the adoption and implementation of PAR 1162.

Air Quality

Evaluation of PAR 1162 resulted in identifying significant adverse air quality impacts. No other environmental areas were identified that could be significantly adversely affected by the proposed project. Under the existing Rule 1162, VOCs were the only ozone precursors associated with gel coats. In paints, VOCs are used as a transport mechanism to apply pigments to the desired surface. Exposed solvents evaporate into the atmosphere. VOC emission inventories from paints and solvents are developed by assuming all VOCs within the paint and solvents evaporate. Monomers are VOCs that partially combine with themselves, or other similar compounds by a cross linking reaction to become part of the cured composite product. A portion of the monomer evaporates into the atmosphere, but the objective is to have most of the monomer cross-link and become the product. Federal, state and local emissions inventories of resins and gel coats have been developed based on monomer content of the compound and monomer emission factors. The monomers and solvents used within gel coats, in addition to being VOCs, are also considered toxic air contaminates.

The existing rule requires operators to apply gel coats with nonatomizing techniques by July 1, 2005. In adopting this provision, it was estimated that the use of nonatomizing gel coat application techniques would result in 853 pounds per day of VOC emission reductions. However, the emissions limit has been found to be infeasible. The proposed amendments to Rule 1162 would rescind the nonatomizing gel coat application technique requirement for open molds. With the rescinding of this provision, 853 pounds per day of VOC emission reductions would be considered foregone. These VOC emission reductions foregone exceed the regional operational VOC air quality significance threshold of 55 pounds per day. Therefore, air quality impacts are considered significant (Table 1-1).

However, since the July 1, 2005, effective date for nonatomizing gel coat application techniques has not passed, these emissions foregone are expected emissions reductions that have not been realized. In practice, the proposed modification to Rule 1162 (i.e., rescinding the nonatomizing gel coat application technique) would allow existing operations to continue at existing facilities; therefore, while the anticipated emission reductions would be considered foregone, the actual emissions are not expected to increase above existing levels.

TACs associated with composite materials include styrene, methyl methacrylate (MMA), methylene chloride, toluene, xylene, n-hexane, methyl ethyl ketone (MEK), methyl isobutyl ketone (MIBK), and 1,1,1-trichloroethane (also known as methyl chloroform, but commonly abbreviated as TCA). Methylene chloride is the only compound in the list above, recognized as carcinogenic by either federal or state regulations or agencies, the remaining compounds are noncarcinogenic TACs. Styrene is considered both an acute and chronic

noncarcinogenic compound under AB2588 and Rule 1401. Significant noncarcinogenic acute and chronic risks were estimated from styrene emission reductions foregone at a PAR 1162 facility with high styrene emissions.

Because significant adverse air quality impacts were identified for the proposed project, a Statement of Findings and a Statement of Overriding Considerations will be prepared for the Governing Board's consideration and approval prior to the public hearing for the proposed amendments.

Table 1-1
Air Quality Impacts from Proposed Project

Air Quality Topic	Proposed Project	Mitigation Measures
VOC Emissions	Significant - VOC reductions foregone are greater than 55 pounds per day	No feasible mitigation was identified
TAC (Styrene)	Significant - noncarcinogenic acute and chronic risk associated with styrene emission reductions foregone	No feasible mitigation was identified

Potential Environmental Impacts Found Not To Be Significant
The *2003 Final EA* and associated *NOP/IS* for the existing Rule 1162 includes an environmental checklist of approximately 17 environmental topics to be evaluated for potential adverse impacts from a proposed project. Air quality was the only environmental topic found to be significant in the *Final EA*. No comments were received on the *2003 Final EA* or the associated *NOP/IS* refuting these conclusions. The analysis concluded that the following environmental areas would not be significantly adversely affected by the existing Rule 1162:

- aesthetics
- agriculture resources
- biological resources
- cultural resources
- energy
- geology/soils
- hydrology and water quality
- land use and planning
- mineral resources
- noise
- population and housing
- public services
- recreation
- solid/hazardous waste

- transportation/traffic

The *2003 Final EA* and associated *NOP/IS* for the existing Rule 1162 investigated the impacts associated with delaying the nonatomizing gel coat application technique requirement for a year. Nonatomizing gel coat application techniques did not demonstrate emission reductions; therefore, environmental impacts would be the same, but would extend indefinitely instead of over one year.

Consistency

The Southern California Association of Governments (SCAG) and the SCAQMD have developed, with input from representatives of local government, the industry community, public health agencies, the EPA – Region IX and the California Air Resources Board (CARB), guidance on how to assess consistency within the existing general development planning process in the district. Pursuant to the development and adoption of its *Regional Comprehensive Plan and Guide* (*RCPG*), SCAG has developed an *Intergovernmental Review Procedures Handbook* (June 1, 1995). The SCAQMD also adopted criteria for assessing consistency with regional plans and the *AQMP* in its *Handbook.*

Summary Chapter 5 – Alternatives

State CEQA *Guidelines §15126.6(c)* require that because EIRs must identify ways to mitigate or avoid significant effects, discussion of alternatives must focus on alternatives which are capable of avoiding or substantially lessening any significant effects. *CEQA Guidelines* specifically note that the range of alternatives required in a CEQA document is governed by a 'rule of reason' and only necessitates that the CEQA document set forth those alternatives necessary to permit a reasoned choice. The key issue is whether the selection and discussion of alternatives fosters informed decision making and meaningful public participation. A CEQA document need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative.

In accordance with SCAQMD's policy document Environmental Justice Program Enhancements for FY 2002-03, Enhancement II-1 recommends that all SCAQMD CEQA assessments include a feasible project alternative with the lowest air toxics emissions. The "least harmful" alternative with regard to hazardous air pollutants was the alternative which replaces styrene and MMA monomers with the non-toxic, non-VOC vinyl toluene. However, commercial use of vinyl toluene is not expected by July 1, 2005.

Two feasible alternatives, in addition to the proposed project are summarized in Table 1-2: Alternative A (No Project) and Alternative B (Two Year Delay in Compliance Date).

Table 1-2
Project Alternatives

Component	PAR 1162 (Project)	Alternative A (No Project)	Alternative B (Two Year Delay in Compliance Date)
Nonatomized gel coat application techniques.	Rescind required.	No change. Requirement became effective July 1, 2005.	Postpone requirement until July 1, 2007.

- Alternative A or 'no project' means that PAR 1162 would not be adopted. Field tests demonstrated that nonatomizing gel coat application techniques, which attain industry performance standards, did not achieve the emission reductions estimated by using the UEF. Since the available control technology cannot achieve the emission reductions estimated by using the UEF, this alternative would maintain a standard that cannot be feasibly met.

- Alternative B would further delay the compliance date for nonatomizing gel coat application techniques until July 1, 2007. The existing rule, proposed project and Alternative B would forego 853 pounds per day of VOC reductions. Alternative B would provide a benefit to air quality only if a viable nonatomizing gel coat application techniques or other control could be found before the July 1, 2007 compliance date. Alternative B would be significant for VOC, and acute and chronic noncarcinogenic health risk until a viable alternative could be found.

A comparison of the potential air quality impacts from each of the project alternatives with PAR 1162 is given in Table 1-3. No other significant adverse impacts were identified for PAR 1162 or any of the project alternatives. The proposed project is the most realistic alternative since Alternative A would require implementation of techniques that have not demonstrated environmental benefits, and Alternative B speculates on technology which has not be identified or tested. Therefore, the proposed project is preferred over the project alternatives, and would be the environmentally superior project.

Summary Chapter 6 - Other CEQA Topics

CEQA requires CEQA documents to address the potential for irreversible environmental changes, growth-inducing impacts. Since PAR 1162 would allow existing operations to continue at existing facilities, that is no change in activities in existing operations, the analyses of the proposed project confirms that it would not result in irreversible environmental changes; or the irretrievable commitment of resources; or foster economic or population growth; or the construction of additional housing; or be inconsistent with regional plans.

Table 1-3
Comparison of Adverse Air Quality Impacts of the Alternatives

Air Quality Topic	PAR 1162	Alternative A (No Project)	Alternative B (Two Year Delay in Compliance Date)
Criteria Pollutant (VOC)	Significant 853 pounds per day of VOC emission reductions foregone as of 07/01/05	Significant 853 pounds per day of VOC emission reductions foregone as of 07/01/05	Significant 853 pounds per day of VOC emission reductions (until January 1, 2007) Greater than PAR 1162
Toxic Air Contaminant (Styrene)	Significant Noncarcinogenic acute & chronic health effects from foregone styrene emissions	Significant Noncarcinogenic acute & chronic health effects from foregone styrene emissions	Significant Noncarcinogenic acute & chronic health effects from foregone styrene emissions (until January 1, 2007)

CHAPTER 2

PROJECT DESCRIPTION

Project Location
Background
Existing Rule 1162
Rationale for Amendment
Project Objective
Project Description

PROJECT LOCATION

The SCAQMD has jurisdiction over an area of 10,473 square miles (referred to hereafter as the district), consisting of the four-county South Coast Air Basin (Basin) and the Riverside County portions of the Salton Sea Air Basin (SSAB) and the Mojave Desert Air Basin (MDAB). The Basin, which is a subarea of the SCAQMD's jurisdiction, is bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The 6,745 square-mile Basin includes all of Orange County and the nondesert portions of Los Angeles, Riverside, and San Bernardino counties. The Riverside County portion of the SSAB and MDAB is bounded by the San Jacinto Mountains in the west and spans eastward up to the Palo Verde Valley. The federal nonattainment area (known as the Coachella Valley Planning Area) is a subregion of both Riverside County and the SSAB and is bounded by the San Jacinto Mountains to the west and the eastern boundary of the Coachella Valley to the east (Figure 2-1).

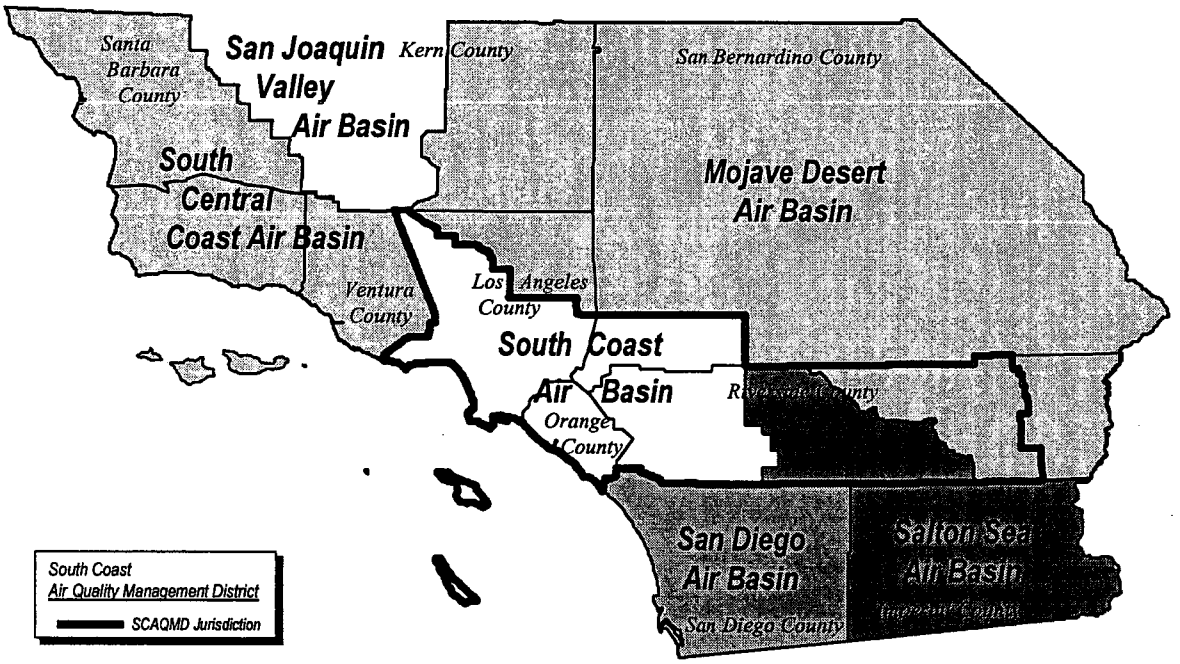

Figure 2-1
South Coast Air Quality Management District

BACKGROUND

All polyester resin operations, also referred to as the fiber reinforced plastic industry, are regulated by Rule 1162. Rule 1162 applies to polyester resin operations in the fabrication of composite or fiberglass products including bathtub, shower and vanity installations; hulls for recreational and commercial watercraft; bodies for recreational vehicles; building panels and appliances; sporting equipment; power tools; automotive, aerospace and aircraft components; and structural components for chemical process equipment and storage tanks.

Overview of Current Regulatory Requirements

There are three levels of regulatory control requirements that apply to VOCs and TACs from the polyester resin industry, including the requirements contained in Rule 1162: 1) local (i.e., SCAQMD); 2) state (i.e., California Air Resources Board or CARB); and 3) federal requirements (i.e., Environmental Protection Agency or EPA). The SCAQMD's local efforts to specifically regulate sources of VOCs and TACs from this industry have been based partly on implementing measures already adopted by EPA and CARB. The following is an overview of the SCAQMD rules that have been adopted to implement federal, state, or SCAQMD VOC and TAC reduction programs and the federal and state air toxic legislation and TAC programs.

SCAQMD Requirements

Polyester resin facilities that are subject to Rule 1162, may also be subject to three other related local rules for reducing VOC emissions from operational activities: Rule 1162 – Further Control of VOC Emissions from High-Emitting Spray Booth Facilities, Rule 1171 – Solvent Cleaning Operations, and Rule 1122 – Solvent Degreasers. Rule 1132 requires VOC reductions from any spray booth facility, except facilities in the petroleum industry; that conducts spray coating or laminating operations that produce more than 20 tons per year of VOC emissions in any emission inventory year from 1999 to present. The requirements of Rule 1171 apply to any facilities including polyester resin facilities, where the following activities occur: the cleaning by hand of application equipment (i.e., spray guns), parts, products, tools, machinery, equipment, and general working areas with VOC-containing solvent and the storage and disposal of the VOC-containing materials. Rule 1122 regulates the use of VOC-based solvents in batch-loaded cold cleaners, open-top vapor degreasers, all types of conveyorized degreasers, and air-tight and airless cleaning systems for the purpose of removing contaminants from parts, products, tools, machinery, and equipment.

There are several materials used in the polyester resin industry that contain VOCs that are also TACs. For example, resin materials and gel coats may contain any of the following: styrene, MMA, methylene chloride, toluene, xylene, n-hexane, MEK, MIBK, and TCA. In addition, the clean up solvents can contain MEK, methanol, acetone, dibasic ester (DBE), diacetone alcohol (DAA), n-methyl pyrolidone (NUT), and propylene carbonate (dioxolanone). There are two other local rules that regulate TAC emissions and which may apply to polyester resin facilities: Rule 1401 – New Source Review of Toxic Air Contaminants, and Rule 1402 – Control of Toxic Air Contaminants from Existing Sources. Rule 1401 applies to new and modified facilities, while Rule 1402 applies to facility-wide risk at existing facilities. Since the majority of polyester resin facilities are located within

SCAQMD's jurisdiction as existing sources, the requirements in Rule 1402 are the main drivers for reducing overall toxic emissions from this industry.

Some of the TACs used in polyester resin operations are considered carcinogenic (cancer-causing) and may have other non-cancer health effects. In light of these considerations, Rule 1162 includes requirements to control VOC by limiting monomer content. To the extent that VOCs in the polyester resin industry are TACs, such as monomers, Rule 1162 secondarily controls TACs by controlling VOCs. Therefore, reductions of VOC emissions would reduce associated carcinogenic and noncarcinogenic health risks from this particular industry.

State Requirements

The Air Toxics "Hot Spots" Information and Assessment Act was enacted in September 1987 by the California State Assembly as Assembly Bill 2588 (hereafter referred to as the AB2588 program). Under this act, certain stationary sources are required to report the types and quantities of specified toxic substances, including any styrene, MMA, methylene chloride, toluene, xylene, n-hexane, MEK, MIBK, TCA, and methanol, they release into the air. Emissions of interest are those that result from the routine operation of a facility or that are predictable, including but not limited to continuous and intermittent releases and process upsets or leaks. The goals of AB2588 are to collect emission data, to identify facilities having localized impacts, to ascertain health risks, and to notify nearby residents of significant risks. All 81 of the polyester resin facilities subject to Rule 1162 are currently in the AB2588 program

Federal Requirements

The federal Clean Air Act (CAA) establishes requirements to regulate emissions of air pollutants to protect human health and the environment. In addition to regulating criteria pollutants, the CAA requires the EPA to regulate TACs that have been found to adversely affect human health. Federal regulations in the CAA include the New Source Performance Standards (NSPS) under §111 and the National Emissions Standards for Hazardous Air Pollutants (NESHAPs) under §112. The EPA periodically promulgates NSPS standards in the Code of Federal Regulations (CFR), Chapter 40, Part 60 (40 CFR Part 60) and NESHAPs in 40 CFR Parts 61 and 63. The SCAQMD has been delegated authority by EPA to implement and enforce both NSPS and NESHAP requirements. The requirements in 40 CFR Parts 60 and 61 were adopted by reference in SCAQMD Regulations IX and X respectively. EPA has promulgated a NESHAP specifically for Boat Manufacturing[4], which sets standards that address organic and inorganic TAC emissions at new and existing boat manufacturing facilities. The NESHAP for Reinforced Plastic Composites Production[5] was published on April 21, 2003, for non-boat reinforced plastic composite manufacturing. Existing sources are required to incorporate pollution-prevention techniques in their production processes. These techniques include: using raw materials containing low amounts of air toxics; non-atomized resin application; and covering open resin baths and

[4] On August 22, 2001, EPA promulgated the Boat Manufacturing NESHAP in Title 40 of Code of Federal Regulations (CFR), Chapter I, Subchapter C, Part 63, Subpart VVVV (40 CFR 63, Subpart VVVV).

[5] On April 21, 2003, EPA promulgated the Reinforced Plastic Composites Production NESHAP in Title 40 of Code of Federal Regulations (CFR), Chapter I, Subchapter C, Part 63, Subpart WWWW (40 CFR 63, Subpart WWWW).

tanks. New facilities that emit less than 100 tons per year of air toxics must also meet these requirements. New facilities that emit greater than tons per year of air toxics are required to reduce open molding, centrifugal casting, continuous lamination/casting, pultrusion, SMC/BMC manufacturing, and mixing by 95 percent. Existing gel coat sources are required to meet existing standards that utilize the verified emission factors for gel coats. Existing sources must comply by April 21, 2006. New sources were required to comply by April 21, 2003 or at start-up.

For the cleaning of polyester resin components or machinery with solvents in a degreasing unit, there is an applicable NESHAP for Halogenated Solvent Cleaning[6]. The specific solvents identified in this NESHAP were incorporated into the Rule 1122.

The VOCs and TACs used in the polyester resin industry are also addressed in other federal legislation including but not limited to:

- Occupational Safety and Health Act (OSHA);
- Toxic Substances Control Act (TSCA);
- Comprehensive Environmental Response, Compensation and Liability Act (CERCLA);
- Title III of the Superfund Amendments and Reauthorization Act (SARA); and,
- Resource Conservation and Recovery Act (RCRA).

EXISTING RULE 1162

Because VOC emissions contribute to ozone and PM10 formation, reducing the quantity of VOCs in the district has been an on-going priority and effort by the SCAQMD. Materials used by the polyester resins industry have been considered by SCAQMD as one potential source where VOC emission reductions can be achieved, in March 1987, Rule 1162 – Polyester Resin Operations, was adopted. Rule 1162 was developed to reduce VOC emissions from all polyester resin operations that involve the fabrication, rework, repair, or touch-up of products used for commercial, military or industrial markets.

The November 2001 amendments to Rule 1162 required operators of affected facilities to comply with the latest application techniques, material requirements, and process requirements in order to reduce VOC and TAC emissions from polyester resin operations. The November 2001 amendments set forth work practice standards, limit VOC and TAC emissions by specifying monomer contents in polyester resin materials and implement past AQMP control measures. The proposed compliance dates varied between 2002 and 2003, depending on the method of compliance. The November 2001 amendments to Rule 1162 also contained updates to the applicability statement, test methods and procedures, new definitions, and other minor changes to improve clarity and promote consistency throughout. The November 2001 amendments to Rule 1162 are currently only partially implemented. The November 2001 amendments included requirements for resin and gel coat operations. Additional emission reduction requirements for gel coats in an open molding source included monomer reduction and the use of nonatomizing application techniques, originally proposed to be effective July 1, 2003. The gel coat monomer and resin requirements have

[6] EPA promulgated the National Emission Standards for Halogenated Solvent Cleaning in Title 40 of Code of Federal Regulations (CFR), Chapter I, Subchapter C, Part 63, Subpart T (40 CFR 63, Subpart T).

been implemented. It was estimated that the November 2001 amendments to Rule 1162 would remove approximately 5,800 pounds per day of VOC and TAC emissions from the air by July 1, 2003.

The nonatomizing application techniques for gel coats was delayed an additional year on July 11, 2003, and July 9, 2004, moving the compliance date for nonatomizing application techniques to July 1, 2004, then to July 1, 2005. During the July 11, 2003 amendments the emission reductions from gel coats were revised with more recent UEFs. Based on this administrative change, the emission reductions from nonatomizing gel coat application techniques were revised to reflect the most current recommend emission factors, the downward to 853 pounds of VOC per day. In addition, the definition of nonatomizing spray application technique of gel coat was revised.

RATIONALE FOR AMENDMENT

Subsequent to the July 9, 2004, field tests demonstrated that nonatomizing gel coat application techniques that attain industry performance standards are not able to achieve the originally anticipated UEF estimated VOC reductions of 853 pounds per day. The implication of the field test is that atomizing and nonatomizing gel coat application techniques are environmentally equivalent. Based on these field tests, staff proposes to rescind the nonatomizing spray application technique requirement from Rule 1162.

PROJECT OBJECTIVE

The objective of proposed amended Rule (PAR) 1162 is to rescind the nonatomizing application requirement.

PROJECT DESCRIPTION

Rule 1162 applies to any person using polyester resin materials during the manufacturing and assembly of the following items, including but not limited to: boats; tubs; pools; shower enclosures; spas; bathroom fixtures; jigs; tools; molds; building panels; air pollution control equipment; sewage treatment equipment; storage tanks; transportation parts; automotive; aircraft; and aerospace components; and other industrial and consumer products. The proposed amendment applies only to operators at facilities that apply gel coat to open surface molding. The following summarizes the change to the proposed amended rule. A copy of PAR 1162 is included in Appendix B.

Applicability

No changes proposed to this subdivision of the rule.

Definitions of Terms

The definition of "nonatomizing spray application technique of gel coat" would be removed. A definition for high-volume, low-pressure spray was added for clarity.

Requirements

Subdivision (c) of the current version of Rule 1162 contains specific requirements for materials applied to molds. Rule 1162 (c)(1)(B) requires gel coats applied to an open

molding surface to use one of the "nonatomizing application techniques" specified in subparagraph (c)(1)(A)(i) through (c)(1)(A)(vi). Rule 1162 (c)(1)(B) requirements for gel coat "nonatomizing application techniques" would be removed from the rule.

Other changes were included for consistency. The words gel coat was removed from (c)(1)(A). Gel coat was added to subparagraph (c)(4), which allows the use of a hand-held spray gun with has a container to be used for touch-up and repair.

Control Equipment

No changes are currently proposed for this subdivision.

Recordkeeping Requirements

No changes are currently proposed for this subdivision.

Test Methods and Procedures

No changes are currently proposed for this subdivision.

Alternative Compliance Option

No changes are currently proposed for this subdivision.

CHAPTER 3

EXISTING SETTING

Introduction
Polyester Resin Industry
Air Quality

INTRODUCTION

In order to determine the significance of the impacts associated with a proposed project, it is necessary to evaluate the project's impacts against the backdrop of the environment as it exists at the time the NOP is published or if NOP is published, at the time the environmental analysis is commenced. The *CEQA Guidelines* define "environment" as "the physical conditions that exist within the area which will be affected by a proposed project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historical or aesthetic significance" (*CEQA Guidelines* §15360; see also *Public Resources Code §21060.5*). Furthermore, a CEQA document must include a description of the physical environment in the vicinity of the project, as it exists at the time the notice of preparation is published, from both a local and regional perspective (*CEQA Guidelines* §15125). Therefore, the "environment" or "existing setting" against which a project's impacts are compared consists of the immediate, contemporaneous physical conditions at and around the project site[7].

The following sections summarize the existing setting for air quality, which is the only environmental area that may be adversely affected by implementing PAR 1162. An overview of air quality in the district is given below. A more complete discussion of current and projected future air quality in the district, with and without additional control measures can be found in the *2003 Final Environmental Impact Report (EIR) for the 2003 AQMP* (Chapter 3 and 4) and in the *Final 2003 AQMP* and associated appendices. The *2003 AQMP Final EIR* contains more comprehensive information on existing and projected environmental settings for the environmental area discussed in this chapter. Copies of the above-referenced documents are available from the SCAQMD's Public Information Center by calling (909) 396-2039.

POLYESTER RESIN INDUSTRY

Polyester resin operations use composite materials that include resins, gel coats, solvents, coatings and adhesives, including reinforcement materials such as fiberglass and fillers. The types of items produced in a polyester resin operation vary, including, but not limited to, boats, tubs, pools, shower enclosures, spas, bathroom fixtures, jigs, tools, molds, building panels, air pollution control equipment, sewage treatment equipment, storage tanks, transportation parts, automotive, aircraft, and aerospace components, and other industrial and consumer products. The affected industries include manufacturers of the above-listed items. Currently, there are 81 facilities that are subject to the requirements of Rule 1162.

Composite materials, also known as fiber reinforced plastics, are created from combining fiber reinforcement materials with polyester resin materials. Fiber reinforcement materials are formed by pultrusion. Pultrusion is a process where continuous roving strands are moved through a strand-tensioning device into a resin bath for impregnation and then passed through a heated die for curing, such as for making fiber reinforcement materials like fiberglass and other fibrous materials used to reinforce plastic.

[7] Remy, et al; 1996

Molding is a technique of forming a product comprised of composite materials, such as plastics, into various shapes. Typically, the process for creating a molded product involves the following key phases:

1. Mixing the various materials in specific proportions according to a recipe appropriate for the type of product being fabricated. The materials are gel coats, polyester resins, fiberglass or other fiber substrate, solvents, catalyst(s), inhibitors and other chemical additives.
2. Applying the composite material onto a mold, using either manual or mechanical application techniques.
3. Composite material finishing which involves joining, machining and coating the final product.

There are two main types of molding techniques, closed molding systems and open molding systems. Closed molding systems are different from open molding systems in that they utilize a confining or enclosed mold cavity and rely on pressure and/or heat to set the materials that are applied to the mold. An open molding system is the most widely used method for applying the various polyester resin materials onto an open mold.

Composite materials can be applied to either type of mold manually or mechanically by using a "hand lay-up" or "spray-up" technique respectively. When applying materials using the hand lay-up method, a mold is prepared by first applying a mold release agent (which is often an alcohol- or wax-based paste) to its surface and it is allowed to set for a period of time (usually overnight). Next, a layer of gel coat is applied on top of the mold release agent. After the gel coat has cured, a layer of chopped fiberglass strands is manually applied. Then a mixture of polyester resin and catalyst (to quicken the final curing process of the resin) is applied to the fiberglass layer by using hand rollers, brushes, or squeegees. Additional rolling may be required to remove any air bubbles remaining after the initial application process.

For the spray-up method, the same mold release agent preparation method used for the hand lay-up method is followed. Next, fiberglass, polyester resin, and catalyst are applied simultaneously to the mold surface with a "chopper gun." There are two methods for spraying the polyester resin mixed with a catalyst and the fiberglass onto a mold, the internal mix and the external mix. For an internal mix, the polyester resin and the catalyst are mixed inside the gun and then sprayed with the fiberglass onto the mold. An external mix is when all three components remain separate from each other as they enter the gun, and instead they are mixed outside the gun as they exit the nozzle.

Status of the Materials Used in Polyester Resin Operations

Among the materials currently used in practice are composite materials that include resins, gel coats, solvents, coatings and adhesives, including reinforcement materials such as fiberglass and fillers. With the exception of the fiberglass and fillers, the composite materials contain monomers that emit VOCs as TACs, such as styrene, MMA, methylene

chloride, toluene, xylene, n-hexane, MEK, MIBK, and 1,1,1-trichloroethane[8]. Reducing VOC emissions by limiting the monomer content of polyester resin materials as applied, especially during the open molding processes, is the main focus of Rule 1162. To the extent that VOCs regulated by Rule 1162 are also TACs, Rule 1162 also produces a secondary benefit of reducing TAC emissions.

A variety of materials, namely resins, gel coats, fiber reinforcement materials, fillers, clean up solvents, inhibitors, catalysts, curing agents, and additives are necessary for manufacturing or fabricating products made of composite materials. The following discussion addresses the current technology status of these materials used by the fiber reinforced plastics industry for polyester resin operations. Analysis regarding the effect the proposed rule amendment will have on VOC emissions is discussed in Chapter 4.

Resin Materials

There is a large variety of resin materials manufactured for the purpose of composite manufacturing. Polyester resins are the primary resin materials manufactured and used by this industry. The polyester resin category includes several sub-categories that vary by chemical formulations such as phthalic resins, halogenated/clorendic resins, bisphenol-A resins, furan resins, and vinyl ester resins. The usage of a particular polyester resin depends on the mechanical properties of the material and the needs or specifications of the product being manufactured.

Of the resin materials manufactured and used for composite manufacturing, styrene is the monomer that is found most often in polyester resin. There are many specialty resins and gel coats that also contain MMA, another widely used monomer. Nationally, 17,000 tons per year of styrene is emitted and approximately 75 percent is attributed to the use of styrene-based polyester resin materials during several phases of the open molding process. The key sources of styrene and other monomer emissions occur when the resin is first applied to the mold, later when the air bubbles are rolled out, and during the curing stage of the final product.

Another category of material, polyurethanes, is slowly becoming the emerging technology in this industry because of the low- or zero-VOC and TAC contents. However, when compared to polyester resins, the use of polyurethanes is less common throughout the industry. Polyurethanes are currently being used to manufacture automotive parts (i.e., campers, inner door panels and seat backs), analytical and laboratory instrumentation; snow and water skis and boards and to fabricate diagnostic equipment.

Gel Coats

A gel coat is a clear or pigmented layer of coating that is applied to the surface of a polyester resin. Its purpose is to cosmetically enhance the appearance of the product being made while improving the product's ability to resist degradation due to exposure to weather, light, heat, et cetera. All gel coats have application- and use-based performance specifications or

[8] EPA has classified styrene, MMA, methylene chloride, toluene, xylene, n-hexane, MEK, MIBK, and TCA as possibly carcinogenic to humans; however, only methylene chloride has a unit risk factor. A screening risk analysis is completed in Chapter 4 based on risk values established by CARB/OEHHA.

requirements based on the physical properties of the specific material. The application-based specifications consider the spraying properties, resistance to sagging, porosity and resin-tearing potential of the gel coats. The use-based performance specifications consider the ability of a particular gel to resist cracking and other damage due to exposure to weather and water.

Fiber Reinforcement Materials

Fiber reinforcement materials are made of multiple filaments or fibers comprised of glass, carbon, boron, metal, or amid polymers and are used to reinforce the strength of plastic. The most common type of fiber reinforcement material is fiberglass. Regardless of what the fibers are made of, the fibers can remain as continuous or discontinuous filaments or they can be woven into continuous multi-filament yarns that consist of strands with several hundred filaments, each of which is five to 20 micrometers in diameter. The yarns can then be woven into mats or cloth. An example of how fiberglass mats are used in hand lay-up applications, the mats are arranged over a mold and sprayed with a matrix forming resin, such as an epoxy, to assure a good adhesion to the glass fibers.

Fillers

Fillers are finely divided materials or short fibers, made of materials such as silica, carbon black, talc, mica, and calcium carbonate that are used to enhance or reinforce the mechanical properties of plastics. Adding fillers will stretch the amount of resin material or gel coat that would otherwise be needed to fabricate a particular product and will displace the quantity of monomer that would otherwise be emitted if 100 percent of a resin material or gel coat (i.e., no added fillers) was used.

Clean-up Solvents

There are several solvents that are either VOCs or non-VOCs, used for cleaning-up polyester resin operations, though their use is subject to the requirements of Rule 1171. For example, solvents such as methanol and MEK (both contain VOCs), and acetone (a non-VOC[9]) are currently used in large quantities to clean equipment and tools. However, previously adopted amendments to Rule 1171 lowered the VOC content limit for cleaning materials used in polyester resin operations to 25 grams per liter, which subsequently encouraged an industry-wide transition from VOC-based cleaning materials to aqueous and other low-VOC cleaning materials. In response to the October 8, 1999 changes to Rule 1171, many manufacturers have begun to replace some clean-up solvents with products that are less volatile or less flammable. For example, products such as aqueous cleaners, dibasic ester (DBE), diacetone alcohol (DAA), n-methyl pyrolidone (NUT), and propylene carbonate (dioxolanone) are being used for cleaning polyester resin operations.

The type of cleaner chosen (i.e., solvent- or aqueous-based cleaners) depends on the item being cleaned and the cleaning method. For example, the effectiveness of aqueous cleaners relies on mechanical action (such as brushing) to clean resin from contaminated applicators while acetone and other solvent-based cleaners with high boiling points clean by dissolving the resin. Aqueous cleaners are effective for certain applications because the mechanical action causes droplets of resin to separate from the device being cleaned, wets the resin

[9] Acetone is considered a "Group I Exempt Compound" in accordance with SCAQMD Rule 102 – Definitions.

droplets with the cleaner, and subsequently causes the droplets to settle to the bottom of the cleaning tank. Solvent-based cleaners are effective because the item being cleaned can be soaked and eventually the resin will be dissolved and suspended within the solvent.

Inhibitors, Catalysts and Curing Agents

The nature of resin materials and gel coats is such that they are designed to chemically cure or cross-link the monomers shortly after they are applied to a mold. In order to prevent the premature curing of these materials when they are manufactured and stored for future use, inhibitors are added. Inhibitors are chemical additives that specifically control the spontaneous cross-linking reaction of monomers that exist in the resin materials and gel coats. Inhibitors are added to keep the resin materials and gel coats in a stable, liquid state for a minimum amount of time and at a given ambient temperature (e.g., three months at 73 ^{o}F).

The process of curing resin materials and gel coats employs curing agents or hardeners and catalysts to develop the desirable curing properties. Curing agents include anhydrides, aldehyde and amine compounds and are often used for curing a product at room temperature or at elevated temperatures as appropriate. Catalysts, also referred to as accelerators, are substances that are added in specific quantities to resin materials or gel coats to make them cure or achieve cross-linked bonds more rapidly. Also, most fabricators rely on catalysts to overcome the presence of inhibitors in the materials. Methyl ethyl ketone peroxide (MEKP) and benzoyl peroxide (BPO) are the most common catalysts used in polyester resin operations. BPO has been reported to have a beneficial effect because it is effective in reducing gel drying time and lowering the peak temperature during the curing process.

Additives

Chemical additives are introduced into resin materials and gel coats to obtain certain desirable product characteristics such as the ability to resist heat and aging, electrical properties, optical clarity, permeability, flame retardant, and ease of application. There are four classes of additives, which represent about 90 percent of all additives used in plastics. They are fillers (as previously discussed), plasticizers, colorants and stabilizers. Plasticizers are used to change the flammability, odor, biodegradability, and the glass transition temperature (T_g) of a polymer in a resin material or gel coat.

For most consumer applications, plastics are manufactured in a variety of colors. When compared to metals and ceramics, which depend on surface coatings for color, plastics have an advantage in that they can become a particular color throughout its molded form, simply because of the addition of a colorant to the resin material or gel coat. Popular pigments for colorants include titanium dioxide and zinc oxide (white), carbon (black), and various other inorganic oxides such as iron and chromium oxides. Organic compounds can also be used to add color either as pigments (insoluble) or as dyes (soluble).

In order for a plastic to have a long and useful life in any application, it is desirable for properties of that plastic to change as little as possible over time. To counter the effects of aging, small quantities of stabilizers are added. The type of stabilizer used depends on the

application. For example, some stabilizers are designed specifically to reduce degradation by sunlight, ozone, and biological agents.

Field Testing of Nonatomizing Gel Coat Application Techniques

Staff, in cooperation with American Composite Manufacturers Association (ACMA), spray equipment manufacturers, gel coat manufacturers, and major composite fabricators developed the SCAQMD Gel Coat Testing Program. The testing program objective was to develop a more appropriate and enforceable definition for the nonatomizing spray application technique of gel coats. It included VOC emission and surface quality measurements (porosity, gloss, orange peel and water resistance tests) of gel coat sprayed materials. Volatile Organic Compound (VOC) emissions were measured by SCAQMD staff. Surface quality analyses were conducted by California Polytechnic State University, San Luis Obispo. The four (4) major spray equipment manufacturers participated in the testing program, which was conducted from August through October 2004.

The Gel Coat Testing Program verified that the gel coat pressure at the tip of the spray gun is an appropriate method to define the nonatomizing spray application technique. However, the testing data also demonstrated that there were no significant differences in both the VOC emission and the surface quality measurements of the nonatomizing application and the conventional air-assisted airless application of gel coats.

Current Rule 1162 Emission Inventories

The following assumptions were used to develop the gel coat reformulation inventory:

- The emissions inventory of gel coats is based on the 1998-99 emissions inventory of composite operations in the AQMD. That inventory reflects a usage of 2,206 tons per year of gel coats. No change in gel coat usage is expected from this rule amendment.
- The emissions inventory of gel coats includes clear and pigmented gel coats. Clear gel coats include marble clear gel coats and other clear gel coats. Pigmented gel coats include white and off-white gel coats and non- white gel coats.
- The emissions inventory of gel coats is based on compliance with the July 1, 2003, monomer content requirements for gel coats as follows: marble clear gel coats (40 percent), other clear gel coats (44 percent), white and off-white gel coats (30 percent), and nonwhite gel coats (37 percent). It also based on the atomized application of gel coats.
- Clear and pigmented gel coats represent 15 percent and 85 percent, respectively, of the total gel coats usage in composite operations in the AQMD during 1998-99.
- White/off-white, and non-white represent 85 percent and 15 percent, respectively, of the total pigmented gel coats usage in composite operations in the AQMD during 1998-99.
- Marble clear gel coats and other clear gel coats represent 35 percent, and 65 percent, respectively, of the total clear gel coats usage in the AQMD during 1998-99.
- The emissions reduction of the nonatomizing application for marble clear gel coats, other clear gel coats, white and off-white pigmented gel coats, and non-white pigmented gel coats are calculated using the 2001 UEF (see Attachment).
- The nonatomizing emissions reduction of gel coats is calculated using the gel coat emissions inventory and the emissions reduction efficiency for the nonatomizing application of gel coats.

Table 3-1 presents emission estimates for gel coats without nonatomizing applications.

Table 3-1
VOC Emissions Inventory of Gel Coats without Nonatomizing Applications

Specific Type of Gel Coat, & Sub-Category	Allowed Monomer Percentage in Existing Rule after July 1, 2003 (%)	Unified Emission Factor [a] (in pounds of styrene per tons of gel coat)	Units Adjustment Factor (1 ton = 2000 pounds)	Estimated Annual Total Gel Coat Usage [b] (in tons per year)	Percentage of Estimated Annual Total Gel Coat Usage per Type & Sub-Category	Projected VOC Emissions From Gel Coats (in tons per year)
Clear, for marble resins	40	(439	÷ 2000)	x 2206	x 0.15 x 0.35	= 25.4
Clear, for other resins	44	(522	÷ 2000)	x 2206	x 0.15 x 0.65	= 56.1
Pigmented, White and Off White	30	(267	÷ 2000)	x 2206	x 0.85 x 0.85	= 212.8
Pigmented, Non-White	37	(377	÷ 2000)	x 2206	x 0.85 x 0.15	= 53.0
					TOTAL	**347**

a) Unified Emission Factors for Open Molding of Composites, July 23, 2001 (see Appendix C)
b) SCAQMD, Table 2-8, Final EA for PAR 1162, SCAQMD No. 010918BAR, Oct. 24, 2001.

AIR QUALITY

Criteria Pollutants

It is the responsibility of the SCAQMD to ensure that state and federal ambient air quality standards are achieved and maintained in its geographical jurisdiction. Health-based air quality standards have been established by California and the federal government for the following criteria air pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO2), sulfur dioxide (SO2), particulate matter less than 10 microns (PM10), particulate matter less than 2.5 microns (PM2.5), and lead. These standards were established to protect sensitive receptors with a margin of safety from adverse health impacts due to exposure to air pollution. The California standards are more stringent than the federal standards. California has also established standards for sulfates, visibility reducing particles, hydrogen sulfide, and vinyl chloride. The state and national ambient air quality standards for each of these pollutants and their effects on health are summarized in Table 3-2. The SCAQMD monitors levels of various criteria pollutants at 32 monitoring stations. The 2003 air quality data from SCAQMD's monitoring stations are presented in Table 3-3.

Table 3-2
Federal and State Ambient Air Quality Standards

	STATE STANDARD	FEDERAL PRIMARY STANDARD	MOST RELEVANT EFFECTS
AIR POLLUTANT	CONCENTRATION/ AVERAGING TIME	CONCENTRATION/ AVERAGING TIME	
Ozone	0.09 ppm, 1-hr. avg. >	0.12 ppm, 1-hr avg.>	(a) Short-term exposures: (1) Pulmonary function decrements and localized lung edema in humans and animals (2) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (b) Long-term exposures: Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (c) Vegetation damage; (d) Property damage
Carbon Monoxide	9.0 ppm, 8-hr avg. > 20 ppm, 1-hr avg. >	9 ppm, 8-hr avg.> 35 ppm, 1-hr avg.>	(a) Aggravation of angina pectoris and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Impairment of central nervous system functions; (d) Possible increased risk to fetuses
Nitrogen Dioxide	0.25 ppm, 1-hr avg. >	0.053 ppm, ann. avg.>	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (b) Risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; (c) Contribution to atmospheric discoloration
Sulfur Dioxide	0.04 ppm, 24-hr avg.> 0.25 ppm, 1-hr. avg. >	0.03 ppm, ann. avg.> 0.14 ppm, 24-hr avg.>	(a) Bronchoconstriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma
Suspended Particulate Matter (PM10)	30 $\mu g/m^3$, ann. geometric mean > 50 $\mu g/m^3$, 24-hr average>	50 $\mu g/m^3$, annual arithmetic mean > 150 $\mu g/m^3$, 24-hr avg.>	(a) Excess deaths from short-term exposures and exacerbation of symptoms in sensitive patients with respiratory disease; (b) Excess seasonal declines in pulmonary function, especially in children
Suspended Particulate Matter (PM2.5)		15 $\mu g/m^3$, annual arithmetic mean> 150 $\mu g/m^3$, 24-hour average>	Decreased lung function from exposures and exacerbation of symptoms in sensitive patients with respiratory disease; elderly; children.
Sulfates	25 $\mu g/m^3$, 24-hr avg. >=		(a) Decrease in ventilatory function; (b) Aggravation of asthmatic symptoms; (c) Aggravation of cardio-pulmonary disease; (d) Vegetation damage; (e) Degradation of visibility; (f) Property damage
Lead	1.5 $\mu g/m^3$, 30-day avg. >=	1.5 $\mu g/m^3$, calendar quarter>	(a) Increased body burden; (b) Impairment of blood formation and nerve conduction
Visibility-Reducing Particles	In sufficient amount to give an extinction coefficient >0.23 inverse kilometers (visual range to less than 10 miles) with relative humidity less than 70%, 8-hour average (10am – 6pm PST)		Nephelometry and AISI Tape Sampler; instrumental measurement on days when relative humidity is less than 70 percent

Table 3-3
2003 Air Quality Data – South Coast Air Quality Management District

Carbon Monoxide						
					No. Days Standard Exceeded[a)]	
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. In ppm 1-hour	Max. Conc. In ppm 8-hour	Federal ≤9.5 ppm 8-hr.	State >9.0 ppm 8-hr.
LOS ANGELES COUNTY						
1	Central LA	362	6	4.57	0	0
2	Northwest Coast LA Co	361	4	3.00	0	0
3	Southwest Coast LA Co	365	7	5.14	0	0
4	South Coast LA Co	361	6	4.71	0	0
6	West San Fernando Valley	365	7	6.00	0	0
7	East San Fernando Valley	364	6	4.88	0	0
8	West San Fernando Valley	355	7	5.00	0	0
9	East San Gabriel Valley1	361	3	2.88	0	0
9	East San Gabriel Valley2	357	3	2.50	0	0
10	Pomona/Walnut Valley	365	5	3.43	0	0
11	South San Gabriel Valley	365	6	4.00	0	0
12	South Central LA Co	365	12	7.71	0	0
13	Santa Clarita Valley	361	6	3.14	0	0
ORANGE COUNTY						
16	North Orange Co	363	11	4.71	0	0
17	Central Orange Co	274*	8*	4.71*	0*	0*
18	North Coastal Orange Co	363	6	4.57	0	0
19	Saddleback Valley	365	3	2.38	0	0
RIVERSIDE COUNTY						
22	Norco/Corona	--	--	--	--	--
23	Metropolitan Riv Co1	356	5	3.43	0	0
23	Metropolitan Riv Co2	329*	6*	4.50*	0*	0*
24	Perris Valley	--	--	--	--	--
25	Lake Elsinore	355	2	2.00	0	0
29	Banning Airport	--	--	--	--	--
30	Coachella Valley1**	357	2	1.50	0	0
30	Coachella Valley2**	--	--	--	--	--
SAN BERNARDINO COUNTY						
32	NW San Bernardino Valley	364	3	1.75	0	0
33	SW San Bernardino Valley	--	--	--	--	--
34	Central San Bern Valley1	--	--	--	--	--
34	Central San Bern Valley2	365	4	3.25	0	0
35	East San Bernardino Valley	--	--	--	--	--
37	Central San Bern Mountains	--	--	--	--	--
38	East San Bern Mountains	--	--	--	--	--
	DISTRICT MAXIMUM		12	7.71	0	0

PPM – Parts Per Million parts of air, by volume
AAM = Annual Arithmetic Mean
-- - Pollutant not monitored.
– The federal 1-hour standard (1-hour average CO> 35 ppm) and state 1-hour standard (1-hour average CO> 20 ppm) were not exceeded.
*Less than 12 full months of data. May not be representative.
a) **Salton Sea Air Basin.

Table 3-3 (Continued)

Ozone								
						No. Days Standard Exceeded[a)]		
						Federal		State
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. In ppm 1-hour	Max. Conc. In ppm 8-hour	Health Advisory ≥ 0.15 ppm 1-hour	> 0.12 ppm 1-hour	> 0.08 ppm 8-hour	>9.0 ppm 8-hr.
LOS ANGELES COUNTY								
1	Central LA	361	0.116	0.099	0	0	1	8
2	Northwest Coast LA Co	365	0.099	0.080	0	0	0	1
3	Southwest Coast LA Co	360	0.098	0.080	0	0	0	1
4	South Coast LA Co	360	0.091	0.070	0	0	0	0
6	West San Fernando V	365	0.140	1.117	0	2	7	25
7	East San Fernando V	356	0.129	1.104	0	2	5	15
8	West San Fernando V	361	0.160	0.120	1	1	9	28
9	East San Gabriel V1	365	0.189	1.131	2	9	18	36
9	East San Gabriel V2	362	0.190	0.135	5	13	31	61
10	Pomona/Walnut Valley	363	0.144	0.108	0	1	3	12
11	South San Gabriel V	365	0.132	0.100	0	1	2	7
12	South Central LA Co	365	0.077	0.061	0	0	0	0
13	Santa Clarita Valley	356	0.184	0.129	2	9	27	49
ORANGE COUNTY								
16	North Orange Co	360	0.114	0.090	0	0	2	4
17	Central Orange Co	274*	0.107*	0.071*	0*	0*	0*	2*
18	N Coastal Orange Co	365	0.098	0.073	0	0	0	1
19	Saddleback Valley	365	0.125	0.098	0	1	2	10
RIVERSIDE COUNTY								
22	Norco/Corona	--	--	--	--	--	--	--
23	Metropolitan Riv Co1	365	0.143	0.120	0	7	34	41
23	Metropolitan Riv Co2	--	--	--	--	--	--	--
24	Perris Valley	361	0.152	0.136	5	19	58	73
25	Lake Elsinore	348	0.151	0.120	1	12	46	61
29	Banning Airport	365	0.149	0.129	2	16	49	63
30	Coachella Valley1**	358	0.137	0.114	0	6	42	53
30	Coachella Valley2**	365	0.114	0.099	0	0	17	21
SAN BERNARDINO COUNTY								
32	NW San Bernardino V	365	0.174	0.138	6	14	33	53
33	SW San Bernardino V	--	--	--	--	--	--	--
34	Central San Bern V1	365	0.165	0.136	6	13	31	44
34	Central San Bern V2	365	0.184	0.144	5	18	39	55
35	East San Bernardino V	327*	0.167*	0.144*	7*	21*	52*	68*
37	Central San Bern Moun	365	0.171	0.139	12	26	74	88
38	East San Bern Moun	--	--	--	--	--	--	--
DISTRICT MAXIMUM			0.190	0.144	12	26	74	88

PPM – Parts Per Million parts of air, by volume
AAM = Annual Arithmetic Mean
-- - Pollutant not monitored.
*Less than 12 full months of data. May not be representative.
b) – The federal 1-hour standard (1-hour average CO> 35 ppm) and state 1-hour standard (1-hour average CO> 20 ppm) were not exceeded.

Table 3-3 (Continued)

Nitrogen Dioxide					
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. In ppm 1-hour[b)]	Max. Conc. In ppm 24-hour	Average Compared To Federal Standard[c)] AAM in ppm
LOS ANGELES COUNTY					
1	Central LA	365	0.14	0.078	0.0378
2	Northwest Coast LA Co	365	0.11	0.080	0.0251
3	Southwest Coast LA Co	362	0.11	0.080	0.0250
4	South Coast LA Co	364	0.13	0.070	0.0308
6	West San Fernando Valley	359	0.09	0.060	0.0266
7	East San Fernando Valley	347	0.25	0.091	0.0419
8	West San Fernando Valley	365	0.15	0.086	0.0345
9	East San Gabriel Valley1	365	0.12	0.094	0.0331
9	East San Gabriel Valley2	365	0.12	0.067	0.0274
10	Pomona/Walnut Valley	365	0.13	0.095	0.0371
11	South San Gabriel Valley	363	0.14	0.076	0.0352
12	South Central LA Co	363	0.15	0.072	0.0369
13	Santa Clarita Valley	351	0.10	0.048	0.0239
ORANGE COUNTY					
16	North Orange Co	363	0.13	0.069	0.0275
17	Central Orange Co	274*	0.12*	0.069*	0.0293*
18	North Coastal Orange Co	365	0.08	0.063	0.0182
19	Saddleback Valley	--	--	--	--
RIVERSIDE COUNTY					
22	Norco/Corona	--	--	--	--
23	Metropolitan Riv Co1	362	0.15	0.064	0.0247
23	Metropolitan Riv Co2	--	--	--	--
24	Perris Valley	--	--	--	--
25	Lake Elsinore	352	0.19	0.102	0.0185
29	Banning Airport	343	0.24	0.057	0.0211
30	Coachella Valley1**	345	0.08	0.043	0.0175
30	Coachella Valley2**	--	--	--	--
SAN BERNARDINO COUNTY					
32	NW San Bernardino Valley	347	0.13	0.085	0.0384
33	SW San Bernardino Valley	--	--	--	--
34	Central San Bern Valley1	365	0.13	0.084	0.0358
34	Central San Bern Valley2	329*	0.11*	0.066*	0.0303*
35	East San Bernardino Valley	--	--	--	--
37	Central San Bern Mountains	--	--	--	--
38	East San Bern Mountains	--	--	--	--
	DISTRICT MAXIMUM		0.25	0.102	0.0419

PPM – Parts Per Million parts of air, by volume
AAM = Annual Arithmetic Mean
-- - Pollutant not monitored.
*Less than 12 full months of data. May not be representative.
**Salton Sea Air Basin.
b) – The state standard is 1-hour average > 0.25 ppm. No location exceeded state standard.
c) – The federal standard is annual arithmetic mean NO2 greater than 0.0534 ppm. No location exceeded this standard

Table 3-3 (Continued)

Sulfur Dioxide				
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. In ppm 1-hour[d)]	Max. Conc. In ppm 24-hour
LOS ANGELES COUNTY				
1	Central LA	365	0.08	0.010
2	Northwest Coast LA Co	--	--	--
3	Southwest Coast LA Co	365	0.09	0.012
4	South Coast LA Co	364	0.05	0.012
6	West San Fernando Valley	--	--	--
7	East San Fernando Valley	345	0.01	0.004
8	West San Fernando Valley	--	--	--
9	East San Gabriel Valley1	--	--	--
9	East San Gabriel Valley2	--	--	--
10	Pomona/Walnut Valley	--	--	--
11	South San Gabriel Valley	--	--	--
12	South Central LA Co	--	--	--
13	Santa Clarita Valley	--	--	--
ORANGE COUNTY				
16	North Orange Co	--	--	--
17	Central Orange Co	--	--	--
18	North Coastal Orange Co	343	0.01	0.007
19	Saddleback Valley	--	--	--
RIVERSIDE COUNTY				
22	Norco/Corona	--	--	--
23	Metropolitan Riv Co1	365	0.02	0.011
23	Metropolitan Riv Co2	--	--	--
24	Perris Valley	--	--	--
25	Lake Elsinore	--	--	--
29	Banning Airport	--	--	--
30	Coachella Valley1**	--	--	--
30	Coachella Valley2**	--	--	--
SAN BERNARDINO COUNTY				
32	NW San Bernardino Valley	--	--	--
33	SW San Bernardino Valley	--	--	--
34	Central San Bern Valley1	330*	0.01*	0.010*
34	Central San Bern Valley2	--	--	--
35	East San Bernardino Valley	--	--	--
37	Central San Bern Mountains	--	--	--
38	East San Bern Mountains	--	--	--
	DISTRICT MAXIMUM		0.09	0.012

PPM – Parts Per Million parts of air, by volume
AAM = Annual Arithmetic Mean
-- - Pollutant not monitored.
*Less than 12 full months of data. May not be representative.
**Salton Sea Air Basin.
d) – The state standards are 1-hour average >0.25 ppm and 24-hour average > 0.045 ppm. No location exceeded state standards. The federal standards are annual arithmetic mean SO_2 > 0.03 ppm, 3-hour average > 0.50 ppm, and 24-hour average > 0.14 ppm. SO_2 concentrations were well below the federal standards.

Table 3-3 (Continued)

Suspended Particulates PM10[e)]							
			No. (%) Samples Exceeding Standard			Annual Averages[h)]	
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max Conc. in µg/m³ 24-hour	Federal > 150 µg/m³ 24-hour	State > 50 µg/m³ 24-hour	AAM Conc. µg/m³	AGM Conc. µg/m³
LOS ANGELES COUNTY							
1	Central LA	61	97	0	20(33)	44.2	40.3
2	Northwest Coast LA Co	--	--	--	--	--	--
3	Southwest Coast LA Co	58	75	0	8(14)	37.1	34.4
4	South Coast LA Co	59	91	0	10(17)	37.4	34.8
6	West San Fernando V	--	--	--	--	--	--
7	East San Fernando V	61	86	0	14(23)	40.9	36.9
8	West San Fernando V	--	--	--	--	--	--
9	East San Gabriel V1	58	106	0	22(38)	45.3	39.9
9	East San Gabriel V2	--	--	--	--	--	--
10	Pomona/Walnut Valley	--	--	--	--	--	--
11	South San Gabriel V	--	--	--	--	--	--
12	South Central LA Co	--	--	--	--	--	--
13	Santa Clarita Valley	61	62	0	4(7)	32.0	28.5
ORANGE COUNTY							
16	North Orange Co	--	--	--	--	--	--
17	Central Orange Co	46*	93*	0*	9(20)*	36.0*	33.7*
18	N Coastal Orange Co	--	--	--	--	--	--
19	Saddleback Valley	57	60	0	3(5)	26.4	24.0
RIVERSIDE COUNTY							
22	Norco/Corona	54	109	0	18(33)	44.8	39.3
23	Metropolitan Riv Co1	117	136	0	78(67)	63.1	54.3
23	Metropolitan Riv Co2	--	--	--	--	--	--
24	Perris Valley	60	86	0	16(27)	40.8	36.0
25	Lake Elsinore	--	--	--	--	--	--
29	Banning Airport	54	219	1(1.9)	7(13)	35.1	26.7
30	Coachella Valley1**	49*	53 [k)]	0[k)]	1(2)[k)]	26.7[k)]	23.9[k)]
30	Coachella Valley2**	112[k)]	149[k)]	0[k)]	50(45)[k)]	50.2[k)]	44.3[k)]
SAN BERNARDINO COUNTY							
32	NW San Bernardino V	--	--	--	--	--	--
33	SW San Bernardino V	64	166	1(1.6)	27(42)	52.4	46.2
34	Central San Bern V1	60	106	0	34(57)	50.5	43.8
34	Central San Bern V2	60	106	0	31(52)	52.0	45.2
35	East San Bernardino V	49*	102*	0*	22(45)*	46.6*	39.6*
37	Central San Bern Moun	--	--	--	--	--	--
38	East San Bern Moun	--	--	--	--	--	--
DISTRICT MAXIMUM			219	1	78	63.1	54.3

PPM – Parts Per Million parts of air, by volume
AAM = Annual Arithmetic Mean
-- - Pollutant not monitored.
*Less than 12 full months of data. May not be representative.
e) – PM10 samples were collected every 6 days (every 3 days at Station Numbers 4144 and 4157) using the size-selective inlet high volume sampler with quartz filter media.
f) – PM2.5 samples were collected every 3 days at all sites except for the following sites: Station Numbers 060, 072, 087, 3176, and 4144 where samples were taken every day, and Station Number 5818 where samples were taken every 6 days.
g) – Total suspended particulates, lead, and sulfate were determined from samples collected every 6 days by the high volume sampler method, on glass fiber filter media.
h) – Federal PM10 standard is AAM > 50 µg/m³; and state standard is AGM > 30 µg/m³

Table 3-3 (Continued)

Suspended Particulates PM2.5 f)					
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. in μg/m³ 24-hour	No. (%) Samples Exceeding Standard Federal > 65 μg/m3 24-hour	Annual Averages i) AAM Conc. μg/m³
LOS ANGELES COUNTY					
1	Central LA	334	73.4	4(1.2)	22.9
2	Northwest Coast LA Co	--	--	--	--
3	Southwest Coast LA Co	--	--	--	--
4	South Coast LA Co	317	72.9	1(0.3)	21.4
6	West San Fernando Valley	109	71.1	1(0.9)	18.5
7	East San Fernando Valley	117	94.7	4(3.4)	24.9
8	West San Fernando Valley	110	78.1	1(0.9)	20.9
9	East San Gabriel Valley1	308	79.7	4(1.3)	21.8
9	East San Gabriel Valley2	--	--	--	--
10	Pomona/Walnut Valley	--	--	--	--
11	South San Gabriel Valley	95	77.3	3(3.2)	26.1
12	South Central LA Co	116	73.1	3(2.6)	24.5
13	Santa Clarita Valley	--	--	--	--
ORANGE COUNTY					
16	North Orange Co	--	--	--	--
17	Central Orange Co	252*	70.8*	1(0.4)*	22.4*
18	North Coastal Orange Co	--	--	--	--
19	Saddleback Valley	102	53.4	0	15.8
RIVERSIDE COUNTY					
22	Norco/Corona	--	--	--	--
23	Metropolitan Riv Co1	325	98.0	19(5.8)	31.1
23	Metropolitan Riv Co2	106	74.9	5(4.7)	28.3
24	Perris Valley	--	--	--	--
25	Lake Elsinore	--	--	--	--
29	Banning Airport	--	--	--	--
30	Coachella Valley1**	107	44.7	0	10.8
30	Coachella Valley2**	113	33.5	0	12.2
SAN BERNARDINO COUNTY					
32	NW San Bernardino Valley	--	--	--	--
33	SW San Bernardino Valley	113	71.2	2(1.8)	26.2
34	Central San Bern Valley1	114	74.8	4(3.5	24.8
34	Central San Bern Valley2	111	78.5	5(4.5)	26.2
35	East San Bernardino Valley	--	--	--	--
37	Central San Bern Mountains	--	--	--	--
38	East San Bern Mountains	57	34.6	0	10.9
	DISTRICT MAXIMUM		98.0	19	31.1

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AAM = Annual Arithmetic Mean
-- - Pollutant not monitored.
*Less than 12 full months of data. May not be representative.
**Salton Sea Air Basin.
f) – PM2.5 samples were collected every 3 days at all sites except for the following sites: Station Numbers 060, 072, 087, 3176, and 4144 where samples were taken every day, and Station Number 5818 where samples were taken every 6 days.
i) – Federal PM2.5 standard is AAM > μg/m³

Table 3-3 (Continued)

Source Receptor Area No.	Location of Air Monitoring Station	Particulates TSP g) No. Days of Data	Max. Conc. in µg/m³ 24-hour	Annual Average AAM Conc. µg/m³
LOS ANGELES COUNTY				
1	Central LA	61	131	75.4
2	Northwest Coast LA Co	60	81	46.5
3	Southwest Coast LA Co	61	118	71.4
4	South Coast LA Co	68	113	67.2
6	West San Fernando Valley	--	--	--
7	East San Fernando Valley	--	--	--
8	West San Fernando Valley	60	88	49.6
9	East San Gabriel Valley1	59	178	93.9
9	East San Gabriel Valley2	--	--	--
10	Pomona/Walnut Valley	--	--	--
11	South San Gabriel Valley	59	146	76.9
12	South Central LA Co	58	385	90.2
13	Santa Clarita Valley	--	--	--
ORANGE COUNTY				
16	North Orange Co	--	--	--
17	Central Orange Co	--	--	--
18	North Coastal Orange Co	--	--	--
19	Saddleback Valley	--	--	--
RIVERSIDE COUNTY				
22	Norco/Corona	--	--	--
23	Metropolitan Riv Co1	57	296	123.7
23	Metropolitan Riv Co2	61	182	86.8
24	Perris Valley	--	--	--
25	Lake Elsinore	--	--	--
29	Banning Airport	--	--	--
30	Coachella Valley1**	--	--	--
30	Coachella Valley2**	--	--	--
SAN BERNARDINO COUNTY				
32	NW San Bernardino Valley	58	171	69.7
33	SW San Bernardino Valley	--	--	--
34	Central San Bern Valley1	60	237	102.1
34	Central San Bern Valley2	55	224	101.3
35	East San Bernardino Valley	--	--	--
37	Central San Bern Mountains	--	--	--
38	East San Bern Mountains	--	--	--
	DISTRICT MAXIMUM		385	123.7

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**Salton Sea Air Basin.
g) – Total suspended particulates, lead, and sulfate were determined from samples collected every 6 days by the high volume sampler method, on glass fiber filter media.

Table 3-3 (Continued)

Lead and Sulfate					
		Lead [g)]		Sulfate [g)]	
Source Receptor Area No.	Location of Air Monitoring Station	Max Monthly Average Conc.[j)] µg/m³	Max Quarterly Average Conc.[j)] µg/m³	Max Conc. in µg/m³ 24-hour	No. (%) Samples Standard State > 25 µg/m³ 24-hour
LOS ANGELES COUNTY					
1	Central LA	0.06	0.05	15.9	0
2	Northwest Coast LA Co	--	--	15.6	0
3	Southwest Coast LA Co	0.04	0.04	20.6	0
4	South Coast LA Co	0.05	0.04	15.9	0
6	West San Fernando Valley	--	--	--	--
7	East San Fernando Valley	--	--	--	--
8	West San Fernando Valley	--	--	13.4	0
9	East San Gabriel Valley1	--	--	14.1	0
9	East San Gabriel Valley2	--	--	--	--
10	Pomona/Walnut Valley	--	--	--	--
11	South San Gabriel Valley	0.07	0.05	14.5	0
12	South Central LA Co	0.23	0.12	15.4	0
13	Santa Clarita Valley	--	--	--	--
ORANGE COUNTY					
16	North Orange Co	--	--	--	--
17	Central Orange Co	--	--	--	--
18	North Coastal Orange Co	--	--	--	--
19	Saddleback Valley	--	--	--	--
RIVERSIDE COUNTY					
22	Norco/Corona	--	--	--	--
23	Metropolitan Riv Co1	0.04	0.03	10.7	0
23	Metropolitan Riv Co2	0.03	0.03	9.2	0
24	Perris Valley	--	--	--	--
25	Lake Elsinore	--	--	--	--
29	Banning Airport	--	--	--	--
30	Coachella Valley1**	--	--	--	--
30	Coachella Valley2**	--	--	--	--
SAN BERNARDINO COUNTY					
32	NW San Bernardino Valley	0.05	0.04	10.7	0
33	SW San Bernardino Valley	--	--	--	--
34	Central San Bern Valley1	--	--	10.7	0
34	Central San Bern Valley2	0.05	0.04	11.5	0
35	East San Bernardino Valley	--	--	--	--
37	Central San Bern Mountains	--	--	--	--
38	East San Bern Mountains	--	--	--	--
	DISTRICT MAXIMUM	0.23	0.12	20.6	0

PPM – Parts Per Million parts of air, by volume
AAM = Annual Arithmetic Mean
-- - Pollutant not monitored.
*Less than 12 full months of data. May not be representative.
**Salton Sea Air Basin.
g) – Total suspended particulates, lead, and sulfate were determined from samples collected every 6 days by the high volume sampler method, on glass fiber filter media.
j) – Federal lead standard is quarterly average > 1.5 µg/m³, and state standard is monthly average ≥ 1.5 µg/m³. No location exceeded lead standards. Special monitoring immediately downwind of stationary sources of lead was carried out at four locations in 2000. The maximum monthly average concentration was 0.57 µg/m³, and the maximum quarterly average concentration was 0.49 µg/m³, both recorded in Area 1, Central Los Angeles

Ozone

Unlike primary criteria pollutants that are emitted directly from an emissions source, ozone is a secondary pollutant. It is formed in the atmosphere through a photochemical reaction of VOC, NOx, oxygen, and other hydrocarbon materials in the presence of sunlight. As a precursor to ozone, VOC contributes to regional air quality impacts.

Ozone is a deep lung irritant, causing the passages to become inflamed and swollen. Exposure to ozone produces alterations in respiration, the most characteristic of which is shallow, rapid breathing and a decrease in pulmonary performance. Ozone reduces the respiratory system's ability to fight infection and to remove foreign particles. People who suffer from respiratory diseases such as asthma, emphysema, and chronic bronchitis are more sensitive to ozone's effects. In severe cases, ozone is capable of causing death from pulmonary edema. Early studies suggested that long-term exposure to ozone results in adverse effects on morphology and function of the lung and acceleration of lung-tumor formation and aging. Ozone exposure also increases the sensitivity of the lung to bronchoconstrictive agents such as histamine, acetylcholine, and allergens.

Recent studies have shown that asthmatic children in southern California are particularly susceptible to the adverse effects of air pollution. In an ongoing long-term study of nearly 3,700 children in 12 communities across Southern California, asthmatics had more frequent bouts of bronchitis and chronic phlegm than non-asthmatics. Other studies have linked air pollution with an increase in asthmatics' acute symptoms and emergency room visits and a decrease in their lung function. Asthma is a serious public health concern across the country since reported cases have risen dramatically during the last decade. Asthma is the number one cause of school absences, the leading cause of children's visits to emergency rooms and the cause of more than 5,000 deaths a year. Low-income and uninsured residents are particularly at risk because they do not have access to preventive and ongoing medical care that can control asthma and instead receive treatment only during acute asthma attacks in emergency rooms.

The national ozone ambient air quality standard is exceeded far more frequently in the SCAQMD's jurisdiction than almost every other area in the United States[10]. In the past few years, ozone air quality has been the cleanest on record in terms of maximum concentration and number of days exceeding the standards and episode levels. Maximum one-hour average and eight-hour average ozone concentrations in 2001 (0.19 ppm and 0.144 ppm) were 158 percent and 180 percent of the federal one-hour and eight-hour standards, respectively. Ozone concentrations exceeded the one-hour state standard at all, but two, monitored locations in 2001. In 1997, the EPA promulgated a new national ambient air quality standard for ozone. The new ozone standard is based on an eight-hour average exposure (the current federal ozone air quality standard is based on a one-hour average period). The new eight-hour standard (0.08 ppm) represents a tightening of the existing one-hour ozone standard (0.12 ppm) and is intended to provide for greater health protection against the effects of prolonged exposure. Soon thereafter, a court decision ordered that the

[10] It should be noted that in 1999 and 2000 Houston, Texas exceeded the federal ozone standards on more occasions than the district and reported the highest ozone concentrations in the nation.

EPA could not enforce the new standard until adequate justification for the new standard was provided. EPA appealed the decision to the Supreme Court.

On February 27, 2001, the Supreme Court upheld EPA's authority and methods to establish clean air standards. Thus, the one-hour ozone standard was retained. The Supreme Court, however, ordered the EPA to revise its *SIP* for the new ozone standard. Under a consent decree that was reached in response to a lawsuit that was filed by nine environmental groups, EPA has agreed to finalize its designations for the eight-hour ozone standard by 2004, though EPA has yet to promulgate the air quality designations of the various regions for the new ozone standards. Also, based on current information from EPA, the *SIP* for the eight-hour ozone standard is not expected to be due until approximately 2007. Thus, current regulatory control strategies will continue to focus on attaining the one-hour standard with the recognition that these controls will have benefits toward attaining the eight-hour standard. EPA is considering several options in transitioning from the one-hour to the eight-hour standard, while ensuring that no backsliding will occur. In addition, based on the same consent decree plus EPA's draft implementation guidance, it is most likely that the Basin will have to meet the eight-hour ozone standard by 2021.

Meanwhile, CARB and local air districts continue to collect technical information in order to prepare for an eventual *SIP* to reduce unhealthful levels of ozone in areas violating the new federal standard. California has previously developed a *SIP* for the current ozone standard, which has been approved by the EPA for the district.

Carbon Monoxide

CO is a colorless, odorless gas formed by the incomplete combustion of fuels. CO competes with oxygen, often replacing it in the blood, thus reducing the blood's ability to transport oxygen to vital organs in the body. The ambient air quality standard for carbon monoxide is intended to protect persons whose medical condition already compromises their circulatory systems' ability to deliver oxygen. These medical conditions include certain heart ailments, chronic lung diseases, and anemia. Persons with these conditions have reduced exercise capacity even when exposed to relatively low levels of CO. Fetuses are at risk because their blood has an even greater affinity to bind with CO. Smokers are also at risk from ambient CO levels because smoking increases the background level of CO in their blood.

CO was monitored at 23 locations in the district in 2001. The national and state eight-hour CO standards were not exceeded at any location. The highest eight-hour average CO concentration of the year (7.71 ppm) was 81 percent of the federal standard.

Nitrogen Dioxide

NO2 is a brownish gas that is formed in the atmosphere through a rapid reaction of the colorless gas nitric oxide (NO) with atmospheric oxygen. NO and NO2 are collectively referred to as NOx. NO2 can cause health effects in sensitive population groups such as children and people with chronic lung diseases. It can cause respiratory irritation and constriction of the airways, making breathing more difficult. Asthmatics are especially sensitive to these effects. People with asthma and chronic bronchitis may also experience headaches, wheezing and chest tightness at high ambient levels of NO2. NO2 is suspected to reduce resistance to infection, especially in young children.

By 1991, exceedances of the federal standard were limited to one location in Los Angeles County. The Basin was the only area in the United States classified as nonattainment for the federal NO2 standard under the *1990 Clean Air Act Amendments*. No location in the area of SCAQMD's jurisdiction has exceeded the federal standard since 1992 and the Basin was designated attainment for the national standard in 1998. In 2001, the maximum annual arithmetic mean (0.0419 ppm) was 78 percent of the federal standard (the federal standard is annual arithmetic mean NO2 greater than 0.0534 ppm.). The more stringent state standard (0.25 ppm) was never exceeded by any of the monitored stations in year 2001, and the Basin was designated attainment for the state standard in 1996. Despite declining NOx emissions over the last decade, further NOx emissions reductions are necessary because NOx emissions are PM10 and ozone precursors.

Particulate Matter (PM10)

PM10 is defined as suspended particulate matter 10 microns or less in aerodynamic diameter and includes a complex mixture of man-made and natural substances including sulfates, nitrates, metals, elemental carbon, sea salt, soil, organics and other materials. PM10 may have adverse health impacts because these microscopic particles are able to penetrate deeply into the respiratory system. In some cases, the particulates themselves may cause actual damage to the alveoli of the lungs or they may contain adsorbed substances that are injurious. Children can experience a decline in lung function and an increase in respiratory symptoms from PM10 exposure. People with influenza, chronic respiratory disease and cardiovascular disease can be at risk of aggravated illness from exposure to fine particles. Increases in death rates have been statistically linked to corresponding increases in PM10 levels.

In 2001, PM10 was monitored at 18 locations in the district. There were two exceedances of the federal 24-hour standard (150 $\mu g/m^3$), while the state 24-hour standard (50 $\mu g/m^3$) was exceeded at all 18 monitored locations. The federal standard (annual arithmetic mean greater than 50 $\mu g/m^3$) was exceeded in five locations, and the state standard (annual geometric mean greater than 30 $\mu g/m^3$) was exceeded at 14 locations.

In July 1997, the EPA adopted new national ambient air quality standards for particulates. Though the annual PM10 standard was retained, the form of the 24-hour PM10 standard was revised. In addition, the EPA established annual and 24-hour standards for the finest fraction, particulate matter with an aerodynamic diameter of 2.5 microns or less (PM2.5), to complement the PM10 standards. Based on health studies conducted, PM2.5 is considered to be the most injurious to health, and also impacts visibility more adversely than any other pollutant. The annual and 24-hour PM2.5 standards were set at 65 and 15 micrograms per cubic meter, respectively. The EPA has yet to promulgate the air quality designations of the various regions for the new PM2.5 standards. The EPA anticipates finishing its periodic review of the national PM standards in 2004.

Based on current information from EPA, the SIP for PM2.5 will not be due until approximately 2007. Thus, current regulatory control strategies will continue to focus on attaining the one-hour standard with the acknowledgment that these controls will have

benefits toward attaining the eight-hour standard. EPA is considering several options for transitioning from the one-hour to the eight-hour standard, while ensuring that no backsliding will occur. Based on the recent consent decree EPA reached with environmental groups plus EPA's draft implementation guidance, it is most likely that the Basin will be required to meet the federal PM2.5 standards by 2014.

On June 20, 2002, CARB also passed new, stricter standards for PM. The newly adopted standards include:

- a PM10 annual-average standard of 20 micrograms per cubic meter ($\mu g/m^3$) (reduced from 30 $\mu g/m^3$);
- a new PM2.5 (particulates with an aerodynamic diameter less than 2.5 microns) annual-average standard of 12 $\mu g/m^3$;
- retention of the 24-hour PM10 standard of 50 $\mu g/m^3$; and
- retention of the sulfates 24-hour average standard of 25 $\mu g/m^3$.

In addition, CARB also adopted several recommendations to revise the monitoring methods for these standards. During the adoption proceedings, CARB staff presented the current status of the 24-hour standard recommendations with the decision to delay those recommendations in light of recent findings related to statistical issues in several key short-term exposure health effects studies (see "Deferment of 24-Hour Average of PM2.5 Standard" at http://www.arb.ca.gov/research/aaqs/std-rs/2_5defer.htm). CARB directed its staff to continue reviewing the 24-hour standards for PM2.5 and PM10 to follow the work by the EPA and others to reanalyze the short-term PM studies affected by the statistical analysis issues and to return to CARB with recommendations for revising the 24-hour PM2.5 and PM10 standards. CARB also directed its staff to work closely with EPA as it reviews the national PM standards and recommended that it promulgate an equally health protective national PM standard.

Sulfur Dioxide

SO2 is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels. Health effects include acute respiratory symptoms and difficulty in breathing for children. Though SO2 concentrations have been reduced to levels well below state and federal standards, further reductions in emissions of SO2 are needed to comply with standards for other pollutants (sulfate and PM10).

Lead

Lead concentrations once exceeded the state and national ambient air quality standards by a wide margin, but have not exceeded state or federal standards at any regular monitoring station since 1982. Though special monitoring sites immediately downwind of lead sources recorded very localized violations of the state standard in 1994, no violations were recorded at these stations since that time.

Sulfates

Sulfates are a group of chemical compounds containing the sulfate group, which is a sulfur atom with four oxygen atoms attached. Though not exceeded in 1993, 1996, 1997, and 1998, the state sulfate standard was exceeded at three locations in 1994 and one location in 1995, 1999, 2000 and 2001. There are no federal air quality standards for sulfate.

Visibility

Since deterioration of visibility is one of the most obvious manifestations of air pollution and plays a major role in the public's perception of air quality, the state of California has adopted a standard for visibility or visual range. Until 1989, the standard was based on visibility estimates made by human observers. The standard was changed to require measurement (extinction coefficient > 0.23 inverse kilometers) of visual range (less than 10 miles) using instruments that measure light scattering and absorption by suspended particles with relative humidity of less than 70 percent on an eight-hour average.

Volatile Organic Compounds

It should be noted that there are no state or national ambient air quality standards for VOCs because they are not classified as criteria pollutants. VOCs are regulated, however, because reduction in VOC emissions reduces the rate of photochemical reactions that contribute to the formation of ozone. They are also transformed into organic aerosols in the atmosphere, contributing to higher PM10 and lower visibility levels.

Although health-based standards have not been established for VOCs, health effects can occur from exposures to high concentrations of VOCs because of interference with oxygen uptake. In general, ambient VOC concentrations in the atmosphere are suspected to cause coughing, sneezing, headaches, weakness, laryngitis, and bronchitis, even at low concentrations. Some hydrocarbon components classified as VOC emissions are thought or known to be hazardous. Benzene, for example, one hydrocarbon component of VOC emissions, is known to be a human carcinogen.

Non-Criteria Pollutant Emissions

Although the SCAQMD's primary mandate is attaining the State and National Ambient Air Quality Standards for criteria pollutants within the district, SCAQMD also has a general responsibility pursuant to the *Health and Safety Code §41700* to control emissions of air contaminants and prevent endangerment to public health. As a result, over the last few years the SCAQMD has regulated pollutants other than criteria pollutants such as TACs, greenhouse gases and stratospheric ozone depleting compounds. The SCAQMD has developed a number of rules to control non-criteria pollutants from both new and existing sources. These rules originated through state directives, CAA requirements, or the SCAQMD rulemaking process.

In addition to promulgating non-criteria pollutant rules, the SCAQMD has been evaluating AQMP control measures as well as existing rules to determine whether or not they would affect, either positively or negatively, emissions of non-criteria pollutants. Toxic emissions create adverse localized air quality impacts.

The following subsections summarize the existing setting for the two major categories of non-criteria pollutants: compounds that contribute to ozone depletion and global warming, and TACs.

Ozone Depletion and Global Warming

The SCAQMD adopted a "Policy on Global Warming and Stratospheric Ozone Depletion" on April 6, 1990. The policy commits the SCAQMD to consider global impacts in rulemaking and in drafting revisions to the AQMP.

In March of 1992, the SCAQMD Governing Board reaffirmed this policy and adopted amendments to the policy to include the following directives:

- phase out the use and corresponding emissions of chlorofluorocarbons (CFCs), methyl chloroform (1,1,1-trichloroethane or TCA), carbon tetrachloride, and halons by December 1995;
- phase out the large quantity use and corresponding emissions of hydrochlorofluorocarbons (HCFCs) by the year 2000;
- develop recycling regulations for HCFCs;
- develop an emissions inventory and control strategy for methyl bromide; and
- support the adoption of a California greenhouse gas emission reduction goal.

In support of these polices, the SCAQMD Governing Board has adopted several rules to reduce ozone depleting compounds. Several other rules concurrently reduce global warming gases and criteria pollutants.

Toxic Air Contaminants

Historically, the SCAQMD has regulated criteria air pollutants using either a technology-based or an emissions limit approach. The technology-based approach defines specific control technologies that may be installed to reduce pollutant emissions. The emission limit approach establishes an emission limit, and allows industry to use any emission control equipment, as long as the emission requirements are met. The regulation of toxic air contaminants (TACs) requires a similar regulatory approach as explained in the following subsections.

Control of TACs Under the TAC Identification and Control Program

California's TAC identification and control program, adopted in 1983 as Assembly Bill (AB) 1807, is a two-step program in which substances are identified as TACs, and airborne toxic control measures (ATCMs) are adopted to control emissions from specific sources. CARB has adopted a regulation designating all 188 federal hazardous air pollutants (HAPs) as TACs.

ATCMs are developed by CARB and implemented by the SCAQMD and other air districts through the adoption of regulations of equal or greater stringency. Generally, the ATCMs reduce emissions to achieve exposure levels below a determined health threshold. If no such threshold levels are determined, emissions are reduced to the lowest level achievable through the best available control technology for toxics unless it is determined that an alternative level of emission reduction is adequate to protect public health.

Under California state law, a federal National Emission Standard for Hazardous Air Pollutants (NESHAP) automatically becomes a state ATCM, unless CARB has already

adopted an ATCM for the source category. Once a NESHAP becomes an ATCM, CARB and the air pollution control or air quality management district have certain responsibilities related to adoption or implementation and enforcement of the NESHAP/ATCM.

Control of TACs Under the Air Toxics "Hot Spots" Act

The Air Toxics Hot Spots Information and Assessment Act of 1987 (AB2588) establishes a state-wide program to inventory and assess the risks from facilities that emit TACs and to notify the public about significant health risks associated with the emissions. Facilities are phased into the AB2588 program based on their emissions of criteria pollutants or their occurrence on lists of toxic emitters compiled by the SCAQMD. Phase I consists of facilities that emit over 25 tons per year of any criteria pollutant and facilities present on the SCAQMD's toxics list. Phase I facilities entered the program by reporting their air TAC emissions for calendar year 1989. Phase II consists of facilities that emit between 10 and 25 tons per year of any criteria pollutant, and submitted air toxic inventory reports for calendar year 1990 emissions. Phase III consists of certain designated types of facilities which emit less than 10 tons per year of any criteria pollutant, and submitted inventory reports for calendar year 1991 emissions. Inventory reports are required to be updated every four years under the state law.

In October 1992, the SCAQMD Governing Board adopted public notification procedures for Phase I and II facilities. These procedures specify that AB2588 facilities must provide public notice when exceeding the following risk levels:

- Maximum Individual Cancer Risk: greater than 10 in one million (10×10^{-6})
- Total Hazard Index: greater than 1.0 for TACs except lead, or 0.5 for lead

Public notice is to be provided by letters mailed to all addresses and all parents of children attending school in the impacted area. In addition, facilities must hold a public meeting and provide copies of the facility risk assessment in all school libraries and a public library in the impacted area.

The SCAQMD continues to complete its review of the health risk assessments submitted to date and may require revision and resubmission as appropriate before final approval. Notification will be required from facilities with a significant risk under the AB2588 program based on their initial approved health risk assessments and will continue on an ongoing basis as additional and subsequent health risk assessments are reviewed and approved.

Control of TACs With Risk Reduction Audits and Plans

Senate Bill (SB) 1731, enacted in 1992 and codified at Health and Safety Code §44390 et seq., amended AB2588 to include a requirement for facilities with significant risks to prepare and implement a risk reduction plan which will reduce the risk below a defined significant risk level within specified time limits. SCAQMD Rule 1402 - Control of Toxic Air Contaminants From Existing Sources, was adopted on April 8, 1994, to implement the requirements of SB1731.

In addition to the TAC rules adopted by SCAQMD under authority of AB1807 and SB1731, the SCAQMD has adopted source-specific TAC rules, based on the specific level of TAC emitted and the needs of the area. These rules are similar to the state's ATCMs because they are source-specific and only address emissions and risk from specific compounds and operations.

Cancer Risks from Toxic Air Contaminants

New and modified sources of toxic air contaminants in the SCAQMD are subject to Rule 1401 - New Source Review of Toxic Air Contaminants and Rule 212 - Standards for Approving Permits. Rule 212 requires notification of the SCAQMD's intent to grant a permit to construct a significant project, defined as a new or modified permit unit located within 1,000 feet of a school (a state law requirement under AB3205), a new or modified permit unit posing an maximum individual cancer risk of one in one million (1×10^{-6}) or greater, or a new or modified facility with criteria pollutant emissions exceeding specified daily maximums. Distribution of notice is required to all addresses within a ¼-mile radius, or other area deemed appropriate by the SCAQMD. Rule 1401 currently controls emissions of carcinogenic and non-carcinogenic (health effects other than cancer) air contaminants from new, modified and relocated sources by specifying limits on cancer risk and hazard index (explained further below), respectively.

Health Effects

One of the primary health risks of concern due to exposure to TACs is the risk of contracting cancer. The carcinogenic potential of TACs is a particular public health concern because it is currently believed by many scientists that there is no "safe" level of exposure to carcinogens. Any exposure to a carcinogen poses some risk of causing cancer. It is currently estimated that about one in four deaths in the United States is attributable to cancer. About two percent of cancer deaths in the United States may be attributable to environmental pollution[11]. The proportion of cancer deaths attributable to air pollution has not been estimated using epidemiological methods.

Noncarcinogenic Health Risks from Toxic Air Contaminants

Unlike carcinogens, for most noncarcinogens it is believed that there is a threshold level of exposure to the compound below which it will not pose a health risk. The California Environmental Protection Agency (CalEPA) Office of Environmental Health Hazard Assessment develops Reference Exposure Levels (RELs) for TACs which are health-conservative estimates of the levels of exposure at or below which health effects are not expected. The noncancer health risk due to exposure to a TAC is assessed by comparing the estimated level of exposure to the REL. The comparison is expressed as the ratio of the estimated exposure level to the REL, called the hazard index (HI).

[11] Doll and Peto, 1981

CHAPTER 4

ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

Introduction
Potential Environmental Impacts and Mitigation Measures
Potential Environmental Impacts Found Not to be Significant
Consistency

INTRODUCTION

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

State CEQA Guidelines recognize that the degree of specificity required in a CEQA document depends on the type of project being proposed (*CEQA Guidelines §15146*). The detail of the environmental analysis for certain types of projects cannot be as great as for others. For example, the environmental document for projects, such as the adoption or amendment of a comprehensive zoning ordinance or a local general plan, should focus on the secondary effects that can be expected to follow from the adoption or amendment, but the analysis need not be as detailed as the analysis of the specific construction projects that might follow. As a result, this *Draft SEA* analyzes impacts on a regional level and impacts on the level of individual industries or individual facilities where feasible.

The categories of environmental impacts to be studied in a CEQA document are established by CEQA (*Public Resources Code, §21000 et seq.*), and the CEQA Guidelines, as promulgated by the State of California Secretary of Resources. Under the state CEQA Guidelines, there are approximately 17 environmental categories in which potential adverse impacts from a project are evaluated. Projects are evaluated against the environmental categories in an Environmental Checklist and those environmental categories that may be adversely affected by the project are further analyzed in the appropriate CEQA document.

POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Pursuant to CEQA, an NOP/IS and 2001 Final EA were prepared for the 2001 amendments to Rule 1162, and these documents are the basis for the preparation of this Draft SEA to the current proposed amendments to Rule 1162. Of the 17 potential environmental impact categories previously analyzed, only one (air quality) was concluded to be affected by the gel coat requirements proposed by the 2001 amendments. Further, the current proposed amendments to Rule 1162 are directly related to the analysis for the 2001 amendments because the currently proposed project constitutes a modification of the previously adopted project. Thus, air quality is again expected to be potentially significantly adversely affected by the proposed project.

Therefore, the environmental impact area of air quality is the focus of the environmental evaluation in this chapter. The environmental impact analysis for air quality incorporates a "worst-case" approach. This entails the premise that whenever the analysis requires that assumptions be made, those assumptions that result in the greatest adverse impacts are typically chosen. This method ensures that all potential effects of the proposed project are documented for the decision-makers and the public.

Accordingly, the following analyses use a conservative "worst-case" approach for analyzing the potentially significant adverse environmental impacts associated with the implementation of the proposed project.

The proposed amendments will rescind the nonatomizing spray application technique requirements for gel coats, since when nonatomizing gel coat application techniques were tested under the same conditions that the UEF were developed (i.e., low pressure and low flow), the products did not meet performance specifications required by to maintain product integrity. When tested at operating conditions, nonatomizing gel coat application techniques could not achieve the UEF provided by the AMCA. Therefore, the expected emission reductions are considered infeasible and foregone. Because the emission reduction anticipated from nonatomizing gel coat application techniques would not be achieved, 853 pounds of VOC per day would be foregone.

The November 2001 amendments to Rule 1162 included resin application and gel coat monomer reduction requirements in addition to the nonatomizing gel coat application techniques. The resin application requirements were estimated to generate approximately 1,434 tons per year of VOC emission reductions. The gel coat monomer reductions were estimated to generate approximately 356 tons per year of VOC emission reductions. Therefore, the total VOC emissions reductions from resin application and gel coat monomer reductions were 1,790 tons per year. Approximately 730 tons per year were removed from the Rule 1162 emissions reductions inventory and applied as VOC credit towards Rule 1132. Therefore, the proposed project does not hinder the implementation of the AQMP because the November 2001 amendments to Rule 1162 achieved reduction of approximately 1,020 tons per year of VOC emissions (1,790 tons of VOC emissions less VOC credit towards Rule 1132) even without the emission reductions from nonatomizing gel coat application techniques.

Significance Criteria

The project will be considered to have significant adverse air quality impacts if any one of the thresholds in Table 4-1 are equaled or exceeded.

Construction Air Quality Impacts

PROJECT-SPECIFIC IMPACT: Since rescinding the use of nonatomizating application techniques for open mold systems does not require physical changes or modifications involving construction activities, there will be no construction air quality impacts resulting from the proposed project. Upon adoption of the proposed amendments, operators of affected facilities will continue existing operations.

PROJECT-SPECIFIC MITIGATION: Not applicable, no construction activities.

Table 4-1
SCAQMD Air Quality Significance Thresholds

Mass Daily Thresholds		
Pollutant	**Construction**	**Operation**
NOx	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM10	150 lbs/day	150 lbs/day
SOx	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Lead	3 lbs/day	3 lbs/day
Toxic Air Contaminants (TACs) and Odor Thresholds		
TACs (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk ≥ 10 in 1 million Hazard Index ≥ 1.0 (project increment) Hazard Index ≥ 3.0 (facility-wide)	
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402	
Ambient Air Quality for Criteria Pollutants [a]		
NO2 1-hour average annual average	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 0.25 ppm (state) 0.053 ppm (federal)	
PM10 24-hour average annual geometric average annual arithmetic mean	10.4 $\mu g/m^3$ (recommended for construction) [b] 2.5 $\mu g/m^3$ (operation) 1.0 $\mu g/m^3$ 20 $\mu g/m^3$	
Sulfate 24-hour average	1 ug/m^3	
CO 1-hour average 8-hour average	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 20 ppm (state) 9.0 ppm (state/federal)	

[a] Ambient air quality thresholds for criteria pollutants based on SCAQMD Rule 1303, Table A-2 unless otherwise stated.
[b] Ambient air quality threshold based on SCAQMD Rule 403.

KEY: lbs/day = pounds per day ppm = parts per million ug/m^3 = microgram per cubic meter ≥ greater than or equal to

Operational Air Quality Impacts

PROJECT-SPECIFIC IMPACT: The overall objective of the proposed project is to rescind the nonatomizing gel coat application technique requirement. Since nonatomizing gel coat application techniques are unable to achieve VOC/ TAC emission reductions previously anticipated to occur by July 1, 2005, the requirement to use nonatomizing gel coat application technique is being rescended. Rule 1162 was expected achieve

approximately 853 pounds per day of VOC emission reductions after July 1, 2005 from the nonatomizing gel coat application technique requirement. Therefore, by removing the provision to use nonatomizing gel coat application techniques for gel coats an estimate 853 pounds per day of VOC emissions foregone is anticipated. The 853 pounds per day of would exceed the VOC significance threshold of 55 pounds per day. Therefore, the emissions foregone are significant for operational air quality. An analysis of this air quality impact is discussed below for completeness.

Nonatomizing Gel Coat Application Techniques

Non atomizing gel coat application techniques were estimated from the annual total gel coat usage, UEFs for nonatomized gel coat application techniques, and existing monomer requirements. Table 4-2 presents emission estimates for gel coats with nonatomizing applications.

Table 4-2
Previously Projected VOC Emissions Inventory with Nonatomizing Applications

Specific Type of Gel Coat, & Sub-Category	Allowed Monomer Percentage in Existing Rule after July 1, 2003 (%)	Unified Emission Factor[a] (in pounds of styrene per tons of gel coat)	Units Adjustment Factor (1 ton = 2000 pounds)	Estimated Annual Total Gel Coat Usage[b] (in tons per year)	Percentage of Estimated Annual Total Gel Coat Usage per Type & Sub-Category	Projected VOC Emissions From Gel Coats (in tons per year)
Clear, for marble resins	40	(259	÷ 2000)	x 2206	x 0.15 x 0.35	= 15.0
Clear, for other resins	44	(296	÷ 2000)	x 2206	x 0.15 x 0.65	= 31.8
Pigmented, White and Off White	30	(169	÷ 2000)	x 2206	x 0.85 x 0.85	= 134.7
Pigmented, Non-White	37	(232	÷ 2000)	x 2206	x 0.85 x 0.15	= 32.6
					TOTAL	**214**

a) Unified Emission Factors for Open Molding of Composites, July 23, 2001 (see Appendix C)
b) SCAQMD, Table 2-8, Final EA for PAR 1162, SCAQMD No. 010918BAR, Oct. 24, 2001.

Emission Reductions Foregone by PAR 1162

The emissions reductions expected from the November 2001 amendments Rule 1162 were estimated by subtracting the emissions with nonatomizing gel coat application techniques in Table 4-2 from the emissions without atomizing gel coat application techniques in Table 3-1, as shown in Table 4-3. These VOC emission reductions were updated with the most current UEF (July 23, 2001). The November 2001 amendment emissions reductions for Rule 1162 were estimated with April 7, 1999 UEF. Using the 2001 UEF, the expected emissions reductions from nonatomizing gel coat applications were expected to be 133 tons of VOC per year or 853 pounds of VOC per day. These expected emissions are considered foregone, since field tests demonstrated that nonatomizing gel coat application techniques that attain industry performance standards are unable to achieve the anticipated UEF estimated VOC emission reductions. The emission reductions foregone are over the 55 pounds per day

regional emissions threshold for operations. Therefore, air quality impacts are considered significant.

Table 4-3
Previously Expected VOC Emission Reductions

Emissions	Emissions with Atomizing Applications	Emissions with Nonatomizing Applications	Emissions Reduction Foregone
Emissions (ton per year)	347	214	133
Emission (pounds per day)	2,224	1,372	853

Emissions, pound/day = (Emissions, ton/year x 2,000 pounds per ton)/(312 days/year)

Toxic Air Contaminants

TACs associated with composite materials, such as gel coats, include styrene, MMA, methylene chloride, toluene, xylene, n-hexane, MEK, MIBK, and 1,1,1-trichloroethane.

Carcinogenic Risk

Methylene chloride is the only compound used at affected facilities, recognized as carcinogenic by either federal or state regulations. Methylene chloride, however, is not a component of gel coats, but was used at one time to etch or roughen the surface of gel coats so that resin could be applied. Since it is not a constituent of gel coats, methylene chloride emissions are not affected by gel coat application techniques. Therefore, PAR 1162 would not alter carcinogenic risk.

Non-Carcinogenic Chronic Risk

The SCAQMD assumes that all nonmonomer VOC TACs are emitted to the atmosphere; therefore, nonmonomer VOC TACs evaporate despite the application used. It is suspected that MMA may volatilize less when applied with nonatomizing applications. But emission factors have not been established by application for MMA; therefore, the difference in MMA emissions between atomizing and nonatomizing application techniques was not quantifiable at this time.

Since TAC emissions generate localized impacts, the analysis of non-carcinogenic risks is a facility-based analysis. To provide a "worst-case" analysis in the, the SCAQMD analyzed the risk from the emissions foregone from an affected composite facility with the highest reported emissions for the reporting year 1998-99 to determine whether or not the VOC/TAC emission reductions foregone in from implementing PAR 1162 would be significant for non-carcinogenic risk. Since no growth has been forecasted for the industry since 1998, this analysis is considered to be valid for the current proposed project. The usage of gel coats was calculated using the industry-wide percentage of emissions from gel coats and the AP-42 emission factor. Table 4-4 presents annual gel coat usage estimated from the highest reported VOC emissions.

Table 4-4
Estimated Highest Annual Usage of Gel Coats and Resins at a Rule 1162 Facility Based on Emission Data from Reporting Year 1998-99 & AP-42 Emission Factors

Reported VOC Emissions in 1998-99[a] (in tons per year)		Industry-wide Percentage of Emissions from Gel Coats[b]		AP-42 Emission Factor[b] (lb of VOC/lb of material)		Estimated Annual Gel Coat Usage[c] (in tons per year)
248	x	0.12	÷	0.10	=	298

a) Based on the highest VOC emissions reported to the AQMD from a single facility for 1998-1999
b) Table 8, Final Staff Report for PAR 1162, November 2001. Percentage is converted to a decimal number.
c) Estimated Annual Gel Coat Usage = (Reported VOC Emissions x Industry-wide Percentage of Emissions for Gel Coats)/AP-42 Emission Factor

The "worst-case" TAC throughput was estimated by assuming the maximum monomer content allowed by Rule 1162 (44 percent) for styrene. The "worst-case" styrene emissions are presented in Table 4-5. Emissions for both atomizing and non-atomizing techniques were estimated. The difference between the two techniques is the TAC emissions foregone.

Table 4-5
Estimated "Worst-Case" Toxic Facility Emissions Reduction Postponed

Description	Estimated Annual Gel Coat Usage[a] (in tons per year)	Unified Emission Factor[b] (in pounds of styrene per tons of gel coat)	Units Adjustment Factor (1 ton = 2000 pounds)	Estimated Styrene Emissions from Gel Coats[c] (in tons per year)	Estimated Styrene Emissions from Gel Coats[d] (in pounds per hour)
Atomizing	298	522	2000	78	62
Non Atomizing	298	296	2000	44	35
TAC Emission Foregone				34	27

a) Estimated Annual Gel Coat Usage from Table 4-4
b) Unified Emission Factors for Open Molding of Composites, July 23, 2001 (see Appendix C)
Styrene UEF = 552 pounds per ton of gel coat for atomized gel coat applications with 44% monomer content
Styrene UEF = 296 pounds per ton of gel coat for atomized gel coat applications with 44% monomer content
c) Emissions, ton/year = (Gel Coat Usage x UEF)/2,000 pound per ton)
d) Emissions, pound/hour = (Emissions, ton/year x 2,000 pounds per ton)/(312 days/year x 8 hours/day)

The chronic hazard index (HI) from usage of the toxics presented in Table 4-6 was estimated according to the Tier II methodology detailed in the *Risk Assessment Procedures for Rules 1401 and 212*, Version 6. The "worst-case" dispersion factor occurs for point sources operating 12 hours per day or less, with a stack height of below 24 feet, and a receptor at 25 meters downwind from the point source. The West Los Angeles meteorological correction factor produces the highest HI value. The Reference Exposure Level (REL) and the target organ were obtained from Attachment K of the *Risk Assessment Procedures for Rules 1401 and 212*, Version 6. The chronic REL is a concentration that is not likely to cause adverse effects in a human population, including sensitive subgroups, exposed to that concentration over an extended period of time. The ratio of the potential exposure to the substance and the level at which no adverse effects are expected is the HI. If the HI is calculated to be less than

1.0, then no adverse health effects are expected as a result of exposure. If the HI is greater than 1.0, then adverse health effects are possible.

Table 4-6 presents the chronic risk from the emissions foregone estimated for a Rule 1162 facility that reported the highest amount of VOC to the SCAQMD for 1998-99. Therefore, by removing nonatomizing gel coat application technique requirement, there are associated styrene emissions that could result in a significant impact. The hazard index is 1.9 for the nervous system, which is a significant adverse impact.

Table 4-6
"Worst-Case" Chronic Hazard Index

Compound	Emission Reduction[a] (in tons per year)	Dispersion Factor[b] X/Q (in [μg/m³]/[tons/year])	Meteorological Correction Factors[c] MET	Chronic Reference Exposure Level[d] REL (in μg/m³)	Multi Pathway Factor (MP)	Chronic Hazard Index (HI)
Styrene	34	51.18	1	900	1	1.9

SCAQMD, Attachment H, *Risk Assessment Procedures for Rules 1401 and 212*, Version 6.0, August 18, 2000
a) "Worst-case" Throughput estimate in Table 4-5
b) Dispersion Factor (X/Q) from Table-2A: point source, > 12 hr/day, ≥ 14 to 24 stack height, receptor distance 25 meters down wind
c) Meteorological Correction Factors (MET) from Table-2B: West L.A.
d) Reference Exposure Level (REL), Multi Pathway Factor (MP) and from Table-8A
e) Hazard Index (HI) = (Throughput x X/Q x MET x REL x MP)

Non-Carcinogenic Acute Risk

The styrene associated with gel coats has an acute REL. The acute REL is a concentration that is not likely to cause adverse effects in a human population, including sensitive subgroups, exposed on an intermittent basis to that concentration for one hour. TAC concentrations below the REL are not expected to create adverse health impacts to the surrounding community. The acute HI from usage of the toxics presented in Table 4-9 was estimated according to the Tier II methodology detailed in the *Risk Assessment Procedures for Rules 1401 and 212*, Version 6. The "worst-case" dispersion factor occurs for point sources with a stack height of below 24 feet, and a receptor at 25 meters downwind from the point source. The RELs and target organs were obtained from Attachment K of the *Risk Assessment Procedures for Rules 1401 and 212*, Version 6. If the HI is calculated to be less than 1.0, then no adverse health effects are expected as a result of exposure. If the HI is greater than 1.0, then adverse health effects are possible.

Table 4-7 presents the acute risk from the emissions foregone estimated for an affected Rule 1162 facility that reported the highest VOC emissions to the SCAQMD for 1998-99. Therefore, by removing nonatomizing gel coat application technique requirement, the associated styrene emissions could result in a significant impact. The hazard index is 2.6 for the eyes and respiratory system, which is a significant adverse impact.

Table 4-7
"Worst-Case" Acute Hazard Index

Compound	Emission Reduction[a] (in pounds per hour)	Dispersion Factor[b] X/Qhr (in [µg/m^3]/ [pound/hour])	Acute Reference Exposure Level[c] REL	Acute Hazard Index[d] HI
Styrene	27	2,000	21,000	2.6

SCAQMD, Attachment K, *Risk Assessment Procedures for Rules 1401 and 212*, Version 6.0, August 18, 2000
a) Worst Case Throughput estimate in Table 4-5
b) Dispersion Factor (X/Q) from Table-6: point source, > 12 hr/day, ≥ 14 to 24 stack height, receptor distance 25 meters down wind
d) Acute Reference Exposure Level (REL) from Table-8A
e) Hazard Index (HI) = (Throughput x X/Q)/(REL)

Conclusion

The proposed project would directly result in significant adverse air quality impacts due to the rescinding of the nonatomizing gel coat application technique requirements. VOC/TAC emission reductions foregone occur as a result of the failure of nonatomizing application techniques to demonstrate emission reductions. Under the proposed project, the VOC emissions from gel coats applied to open molding surfaces would remain at current levels. The emission reductions foregone would diminish an existing air quality rule or future compliance requirement (existing Rule 1162), but does not conflict with or obstruct implementation of the applicable air quality plan (2003 AQMP). The emission reductions foregone would not cause a violation of any air quality standard or directly contribute to an existing or projected air quality violation, since emissions would remain the same the use of nonatomizing gel coat application techniques cannot produce the anticipated emission reductions. Air quality impacts from emission reductions foregone exceed the operational VOC air quality significance threshold of 55 pounds per day. The chronic and acute hazard indices estimated for the VOC reductions foregone at a "worst-case" Rule 1162 facility were both estimated to be greater than 1.0. Since nonatomizing gel coat application techniques did not demonstrate a reduction, this risk would continue for the foreseeable future. Therefore, the VOC/TAC emission reductions foregone are significant.

Project-Specific Mitigation

No commercial non-VOC or nontoxic substitutes were found that could replace styrene or MMA. Additional control technologies were analyzed in the Final Staff Report for PAR 1162 dated November 2001. No viable mitigation was identified.

Remaining Air Quality Impacts

The air quality analysis concluded that significant adverse air quality impacts could be created by the proposed amendments. As a result, a Statement of Findings and a Statement of Overriding Considerations will be prepared for the Governing Board's consideration and approval prior to the public hearing for the proposed amendments.

Cumulative Air Quality Impacts

In general, the preceding analysis concluded that air quality impacts from construction activities would not be significant from implementation of the proposed project. The UEF estimated VOC/TOC emission reductions from nonatomizing gel coat application techniques

that attain industry performance standards were not demonstrated by field test and; therefore, are considered foregone. These emissions reductions foregone (853 pounds of VOC per day) exceed the SCAQMD's threshold of significance. These emissions foregone should be viewed in context with the VOC emissions reductions achieved by the November 2001 amendments, which include 1,020 tons per year (6,538 pounds per day) of VOC emission reductions from resin applications and gel coat monomer reductions on top of the 730 tons per year (1,700 pounds per day) of VOC emissions reductions credited to Rule 1132. In addition, Rule 1162 is part of an overall program set forth in the AQMP to reduce ozone through reducing NOx and VOC emissions. Existing rules and further compliance dates will result in a net reduction in VOC emissions in the district as predicted by the AQMP.

In practice, VOC/ TAC emissions from gel coat application will remain the same and no new emissions would be added to any community. Styrene is both a VOC and a TAC. VOC emission reductions are based on monomer content. Significant noncarcinogenic acute and chronic risks were estimated from the styrene emission reductions foregone from an affected Rule 1162 facility with high styrene emissions to provide the basis of a "worst-case" analysis. The chronic and acute HIs were estimated to be 1.9 and 2.6, respectively. Significant adverse cumulative impacts are expected from HIs greater than 3.0. Since no new VOCs are anticipated to be directly added to any community and the facility wide (cumulative) threshold is less than 3.0, cumulative impacts would not be significant.

POTENTIAL ENVIRONMENTAL IMPACTS FOUND NOT TO BE SIGNIFICANT

While all the environmental topics required to be analyzed under CEQA were reviewed to determine if the proposed amendments would create significant impacts, a screening analysis concluded that the following environmental areas would not be significantly adversely affected by PAR 1162: aesthetics, agriculture resources, biological resources, cultural resources, energy, geology/soils, hazards and hazardous materials, hydrology and water quality, land use and planning, mineral resources, noise, population and housing, public services, recreation, solid/hazardous waste and transportation/traffic. These topics were not analyzed in further detail in this environmental assessment, however, a brief discussion of each is provided below.

Aesthetics

PAR 1162 proposes to rescind the nonatomizing gel coat application technique requirement.. Operators are expected to continue existing operations, since nonatomizing gel coat application techniques would not be required. Because operators would continue existing operations, no substantial adverse effect on any scenic vistas, substantially degrade the existing visual character or quality of any site and its surroundings, or create new sources of substantial light or glare which would adversely affect day or nighttime views of an area is expected by PAR 1162. Therefore, PAR 1162 is not considered to be significant for aesthetics.

Agriculture Resources

PAR 1162 proposes to rescind the nonatomizing gel coat application technique requirement. Operators are expected to continue existing operations, since nonatomizing gel coat application techniques would not be required. Because operators would continue existing operations, new construction of buildings or other structures that would convert farmland to non-agricultural use or conflict with zoning for agricultural use or a Williamson Act contract

is not expect as a result of implementing PAR 1162. There are no provisions in the amendments that would affect land use plans, policies, or regulations. Land use and other planning considerations are determined by local governments and no land use or planning requirements are expected to be altered by the existing Rule 1162. Since no significant adverse agricultural resource effects were found in continuing existing operations; no adverse effects are expected from rescinding the nonatomizing gel coat application technique requirement in PAR 1162. Therefore, PAR 1162 is not considered to be significant for agricultural resources.

Biological Resources

PAR 1162 proposes to rescind the nonatomizing gel coat application technique requirement. Operators are expected to continue existing operations, since nonatomizing gel coat application techniques would not be required. Because operators would continue existing operations, PAR 1162 is not expected to adversely impact existing commercial or industrial facilities that are should be located in appropriately zoned commercial or industrial areas, which typically do not support a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.

Since existing operations would continue, there are no provisions in the existing rule that would affect land use plans, policies, or regulations. Land use and other planning considerations are determined by local governments and no land use or planning requirements will be altered by the proposed project. Retaining existing operations is not expected to adversely affect habitat conservation or natural community conservation plans, agricultural resources or operations, and would not create divisions in any existing communities that did not already exist. Since no increase in adverse biological resource effects were determined by in allowing existing operations to continue; no adverse effects are expected from rescinding the nonatomizing gel coat application technique requirement in PAR 1162. Therefore, PAR 1162 is not considered to be significant for biological resources.

Cultural Resources

PAR 1162 proposes to rescind the nonatomizing gel coat application technique requirement. Operators are expected to continue existing operations, since nonatomizing gel coat application techniques would not be required. Because operators would continue existing operations at existing facilities which have been previously disturbed, no cultural resources are expected to be affected by the proposed amendments. There are existing laws in place that are designed to protect and mitigate potential impacts to cultural resources. Existing gel coat operations are not expected to cause a substantial adverse change a historical or archaeological resource, directly or indirectly destroy a unique paleontological resource or site or unique geologic feature, or disturb any human remains, including those interred outside a formal cemeteries. Since no adverse cultural resource effects were found in allowing existing operations to continue; no adverse effects are expected from rescinding the nonatomizing gel coat application technique requirement in PAR 1162. Therefore, PAR 1162 is not considered to be significant for cultural resources.

Energy

PAR 1162 proposes to rescind the nonatomizing gel coat application technique requirement. Operators are expected to continue existing operations, since nonatomizing gel coat

application techniques would not be required. Because operators would continue existing operations at existing facilities which have been previously disturbed, no additional electricity or natural gas use was expected to be required by PAR 1162. Additionally, allowing existing operations to continue is not expected to substantially increase the number of businesses or amount of equipment in the district. An increase in energy consumption from non-renewable resources (e.g., diesel and gasoline) was not expected by continuing existing operations. Nor would continuing existing operations conflict with adopted energy conservation plans, result in the need for new or substantially altered power or natural gas utility systems, or be out of compliance with existing energy standards. Therefore, PAR 1162 is not considered to be significant for energy.

Geology and Soils

PAR 1162 proposes to rescind the nonatomizing gel coat application technique requirement. Operators are expected to continue existing operations, since nonatomizing gel coat application techniques would not be required. Allowing operators to continue existing operations is not expected to result in additional exposure of people to potential impacts involving seismicity, landslides, mudslides or erosion as no new development is anticipated. Existing operations are not expected to significantly disrupt or overcover soil, or change in topography or surface relief features, nor result in the erosion of beach sand, or a change in existing siltation rates. Therefore, PAR 1162 is not considered to be significant for geology and soils.

Hazards and Hazardous Materials

PAR 1162 proposes to rescind the nonatomizing gel coat application technique requirement. Operators are expected to continue existing operations, since nonatomizing gel coat application techniques would not be required. There are no provisions in the proposed amended rule that would increase the total amount of gel coat materials currently used by affected facilities. Since these facilities already use materials that contain toxics, such as styrene, methylene chloride, toluene, xylene, n-hexane, MEK, TCA and methanol, which all currently require solvent delivery and waste transport services, it is assumed that there will be no increase in potential truck trips in response to PAR 1162. In summary, since PAR 1162 would allow existing operations to continue at existing facilities, implementation of PAR 1162 is not expected to increase any existing hazard that the routine transport, use, or disposal of gel coat materials used may have or lead to a reasonably foreseeable accident involving the release of new formulations into the environment.

PAR 1162 would rescind the gel coat nonatomizing application techniques requirement for open molding surfaces. Facilities that switch from using atomized spray equipment to nonatomizing gel coat application techniques were expected to have a small increase (a few ounces) in the amount solvent(s) used to clean or flush the spray equipment. Rescinding the nonatomizing gel coat application technique requirement would eliminate these potential increases in cleaning solvent use. Therefore, rescinding the requirement for facilities to switch to using nonatomizing gel coat application techniques will not result in new adverse hazardous material impacts.

Since no change in existing operations would occur, PAR 1162 would not create a significant hazard to the public, possible nearby public airports or private airstrips or hazardous materials sites compiled pursuant to Government Code §65962.5.

The proposed amendments would not change practices at existing facilities; therefore, would not interfere with airport land use plans, adopted emergency response plans or emergency evacuation plans. There is no change in the composition of gel coats, so any wildlands intermixed with residences or areas with flammable materials would not be exposed to any increased fire hazards. Therefore, rescinding the requirement for facilities to switch to using nonatomizing gel coat application techniques will not result in new adverse hazard or hazardous material impacts. Therefore, PAR 1162 is not considered to be significant for hazards and hazardous materials.

Hydrology and Water Quality

PAR 1162 proposes to rescind the nonatomizing gel coat application technique requirement, which in effect would allow existing operations to continue. As stated in the Hazards and Hazardous Materials solvent and gel coat usage is assumed to remain the same, since facilities would not be required to switch to nonatomizing gel coat application techniques. Because the proposed amendments would allow continued use at existing levels, additional groundwater supplies would be not depleted, existing drainage patterns and systems would not be altered, and water quality would not be degraded. The proposed project would not place housing within a 100 year flood hazard area, expose people to new flooding, seiche, tsunami or mudflow conditions. Compliance with all requirements of the applicable Regional Water Quality Control Board is expected for facility operators. Therefore, PAR 1162 is not considered to be significant for hydrology and water quality.

Land Use and Planning

PAR 1162 proposes to rescind the nonatomizing gel coat application technique requirement. Operators are expected to continue existing operations, since nonatomizing gel coat application techniques would not be required. Continuing existing operations is not expected to affect land use plans, policies, or regulations. Land use and other planning considerations are determined by local governments and no land use or planning requirements are expected to be altered by the proposed project, no changes to operations or land use are required. Since the proposed project allows existing operations to continue at existing facilities, PAR 1162 is not expected to affect in any way habitat conservation or natural community conservation plans, agricultural resources or operations, and is not expected to create divisions in any existing communities. Since PAR 1162 allows existing operations to continue at existing facilities, no new development or alterations to existing land designations are expected to occur as a result of the implementation of the proposed rule. Based on this analysis no adverse effects are expected from PAR 1162. Therefore, PAR 1162 is not considered to be significant for land use and planning.

Mineral Resources

PAR 1162 proposes to rescind the nonatomizing gel coat application technique requirement. Operators are expected to continue existing operations, since nonatomizing gel coat application techniques would not be required. Existing operations are not expected to result in the loss of availability of a known mineral resource of value to the region and the residents of the state, or of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan. PAR 1162 allows continued use of existing levels of materials. Therefore, PAR 1162 is not considered to be significant for mineral resources.

Noise

PAR 1162 proposes to rescind the nonatomizing gel coat application technique requirement. Operators are expected to continue existing operations, since nonatomizing gel coat application techniques would not be required. PAR 1162 allows continued use of existing materials and techniques; therefore, no changes in noise levels at the manufacturing facility or in residential areas are anticipated. Gel coat product manufacturers are located in existing industrial or commercial areas where noise levels are already relatively high. It is assumed that operations in these areas are subject to and in compliance with existing community noise ordinances and applicable United States Occupational Safety and Health Administration (OSHA) or California Occupational Safety and Health Administration (Cal/OSHA) workplace noise reduction requirements. In addition to noise generated by existing operations, noise sources in each area may include nearby freeways, truck traffic to adjacent businesses, and operational noise from adjacent businesses.

Since PAR 1162 would allow existing operations to occur at existing facilities, PAR 1162 is not expected to result in increased noise impacts in residential areas. As with industrial or commercial areas, it is assumed that these areas are subject to local community noise standards. Therefore, PAR 1162 is not considered to be significant for noise.

Population and Housing

PAR 1162 proposes to rescind the nonatomizing gel coat application technique requirement. Operators are expected to continue existing operations, since nonatomizing gel coat application techniques would not be required. PAR 1162 allows continued use of existing material levels and techniques; therefore, is not expected to affect in any way population growth or the supply and/or availability of houses. Human population in the SCAQMD's jurisdiction is anticipated to grow regardless of implementing the existing rule or proposed project. Maintaining current operations is not expected to create any industry that would induce or inhibit population growth or distribution. Continuing existing is not directly or indirectly expected to induce the construction of single- or multiple-family housing units. Accordingly, no significant adverse impacts on human population or housing are expected. Therefore, PAR 1162 is not considered to be significant for population or housing.

Public Services

PAR 1162 proposes to rescind the nonatomizing gel coat application technique requirement. Operators are expected to continue existing operations, since nonatomizing gel coat application techniques would not be required. There is no expected change in the formulation or new materials or procedures introduced as a result of the rescinding nonatomizing application techniques that could pose a need for additional public services above what was currently expected from the fire department, police, schools, parks, government, etc. Allowing existing operations to continue is not expected to result in the need for new or physically altered government facilities in order to maintain acceptable service ratios, response times or other performance objectives. Therefore, PAR 1162 is not considered to be significant for public services.

Recreation

PAR 1162 proposes to rescind the nonatomizing gel coat application technique requirement. Operators are expected to continue existing operations, since nonatomizing gel coat

application techniques would not be required. As discussed under "Land Use" above, there are no amendments that affected land use plans, policies, or regulations. Land use and other planning considerations are determined by local governments; no land use or planning requirements were expected to be altered by PAR 1162. Continuing existing operations is not expected to increase the use of existing neighborhood and regional parks or other recreational facilities or include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment. Therefore, PAR 1162 is not considered to be significant for recreation.

Solid/Hazardous Waste

PAR 1162 proposes to rescind the nonatomizing gel coat application technique requirement. Operators are expected to continue existing operations, since nonatomizing gel coat application techniques would not be required. Rule 1162 required nonatomizing gel coat application techniques by July 1, 2005, which was expected to increase the transfer efficiency of the material being sprayed onto a given part while simultaneously decreasing the amount of overspray. A proposed a decrease in overspray was expected to reduce the amount of solid and hazardous waste from the disposable floor coverings, cured resin waste, and waste from personal protective equipment for workers. However the reduction was expected to be insignificant.

Switching from atomized spray equipment to nonatomizing gel coat application techniques was expected to cause a small increase in the amount of hazardous wastes depending on the application techniques used and the specific solvent(s) used to clean or flush the spray equipment. Rescinding the nonatomized gel coat application technology eliminates this increase in cleaning solvent (see Hazards and Hazardous Material above).

Therefore, there were no significant adverse solid and hazardous waste impacts associated with the existing Rule 1162. As a result, no net increase in the amount or character of solid or hazardous waste streams was expected to occur. Continuing existing operations is not expected to increase the volume of solid or hazardous wastes from polyester resin operations, require additional waste disposal capacity, or generate waste that does not meet applicable local, state, or federal regulations. Therefore, PAR 1162 is not considered to be significant for solid/hazardous waste.

Transportation/Traffic

PAR 1162 proposes to rescind the nonatomizing gel coat application technique requirement. Operators are expected to continue existing operations, since nonatomizing gel coat application techniques would not be required. Continuing existing operations is not expected to substantially increase the amount of businesses or equipment in the district, increase existing traffic load, worker commute trips, raw material or finished product transport trips, adversely affect parking, or conflict with adopted policies associated with alternative transportation. The level of service standard, traffic levels or existing emergency accesses is not expected to change because PAR 1162 would maintain the existing setting. Therefore, PAR 1162 is not considered to be significant for transportation/traffic.

CONSISTENCY

The Southern California Association of Governments (SCAG) and the SCAQMD have developed, with input from representatives of local government, the industry community,

public health agencies, the USEPA - Region IX and the California ARB, guidance on how to assess consistency within the existing general development planning process in the Basin. Pursuant to the development and adoption of its *Regional Comprehensive Plan Guide (RCPG)*, SCAG has developed an *Intergovernmental Review Procedures Handbook* (June 1, 1995). The SCAQMD also adopted criteria for assessing consistency with regional plans and the AQMP in its *CEQA Air Quality Handbook.* The following sections address analyzes consistency between PAR 1162 and relevant regional plans pursuant to the *SCAG Handbook* and *SCAQMD Handbook.*

Consistency with *Regional Comprehensive Plan and Guide (RCPG)* Policies

The *RCPG* provides the primary reference for SCAG's project review activity. The *RCPG* serves as a regional framework for decision making for the growth and change that is anticipated during the next 20 years and beyond. The Growth Management Chapter (GMC) of the *RCPG* contains population, housing, and jobs forecasts, which are adopted by SCAG's Regional Council and that reflect local plans and policies, shall be used by SCAG in all phases of implementation and review. It states that the overall goals for the region are to (1) re-invigorate the region's economy, (2) avoid social and economic inequities and the geographical isolation of communities, and (3) maintain the region's quality of life.

Consistency with Growth Management Chapter (GMC) to Improve the Regional Standard of Living

The Growth Management goals are to develop urban forms that enable individuals to spend less income on housing cost, that minimize public and private development costs, and that enable firms to be more competitive, strengthen the regional strategic goal to stimulate the regional economy. Proposed amended Rule 1162 in relation to the GMC would not interfere with the achievement of such goals, nor would it interfere with any powers exercised by local land use agencies. PAR 1162 will not interfere with efforts to minimize red tape and expedite the permitting process to maintain economic vitality and competitiveness. PAR 1162 would allow existing facilities to continue existing operations, thus, having no effect on public or private development cost or the regional economy.

Consistency with Growth Management Chapter (GMC) to Provide Social, Political and Cultural Equity

The Growth Management goals to develop urban forms that avoid economic and social polarization promotes the regional strategic goals of minimizing social and geographic disparities and of reaching equity among all segments of society. Consistent with the Growth Management goals, local jurisdictions, employers and service agencies should provide adequate training and retraining of workers, and prepare the labor force to meet the challenges of the regional economy. Growth Management goals also includes encouraging employment development in job-poor localities through support of labor force retraining programs and other economic development measures. Local jurisdictions and other service providers are responsible to develop sustainable communities and provide, equally to all members of society, accessible and effective services such as: public education, housing, health care, social services, recreational facilities, law enforcement, and fire protection. Implementing PAR 1162 is not expected to interfere with the goals of providing social, political and cultural equity. Further, PAR 1162 will allow gel coat operations to continue in the district, which will not require operation changes at any of the affected facilities.

Consistency with Growth Management Chapter (GMC) to Improve the Regional Quality of Life

The Growth Management goals also include attaining mobility and clean air goals and developing urban forms that enhance quality of life, accommodate a diversity of life styles, preserve open space and natural resources, are aesthetically pleasing, preserve the character of communities, and enhance the regional strategic goal of maintaining the regional quality of life. The *RCPG* encourages planned development in locations least likely to cause environmental impacts, as well as supports the protection of vital resources such as wetlands, groundwater recharge areas, woodlands, production lands, and land containing unique and endangered plants and animals. While encouraging the implementation of measures aimed at the preservation and protection of recorded and unrecorded cultural resources and archaeological sites, the plan discourages development in areas with steep slopes, high fire, flood and seismic hazards, unless complying with special design requirements. Finally, the plan encourages mitigation measures that reduce noise in certain locations, measures aimed at preservation of biological and ecological resources, measures that would reduce exposure to seismic hazards, minimize earthquake damage, and develop emergency response and recovery plans. PAR 1162 in relation to the GMC is not expected to interfere with attaining these goals. PAR 1162 would allow existing facilities to continue existing operations.

Consistency with *Regional Mobility Element (RMP)* and *Congestion Management Plan (CMP)*

PAR 1162 is consistent with the RMP and CMP since no significant adverse impact to transportation/circulation will result from the proposed project, which will allow existing operations to occur at existing facilities.

CHAPTER 5 - ALTERNATIVES

Introduction

Alternatives Rejected as Infeasible

Description of Alternatives

Comparison of Alternatives

Conclusion

INTRODUCTION

This *Draft SEA* provides a discussion of alternatives to the proposed project as required by state CEQA Guidelines. Alternatives include measures for attaining objectives of the proposed project and provide a means for evaluating the comparative merits of each alternative. A "No Project" alternative must also be evaluated. The range of alternatives must be sufficient to permit a reasoned choice, but need not include every conceivable project alternative. State *CEQA Guidelines §15126.6(c)* specifically notes that the range of alternatives required in a CEQA document is governed by a 'rule of reason' and only necessitates that the CEQA document set forth those alternatives necessary to permit a reasoned choice. The key issue is whether the selection and discussion of alternatives fosters informed decision making and meaningful public participation. A CEQA document need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative.

SCAQMD Rule 110 (the rule which implements the SCAQMD's certified regulatory program) does not impose any greater requirements for a discussion of project alternatives in an environmental assessment than is required for an EIR under CEQA.

SCAQMD's policy document Environmental Justice Program Enhancements for FY 2002-03, Enhancement II-1 recommends that all SCAQMD CEQA assessments include a feasible project alternative with the lowest air toxics emissions. In other words, for any major equipment or process type under the scope of the proposed project that creates a significant environmental impact, at least one alternative, where feasible, shall be considered from a "least harmful" perspective with regard to hazardous air emissions.

The Governing Board may choose to adopt any portion or all of any alternative presented below. The Governing Board is able to adopt any portion or all of any of the following alternatives because the impacts of each alternative are fully disclosed to the public and the public has the opportunity to comment on the alternatives and impacts generated by each alternative.

ALTERNATIVES REJECTED AS INFEASIBLE

A CEQA document should identify any alternatives that were considered by the lead agency, but were rejected as infeasible during the scoping process and explain the reasons underlying the lead agency's determination (*CEQA Guidelines §15126.6(c)*. These alternatives and the rationale for rejecting them as infeasible are discussed in the following bullet points.

- A possible lowest toxic alternative under consideration is an alternative requiring replacing styrene and MMA monomers with non-VOC and non-toxic polymer could offset or exceed the emissions reductions foregone by PAR 1162. Vinyl toluene is a possible replacement for styrene and MMA monomers; however, testing has not been completed. Thus, the lowest toxics alternative is dismissed as infeasible because significant commercial use of vinyl toluene is not expected by July 1, 2005.
- An alternative requiring the use of vapor suppressants to reduce VOC and toxic emissions. A vapor suppressants alternative was rejected as infeasible because vapor suppressants are typically waxes, which form a layer on the surface of the polymer and

minimize the outward diffusion of monomers into the atmosphere. Vapor suppression reduction which is used for resins in the bath and shower industry is not used for gel coats because it interferes with the surface desired by consumers.

- An alternative requiring fillers to be used with gel coats in lieu of requiring the applicant to use nonatomizing application techniques was also considered. Fillers are finely divided materials, which are added to resins to enhance the mechanical properties, extend the volume and lower the cost of plastic products. This alternative was rejected as infeasible because fillers are used with polyester resins not with gel coats because they interfere with the surface desired by consumers.

DESCRIPTION OF ALTERNATIVES

The following proposed alternatives were developed by modifying specific components of the proposed amendments. The rationale for selecting and modifying specific components of the proposed amendments to generate feasible alternatives for the analysis is based on CEQA's requirement to present "realistic" alternatives; that is, alternatives that can actually be implemented.

The following two alternatives were developed by identifying and modifying major components of PAR 1162. Specifically, the primary component of the proposed alternatives that has been modified is the final compliance date for implementing nonatomizing application techniques. The alternatives are described below and summarized in Table 5-1: Alternative A (No Project) and Alternative B (Two Year Delay in Compliance Dates). The following sections provide a brief description of each alternative.

Table 5-1
Project Alternatives

Component	PAR 1162 (Project)	Alternative A (No Project)	Alternative B (Two Year Delay in Compliance Date)
Nonatomized gel coat application techniques.	Rescind required.	No change. Requirement became effective July 1, 2005.	Postpone requirement until July 1, 2007.

Alternative A - No Project Alternative

Alternative A, the No Project Alternative, means no action would be taken and Rule 1162 would not be amended. Therefore, the existing SCAQMD Rule 1162 requirements for implementing nonatomizing application techniques would become effective July 1, 2005.

Alternative B - Two Year Delay in Compliance Dates

Alternative B would require the replacement of atomizing application techniques by nonatomizing application techniques by July 1, 2007. This alternative would allow the industry an additional two years to develop gel coat application techniques that could meet or exceed the emission reductions that were previously expected from nonatomizing gel coat application techniques.

COMPARISON OF ALTERNATIVES

The Environmental Checklist in the NOP for the 2003 FEA identified only air quality as an environmental area that could be significantly adversely affected by the proposed project.

Further evaluation of potential air quality impacts in Chapter 4 of this Draft SEA confirmed that significant adverse project-specific air quality impacts would occur as a result of implementing PAR 1162. Because of the narrow focus of the proposed project, no feasible mitigation measures were identified. Therefore, area of concern is air quality, and these impacts must be weighed against the public health benefits.

The following sections describe potential adverse air quality impacts that may be generated by each project alternative. The air quality discussion contains a brief description of the air quality impacts for each project alternative compared to impacts resulting from implementing the proposed amendments. A comparison of the air quality impacts for each of the environmental topics is summarized in Table 5-2.

Table 5-2
Comparison of Adverse Air Quality Impacts of the Alternatives

ENVIRONMENTAL TOPIC	PAR 1162	ALTERNATIVE A (No Project)	Alternative B (Two Year Delay in Compliance Date)
Criteria Pollutant (VOC)	Significant 853 pounds per day of VOC emission reductions foregone as of 07/01/05	Significant 853 pounds per day of VOC emission reductions foregone as of 07/01/05	Significant 853 pounds per day of VOC emission reductions (until January 1, 2007) Greater than PAR 1162
Toxic Air Contaminant (Styrene)	Significant Noncarcinogenic acute & chronic health effects from foregone styrene emissions	Significant Noncarcinogenic acute & chronic health effects from foregone styrene emissions	Significant Noncarcinogenic acute & chronic health effects from foregone styrene emissions (until January 1, 2007)

Alternative A - No Project Alternative

Theoretically, the effects of the No Project Alternative would be equivalent to the proposed project since the nonatomizing gel coat application techniques since the current emission limits are infeasible. Therefore, facilities would be required to implement techniques that would not generate any expected emission reductions. Since many of these techniques would require new equipment, facilities would be required to purchase and use equipment that would not generate benefits. .

Alternative B - Two Year Delay in Compliance Date

Alternative B would delay the date for complying with the required nonatomizing gel coat application technique requirement for two years. The expectation is that, during this delay, a nonatomizing gel coat application technique or alternative control would be found that could achieve or surpass the 853 pounds of VOC emission reductions previously expected. This alternative would result in a delay of 853 pounds of VOC emission reductions per day until July 1, 2007. Since risk estimates are based on annual (chronic) and hour (acute) effects the

same noncarcinogenic risk estimated for the proposed project would be the same as the proposed project for two years under Alternative B. Estimated emissions and noncarcinogenic chronic risk from the use of atomizing or nonatomizing application techniques can be found in Chapter 4 of this document.

CONCLUSION

The *CEQA Guidelines §15126.6(e)(2)* requires the environmentally superior alternative to be identified. Since the nonatomizing gel coat application technique emissions limit VOC/TAC was found to be infeasible, the project and all alternatives would generate the same emission reductions foregone until at least July 1, 2007. Alternative A is not considered appropriate, since it would require facilities to purchase, install and operate technologies without any environmental benefits. If a viable alternative is found before July 1, 2007, Alternative B would be the environmentally superior alternative. If no viable alternative is found, then the proposed project and all the alternatives would be equivalent. Since no feasible alternatives have been identified at this time, it is speculative to suggest that one would be identified, tested, implemented and used before July 1, 2007. Therefore, the proposed project is considered the best alternative, since it as the same emissions as both alternatives, does not burden gel coat operators with installing techniques without environmental benefit, and is not speculative.

However, while the proposed project provides the best alternative, the Governing Board may choose to adopt any of the alternatives in whole or in part in place of the proposed project, based on other considerations in addition to environmental concerns such as compliance costs, effects on future employment (jobs lost, for example), etc.

CHAPTER 6

OTHER CEQA TOPICS

Significant Irreversible Environmental Changes
Potential Growth-Inducing Impacts

SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES

CEQA Guidelines §15126(c) requires an environmental analysis to consider "any significant irreversible environmental changes which would be involved if the proposed action should be implemented." The 2003 Final EA and associated Initial Study identified air quality as a potential impact area.

The environmental analysis for PAR 1162 has evaluated the use of atomizing gel coat application techniques and their replacement with nonatomizing gel coat application techniques. Since the nonatomizing gel coat applications did not demonstrate emission reduction (i.e., atomizing and nonatomizing gel coat applications generate the same VOC/TAC emissions), VOC/TAC emission would remain the same whether or not nonatomizing gel coat applications were used. Therefore, no significant irreversible environmental changes would occur. PAR 1162 would rescind the nonatomizing gel coat application technique requirement; no changes to gel coat materials or alteration of process are associated with the proposed rule. No compounds considered carcinogenic by state or federal agencies were identified with gel coatings in the *Final Staff Report for PAR 1162,* November 2001. As a result, no significant carcinogenic human health impacts are anticipated. Noncarcinogenic chronic and acute risks associated with the loss of emission reductions were found to be significant. However, in practice no change in risk will occur since existing operations at existing facilities would remain the same; therefore, no actual change in emission will occur. Since atomizing and nonatomizing gel coat application techniques generate the same environmental impacts; no actual environmental changes would occur by the implantation of PAR 1162; therefore, these environmental changes are not irreversible. As can be seen by the information presented in this *Draft SEA,* the proposed project would not result in irreversible environmental changes or irretrievable commitment of resources.

POTENTIAL GROWTH-INDUCING IMPACTS

CEQA Guidelines §15126(d) requires an environmental analysis to consider the "growth-inducing impact of the proposed action." The proposed amendments are not expected to foster economic or population growth or the construction of additional housing and primarily affect existing polyester resin facilities. The November 2001 Final EA and associated IS concluded that Rule 1162 would not affect in any way population growth in the district. No letters were received refuting this conclusion. Since PAR 1162 would in effect allow existing operations at existing facilities to continue; implementing PAR 1162 would not have any direct or indirect growth-inducing impacts on businesses in the SCAQMD's jurisdiction.

APPENDIX A

LIST OF ABBREVIATIONS AND ACRONYMS

Abbreviation/Acronym	Description
AAM	Annual Arithmetic Mean
AAQS	Ambient Air Quality Standard
AB	Assembly Bill
ACMA	American Composite Manufacturers Association
AGM	Annual Geometric Mean
AQMD	South Coast Air Quality Management District
AQMP	Air Quality Management Plan
ATCM	Airborne Toxic Control Measures
Avg	Average
Basin	South Coast Air Basin
Cal/OSHA	California Occupational Safety and Heath Administration
CalEPA	California Environmental Protection Agency
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
CFA	Composites Fabricators Association
CFCs	Chlorofluorocarbons
CMP	*Congestion Management Plan*
CTS	Coatings and Solvents, Group 1 Control Measure
DBE	Dibasic Ester
DAA	Diacetone Alcohol
EA	Environmental Assessment
EPA	United States Environmental Protection Agency
ft	Foot
GMC	*Growth Management Chapter*
HAP	Hazardous Air Pollutant
HCFC	Hydrochlorofluorocarbons
HI	Hazard Index
hr	Hour
IS	Initial Study
lb	Pound
m	Meter
MDAB	Mojave Desert Air Basin
MEK	Methyl Ethyl Ketone
MET	Meteorological Correction Factors
mg/m^3	Milligram per Cubic Meter
MIBK	Methyl Isobutyl Ketone
MICR	Maximum Individual Cancer Risk
MMA	Methyl Methacrylate
MP	Multi Pathway
NAAQS	National Ambient Air Quality Standard
NESHAP	National Emission Standard for Hazardous Air Pollutants

LIST OF ABBREVIATIONS AND ACRONYMS (CONTINUED)

Abbreviation/Acronym	Description
NO	Nitric Oxide
NO2	Nitrogen Dioxide
NOC	Notice of Completion
NOE	Notice of Exemption
NOP	Notice of Preparation
NOx	Oxides of Nitrogen
NUT	n-Methyl Pyrolidone
OEHHA	Office of Environmental Health Hazard Assessment
OSHA	United States Occupational Safety and Heath Administration
PAR	Proposed Amended Rule
PM	Particulate Matter
PM2.5	Particulate of Less Than 2.5 Microns in Aerodynamic Diameter
PM10	Particulate of Less Than 10 Microns in Aerodynamic Diameter
PPM	Parts per Million
RCPG	Regional Comprehensive Plan Guide
REL	Reference Exposure Level
RMP	*Regional Mobility Element*
SB	Senate Bill
SCAG	Southern California Association of Governments
SEA	Supplemental Environmental Assessment
SIP	State Implementation Plan
SO2	Sulfur Dioxide
SOx	Oxides of Sulfur
SSAB	Salton Sea Air Basin
TAC	Toxic Air Contaminant
TBACT	Toxic Best Available Control Technology
TCA	Trichloroethane
TSP	Total Suspended Particulate
UEF	Unified Emission Factors
VOC	Volatile Organic Compound
X/Q	Dispersion Factor
$\mu g/m^3$	Micrograms per Cubic Meter

APPENDIX B

PROPOSED AMENDED RULE 1162

PROPOSED AMENDED RULE 1162

Version "PAR 1162 June 3, 2005" of the proposed amended rule was circulated with hard copies of this Draft Subsequent Environmental Assessment. An electronic version of "PAR 1162 June 3, 2005)" can be downloaded from the SCAQMD website at: http://www.aqmd.gov/ceqa/documents/2005/aqmd/draftEA/PAR1162.pdf

Hard copies of this Draft Subsequent Environmental Assessment, which include the version "PAR 1162 (June 3, 2005)" of the proposed amended rule, can be obtained through the SCAQMD Public Information Center at the Diamond Bar headquarters or by calling (909) 396-2039.

APPENDIX C

UNIFIED EMISSION FACTORS FOR OPEN MOLDING OF COMPOSITES

Unified Emission Factors for Open Molding of Composites[15]

July 23, 2001

Emission Rate in Pounds of Styrene Emitted per Ton of Resin or Gelcoat Processed

Styrene content in resin/gelcoat, % (1)	<33 (2)	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	>50 (2)
Manual	0.126 x %styrene x 2000	83	89	94	100	106	112	117	123	129	134	140	146	152	157	163	169	174	180	((0.286 x %styrene) - 0.0529) x 2000
Manual w/ Vapor Suppressed Resin VSR (3)	**Manual emission factor** [listed above] x (1 - (0.50 x specific VSR reduction factor for each resin/suppressant formulation))																			
Mechanical Atomized	0.169 x %styrene x 2000	111	126	140	154	168	183	197	211	225	240	254	268	283	297	311	325	340	354	((0.714 x %styrene) - 0.18) x 2000
Mechanical Atomized with VSR (3)	**Mechanical Atomized emission factor** [listed above] x (1 - (0.45 x specific VSR reduction factor for each resin/suppressant formulation))																			
Mechanical Atomized Controlled Spray (4)	0.130 x %styrene x 2000	86	97	108	119	130	141	152	163	174	185	196	207	218	229	240	251	262	273	0.77 x ((0.714 x %styrene) - 0.18) x 2000
Mechanical Controlled Spray with VSR	Mechanical Atomized Controlled Spray emission factor [listed above] x (1 - (0.45 x specific VSR reduction factor for each resin/suppressant formulation))																			
Mechanical Non-Atomized	0.107 x %styrene x 2000	71	74	77	80	83	86	89	93	96	99	102	105	108	111	115	118	121	124	((0.157 x %styrene) - 0.0165) x 2000
Mechanical Non-Atomized with VSR (3)	**Mechanical Non-Atomized emission factor** [listed above] x (1 - (0.45 x specific VSR reduction factor for each resin/suppressant formulation))																			
Filament application	0.184 x %styrene x 2000	122	127	133	138	144	149	155	160	166	171	177	182	188	193	199	204	210	215	((0.2746 x %styrene) - 0.0298) x 2000
Filament application with VSR (3)	0.120 x %styrene x 2000	79	83	86	90	93	97	100	104	108	111	115	118	122	125	129	133	136	140	0.65 x ((0.2746 x %styrene) - 0.0298) x 2000
Gelcoat Application	0.445 x %styrene x 2000	294	315	336	356	377	398	418	439	460	481	501	522	543	564	584	605	626	646	((1.03646 x %styrene) - 0.195) x 2000
Gelcoat Controlled Spray Application (4)	0.325 x %styrene x 2000	215	230	245	260	275	290	305	321	336	351	366	381	396	411	427	442	457	472	0.73 x ((1.03646 x %styrene) - 0.195) x 2000
Gelcoat Non-Atomized Application (8)	SEE Note 9 below	196	205	214	223	232	241	250	259	268	278	287	296	305	314	323	332	341	350	((0.4506 x %styrene) - 0.0505) x 2000
Covered-Cure after Roll-Out	**Non-VSR process emission factor** [listed above] x (0.80 for Manual <or> 0.85 for Mechanical)																			
Covered-Cure without Roll-Out	**Non-VSR process emission factor** [listed above] x (0.50 for Manual <or> 0.55 for Mechanical)																			

MMA content in gelcoat, % (6)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	³20
Gel coat application (7)	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	0.75 x %MMA x 2000

1 Including styrene monomer content as supplied, plus any extra styrene monomer added by the molder, but before addition of other additives such as powders, fillers, glass,...etc.

2 Formulas for materials with styrene content < 33% are based on the emission rate at 33% (constant emission factor expressed as percent of available styrene), and for styrene content > 50% on the emission rate based on the extrapolated factor equations; these are not based on test data but are believed to be conservative estimates. The value for "% styrene" in the formulas should be input as a fraction. For example, use the input value 0.30 for a resin with 30% styrene content by wt.

3 The VSR reduction factor is determined by testing each resin/suppressant formulation according to the procedures detailed in the ***CFA Vapor Suppressant Effectiveness Test.***

4 SEE the ***CFA Controlled Spray Handbook*** for a detailed description of the controlled spray procedures.

5 The effect of vapor suppressants on emissions from filament winding operations is based on the ***Dow Filament Winding Emissions Study.***

6 Including MMA monomer content as supplied, plus any extra MMA monomer added by the molder, but before addition of other additives such as powders, fillers, glass,...etc.

7 Based on gelcoat data from ***NMMA Emission Study.***

8 SEE the July 17, 2001 EECS report ***Emission Factors for Non-Atomized Application of Gel Coats used in the Open Molding of Composites*** for a detailed description of the non-atomized gelcoat testing.

9 Use the equation **((0.4506 x %styrene) - 0.0505) x 2000** for gelcoats with styrene contents between 19% and 32% by wt.; use the equation **0.185 x %styrene x 2000** for gelcoats with less than 19% styrene content by wt.

[15] Engineering Environmental Consulting Services, 2001

SACRAMENTO METROPOLITAN
AIR QUALITY MANAGEMENT DISTRICT

NEGATIVE DECLARATION
AND
INITIAL STUDY

2003 TRIENNIAL REPORT

PREPARED IN COMPLIANCE WITH
THE CALIFORNIA ENVIRONMENTAL QUALITY ACT

JANUARY 2005

SACRAMENTO METROPOLITAN
AIR QUALITY
MANAGEMENT DISTRICT

Larry Greene
AIR POLLUTION CONTROL OFFICER

PROPOSED NEGATIVE DECLARATION

2003 TRIENNIAL REPORT

Pursuant to Division 6, Title 14, Chapter 3, Article 6, Sections 15070 through 15073 of the California Administrative Code, the Environmental Coordinator of the Sacramento Metropolitan Air Quality Management District, State of California, does prepare, make, declare, publish, and cause to be filed with the County Clerk of Sacramento County, State of California, this Negative Declaration of environmental impact for the project described as follows:

2003 Triennial Report. The 2003 Triennial Report includes the selection of air pollution control measures for study or adoption over the next three years. The rules would limit emissions from stationary sources including water heaters, boilers, steam generators, space heaters, internal combustion engines, natural gas fired water heaters, fugitive emissions from oil and gas production and processing facilities and organic liquid loading. The Report also proposes programs to provide incentives for mobile heavy duty vehicles/engines, CEQA mitigation for construction and land use development and a Spare The Air program to reduce vehicle trips. The rules would reduce emissions from degreasing and solvent cleaning operations, adhesives and sealants, solvents and unspecified coatings. In addition, control measures to limit emissions from automotive refinishing, concentrated animal feeding operations, food product manufacturing and processing, polyester resins, accelerated vehicle retirement, free gas caps and construction equipment will be studied. The negative declaration focuses on the potential secondary adverse environmental impacts of the measures that may be adopted. The initial study evaluated less than significant impacts on air quality, hazards/hazardous materials, water quality, noise and solid waste management.

The Sacramento Metropolitan Air Quality Management District has reviewed the proposed project and has determined that the project, as identified in the Initial Study, will not have a significant effect on the environment. Therefore, the preparation of an environmental impact report pursuant to the California Environmental Quality Act (Division 13 of the Public Resources Code of the State of California) is not required.

This Negative Declaration is being circulated for public review beginning February 2, 2005. Written comments on the Negative Declaration will be accepted until 5:00 p.m., March 4, 2005. Written public comments will be considered by the District Board of Directors prior to adoption of this negative declaration. Upon adoption of this Negative Declaration, the Sacramento Air Quality Management District intends to adopt the 2003 Triennial Report.

The following public workshop will be held on the project:

Date	Time	Place
2/23/2005	1:00 p.m.	SMAQMD Conference Room A 777 12th Street, 3rd Floor, Sacramento, CA

A copy of this document is available at the Sacramento Metropolitan Air Quality Management District, 777 12th Street, 3rd Floor, Sacramento, CA, 95814-1908, (916) 874-4800, and online at www.airquality.org.

Sacramento Metropolitan Air Management District

By: _____
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Environmental Coordinator

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SACRAMENTO METROPOLITAN
AIR QUALITY MANAGEMENT DISTRICT

2003 TRIENNIAL REPORT

INITIAL STUDY

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Greg Tholen

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

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LARRY GREENE

Initial Study for SMAQMD 2003 Triennial Report – January 2005

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I. INTRODUCTION

This initial study evaluates the potential environmental impacts of the Sacramento Air Quality Management District's proposed 2003 Triennial Report, prepared pursuant to the California Clean Air Act.

A) California Clean Air Act Plans

The California Clean Air Act (CCAA) of 1988 requires each air district to adopt and implement plans to achieve and maintain the state ambient air quality standards by the earliest practicable date. Plans implementing the CCAA must achieve a 5% average annual emission reduction. However, if a 5% reduction is not achievable, the plan must include an expeditious schedule for adopting every feasible emission control measure. (Health & Safety Code, sec. 40914.) The CCAA also requires that, by the end of 1994 and once every three years thereafter, the air districts are to assess their progress toward attaining the state ambient air quality standards. These triennial assessments report the extent of air quality improvement over previous three years. The report must include the "expected and revised emission reductions for each measure scheduled for adoption in the preceding three–year period." (Health & Safety Code, sec. 40924.) During the plan review, each district must "review and revise the attainment plan to correct for deficiencies in meeting the interim measures of progress incorporated into the plan." (Health & Safety Code, sec. 40925.) "The main purpose of the assessments and plans is to identify rulemaking commitments for the next triennial cycle and document past progress in adopting control measures, reducing emissions, and improving air quality." (CARB, 2003 Triennial Assessment and Plan Revisions, p. 2.)

The Sacramento Metropolitan Air Quality Management District has prepared its 2003 Triennial Report to fulfill these requirements of the CCAA. The 2003 Triennial Report describes the historical trends in ambient air quality levels, provides updates to the emission inventories, and evaluates the implementation of stationary and mobile source control measure commitments made in the 2000 Triennial Report. In addition, ozone transport mitigation requirements for upwind districts are addressed. Finally, the report identifies new air pollution control measures the District will adopt or study further over the next three years.

B) Focus of CEQA Review

The California Environmental Quality Act (CEQA) requires that an agency identify and evaluate the potentially significant environmental impacts of its discretionary decisions. Whenever feasible, the agency is required to mitigate the significant environmental impacts of its decision.

The purpose of an initial study is to determine if a project may have a significant impact on the environment. If a fair argument can be made that a project may have a significant impact on the environment, then the lead agency must prepare an EIR. (CEQA Guidelines, Sec. 15064, subd. (f)(1).) However, if the project has no significant impacts,

or is modified to reduce impacts to a level of insignificance, then the lead agency may complete a negative declaration. (CEQA Guidelines, Sec. 15064, subd. (f)(2).)

By approving the 2003 Triennial Report, the District Board would add new air pollution control measures to the District's CCAA Plan. Although designed to improve air quality, these measures could have secondary impacts on the environment. This initial study will explore these possible secondary environmental impacts.

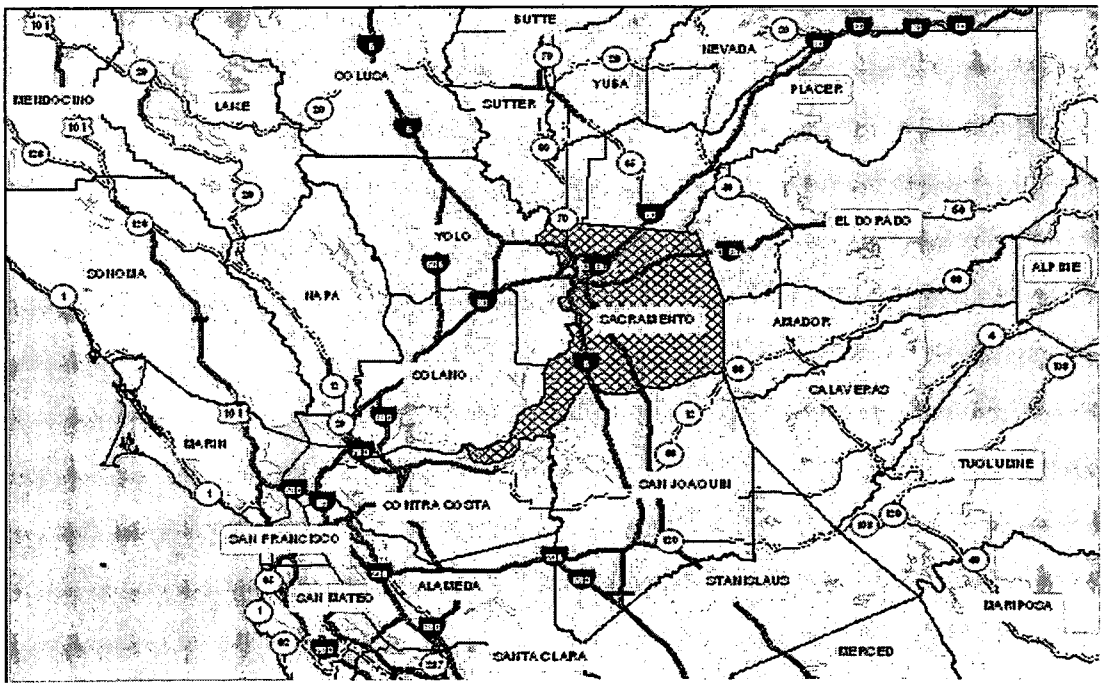
II. PROJECT DESCRIPTION

A) Project Location

The 2003 Triennial Report and its proposed air pollution control measures apply within the jurisdiction of the Sacramento Metropolitan Air Quality Management District. The District covers all of Sacramento County, California (Figure 1).

Sacramento County encompasses approximately 994 square miles in the middle of the 400-mile long Central Valley. Sacramento County is bounded by Contra Costa and San Joaquin Counties to the south, Amador and El Dorado Counties on the east, Placer and Sutter Counties to the north, and Yolo and Solano Counties on the west. Sacramento County extends from the low delta lands between the Sacramento and San Joaquin Rivers north, to about ten miles beyond the State Capitol in downtown Sacramento, and east, to the foothills of the Sierra Nevada Mountains.

FIGURE 1: LOCATION OF SACRAMENTO COUNTY



B) Project Objectives

The objective of the 2003 Triennial Report is to meet the California Clean Air Act's reporting and plan revision requirements.

To comply with the CCAA's reporting requirements, the 2003 Triennial Report describes the historical trends in ambient air quality levels, provides updates to the emission inventories, and evaluates the implementation of stationary and mobile source control measure commitments made in the 2000 Triennial Report.

To comply with the CCAA's plan revision requirements, the 2003 Triennial Report identifies mobile source, stationary source, area source, and indirect source rules for adoption, amendment or further study during the next triennial period (2004-2006). These control measure commitments are being proposed for incorporation into the District's attainment strategy as a triennial plan revision to satisfy the "all feasible measures" progress requirement.

C) Technical, Economic & Environmental Characteristics

1) Report Findings

Generally, the 2003 Triennial Report presents many favorable air quality findings:

"Air quality indicators show significant overall progress toward reducing exceedances of the ambient ozone standards and region-wide exposure to unhealthy concentrations since the late 1980's."

"Between 1990 and 2005, emission inventory trends in Sacramento County indicate reactive organic gas emissions and nitrogen oxide emissions are estimated to decline about 50% and 40%, respectively.

"Overall, the recent stationary source controls surpassed the District's 2000 Triennial ROG emission reduction commitments of 0.6-1.5 tons per day for 'all feasible measures' evaluations."

"NOx reductions from the District's mobile source program surpassed the expected 0.5 tons per day region-wide commitment from the 2000 Triennial Report." (2003 Triennial Report, pp. 1-1 to 1-4.)

2) Control Measures & Programs

If approved, the 2003 Triennial Report will commit the District to act on the control measures and programs in Table 1. For more general details regarding these measures, consult the 2003 Triennial Report, Appendix A.

Table 1
Summary of Proposed Triennial Commitments for 2004-2006
Sacramento Metropolitan AQMD Control Programs
"Committed – All Feasible Measures"

District Control Programs	Proposed Action and Schedule	Expected ROG Emission Reduction (TPD)	Expected NOx Emission Reduction (TPD)	Cost Effectiveness ($/ton)
Stationary Source Measures (Rule No.)				
Adhesives and Sealants (460)	To be amended 2006	0.06	-	$373
Degreasing Operations/ Solvent Cleaning (454/466)	To be amended 2006	0.37[a]	-	$0 - $4,200
Natural Gas Fired Water Heaters (414)	To be adopted 2005	-	0.08	$1,200 - $10,600
Unspecified Coatings (440)	To be adopted 2005	0.27	-	$800 - $14,400
Oil and Gas Fugitive Emissions (461)	To be adopted 2005	0.17	-	$9,957
Boilers, Steam Generators, and Process Heaters/Space Heaters (411)	To be amended 2005	-	0.09	$12,664 - $40,000
Organic Liquid Loading (447)	To be amended 2006	-	-	Low
Stationary IC Engines (412)	To be amended 2006	-	tbd	Tbd
District Mobile Source NOx Programs				
Vehicle and Engine Technology Market-Based Incentive Program - On-Road Heavy-Duty Vehicles - Off-Road Vehicles and Ag. Pumps	To be implemented 2004-2006	-	0.18 (On-Road) 0.4 (Off-Road)	$10-11,000 (On-Road) $3-4,000 (Off-Road)
Land Use and Transportation Control Measures				
CEQA Construction Mitigation Program	To be implemented 2004-2006	-	0.07	$13,600
CEQA Land Use Operational Mitigation Program	To be implemented 2004-2006	0.04	0.04	Unknown[b]
TCM Projects – Folsom Light Rail Extension[c]	To be implemented 2005	tbd	tbd	Tbd
Community Education Programs				
Spare The Air Program[d]	To be implemented 2004-2006	0.1-0.5	0.1-0.5	$10,000 - $50,000

tbd – to be determined

[a] Implementation and emission reductions are expected to occur in 2007.

[b] Cost effectiveness data not quantified. Actual cost effectiveness depends on the project-specific emission reduction measures selected by the developer.

[c] Emission reductions from Regional Transit light rail line extension to Folsom are yet to be determined.

[d] Emission reductions and cost effectiveness are dependent on the varying number of Spare The Air days and public response each year.

In addition, the District will give further study to several measures listed in Table 2. For more general details regarding these measures, consult the 2003 Triennial Report, Appendix A.

Table 2
Summary of Proposed Triennial Commitments for 2004-2006
Sacramento Metropolitan AQMD Control Programs
Further Study Measures and Model Ordinances

District Control Programs	Proposed Action and Schedule	Expected ROG Emission Reduction (TPD)	Expected NOx Emission Reduction (TPD)	Cost Effectiveness ($/ton)
Stationary Source Measures (Rule No.)				
Automotive Refinishing (459)	To be re-evaluated 2006	Further study	-	tbd
Concentrated Animal Feeding Operations (New)	To be evaluated 2006	Further study	-	tbd
Food Product Manufacturing and Processing (New)	To be evaluated 2006	Further study	-	tbd
Polyester Resins (465)	To be re-evaluated 2006	Further study	-	tbd
District Mobile Source NOx Programs				
Accelerated Vehicle Retirement	To be evaluated 2006	Further study	Further study	tbd
Free Gas Caps	To be evaluated 2006	Further study	-	tbd
Land Use and Transportation Control Measures				
Indirect Source Rule for Construction	To be evaluated 2004-2006	Further study	Further study	tbd
Indirect Source Rule for Land Use Operational Phase	To be evaluated 2005-2006	Further study	Further study	tbd
Community Education Programs				
Clean Air Consortium for Spare The Air	To be evaluated 2005-2006	Further study	Further study	tbd
Mobile Source Ordinances for Local Jurisdictions				
Model Low Emission Vehicle & Fleet Ordinance	Developed for local implementation 2004-2006	-	tbd	tbd
Model Low Emission Vehicle "Green" Contracting Ordinance	Developed for local implementation 2004-2006	-	tbd	tbd
Model Limitation on Engine Idling Ordinance	Developed for local implementation 2004-2006	-	tbd	tbd

tbd – to be determined

a) Some Control Measures are Not Subject to Detailed CEQA Review

Some control measures listed in Table 1 and Table 2 are not subject to detailed CEQA review at this time. These measures include ongoing programs, planning studies, and measures that do not involve discretionary decisions by the District. These measures are examined below, in subsections "b", "c", and "d". These measures receive no subsequent environmental impact analysis elsewhere in this initial study. Subsection "e" describes the control measures that are the focus of this environmental review.

b) No Significant Impacts from On-going Programs

The 2003 Triennial Report includes the District's commitment to continue existing programs. Prior to their inception, these programs were analyzed in CEQA documents. Environmental review of these existing programs is limited to project changes, circumstance changes, or new information that has come to light since the previous environmental impact report or negative declaration. If the new information or the changed circumstances shed new light on significant adverse impacts, alternatives, or mitigation measures, subsequent environmental review may be needed. (CEQA Guidelines, sec. 15162.) For most of the District's ongoing programs, no further environmental review is required.

For example, the Vehicle and Engine Technology Market-Based Incentive Program was originally evaluated the subject of environmental review in 1994. (SMAQMD, Negative Declaration: Sacramento Area Proposed Regional Ozone Attainment Plan, 1994.) This year, it is possible that the program may receive larger and more stable annual funding. If this funding is approved, more high-emission vehicles and engines will enter the solid waste stream annually. However, some parts from these engines and vehicles are reused, and the rest are recycled, so no significant solid waste impact is expected. (Mike Neuenberg, Personal Communication, 8/4/04.)

The CEQA Land Use Operational Mitigation Program was reviewed for environmental impacts in 1991. (SMAQMD, Environmental Impact Report on the Draft 1991 Air Quality Attainment Plan, SCH# 90021130.) No new information or changed circumstances suggest that this program will have an adverse environmental impact. (Ron Maertz, Personal Communication, 9/14/04.)

The community education program, that now includes Spare The Air, was also subject to environmental review in 1991. (SMAQMD, Environmental Impact Report on the Draft 1991 Air Quality Attainment Plan, SCH# 90021130.) Spare The Air is an outgrowth of those early educational programs. The mere alteration of educational programs is categorically exempt from CEQA review. (CEQA Guidelines, sec. 15322.) No new information or changed circumstances suggest that this program will have an adverse environmental impact. (Kerry Shearer, Personal Communication, 9/14/04.)

However, there is new information suggesting that the CEQA Construction Mitigation Program may have a significant adverse impact. As a result, this measure will be analyzed in more detail in this initial study. (See page 28.)

c) Planning Studies Not Requiring a Negative Declaration

A number of measures are merely under study (i.e. Automotive Refinishing, Concentrated Animal Feeding Operations, Food Product Manufacturing and Processing, Polyester Resins, Accelerated Vehicle Retirement, Free Gas Caps, Indirect Source Rule for Construction, Indirect Source Rule for Land Use Operational Phase, and Clean Air Consortium for Spare The Air). There are no potentially significant impacts associated with these investigations. There are no hazardous experiments. These studies merely involve gathering existing information, analyzing data, and preparing reports. Also, the inclusion of these study measures in the plan is for informational purposes only, and does not legally bind the District to adopt the measures in the future. Such preliminary feasibility and planning studies do not require analysis in a negative declaration. (CEQA Guidelines, secs. 15262 & 15306.) Also, attempting an environmental review at this time; when the proposed control measures, their exceptions, and the sources they affect are not yet refined, would require too much speculation. In general, the CEQA Guidelines discourage the analysis of impacts that are "too speculative for evaluation." (CEQA Guidelines, sec. 15145.) Should these studies lead to the development of definitive, feasible and cost effectiveness air pollution control measures, they will provide a subject suitable for environmental evaluation.

d) Measure Receiving no Discretionary Approval

The TCM project is the Regional Transit light rail line extension to Folsom. The District has no discretionary approval over this project. The District is neither a lead nor a responsible agency for this project. The District provides no financial assistance to this project. This project is included in the Triennial Report simply to accurately depict regional TCM efforts to reduce passenger vehicle trips. CEQA applies only to the discretionary actions of a government agency. (CEQA Guidelines, sec. 15002, subd. (i).) Since the District exercises no discretion over Regional Transit's light rail line extension to Folsom, no environmental review is of this measure is required at this time.

e) Measures Evaluated Further in the Initial Study

The proposed control measures described below are the focus of this environmental review.

1) Rule 460, Adhesives and Sealants.

Adhesives are used to bond one surface to another. Adhesives are used to bond rubber, plastic, metal, and fiberglass. Adhesives are used in the construction industry during the installation of carpeting, flooring, and roofing. Large amounts of adhesives are used in

manufacturing furniture and automobiles. Sealants are used heavily in the construction industry to fill, seal, waterproof, or weatherproof gaps or joints between two surfaces.

VOC emissions result from the use of organic solvent-based adhesives. This rule would reduce the VOC limit for adhesives and sealants. This would result in a reduction in emissions from solvent-based adhesives of 0.06 tons per day. The cost effectiveness analysis estimates that this rule costs $373 for every ton of VOC reduction. Since the rule is already being implemented in the South Coast AQMD, the industry already has adhesives and sealants that meet these limits.

Available reformulated products do not generally contain greater amounts of materials that could be hazardous to human health. One exception is the use of the toxin methylene chloride as a solvent. A toxic risk evaluation found that, to trigger the toxic risk threshold of one cancer case per million exposed, an individual would have to be exposed to approximately 1 gallon of methylene chloride per day. (Wilson, "Control Measure Number: D3", from Sacramento Region Clean Air Plan Update, 10/14/03.)

2) Rule 454/466 Degreasing Operations/Solvent Cleaning

Solvents are used by coating operations for cleaning application equipment such as brushes and spray guns. Degreasing is used by automotive maintenance and repair facilities, and a variety of other manufacturing and commercial sources.

The rule would lower the VOC limit to 25 grams per liter for materials used in general cleaning and degreasing operations. This would reduce ROG emissions from these operations by 0.37 tons per day.

Sacramento reduced the VOC limit for degreasing to 50 grams per liter in May of 2002. The environmental evaluation at that time concluded there were no significant impacts associated with reducing the VOC limit for degreasing operations. (SMAQMD, Initial Study: Amendment to Rule 454 and Adoption of Rule 466, April 2002, Board Packet pp. 100-112.) However, there is a potential for manufacturers to substitute exempt solvents (such as acetone and methylene chloride), that could increase people's exposure to toxic substances.

3) Rule 414 Natural Gas Fired Water Heaters

This rule would require new boilers and water heaters with the heat input range of 75,000 – 1,000,000 Btu/hr. to meet low NOx limits. These small commercial/industrial boilers generally burn natural gas, and are used by restaurants, retail stores, schools, hotels, and office buildings. The rule is expected to reduce NOx emissions by about 0.08 tons per day. (2003 Triennial Report, Appendix A, Rule 414 Natural Gas Fired Water Heaters.) No significant adverse environmental impacts are expected from this measure. (Friesen, "Control Measure Number: SN-111A," from Sacramento Region Clean Air Plan Update, 10/14/03.)

4) Rule 440 Unspecified Coatings

This category includes VOC emissions coatings that are not otherwise covered by specific coating rules. These sources include coatings of glass or plastics parts and products, wood and metal parts and products, aerospace coatings, and automotive refinishing.

Because of the diverse and currently unregulated nature of these sources, the emission reductions should be treated as rough estimates. These sources generally emit an average of about 4.2 pounds of VOC per gallon. The rule would limit average emissions to about 3.5 pounds of VOC per gallon. This would result in a reduction in emissions of about 0.27 tons per day of VOC. (2003 Triennial Report, Appendix A, Rule 440 Unspecified Coatings.)

To meet the lower VOC limits, manufacturers would most likely choose to reformulate their products using exempt solvents, or develop waterborne products. The analysis of this rule did not reveal any potentially significant environmental impacts. (Prasetyo Jo, "Control Measure Number: D9," from Sacramento Region Clean Air Plan Update, 10/14/03.)

5) Rule 461 Fugitive Emissions – Oil and Gas

The focus of this rule is to limit fugitive emissions from natural gas production facilities. Emissions come from well cellars, compressors, valves, and flanges. The primary means used to reduce emissions is to increase the frequency of inspections and repairs.

It is estimated that applying control measure would reduce ROG emissions from these sources by 0.17 tons per day. (2003 Triennial Report, Appendix A, Rule 461 Oil and Fugitive Gas Emission.) The consultant's analysis identified no potentially significant impacts associated with this control measures. (Friesen, "Control Measure Number: SN-58," from Sacramento Region Clean Air Plan Update, 10/14/03.)

6) Rule 411, Boilers, Steam Generators, and Process Heaters/Space Heaters

Boilers and steam generators provide steam and hot water for space heating, food processing, laundry, and for manufacturing processes. The purpose of the rule is to reduce NOx emissions from boilers and process heaters rated at 1 million btu/hour or greater. By adding new requirements for such units, the rule would reduce NOx emissions about 0.09 tons per day.

For some large boilers, it may be cost effective to use selective catalytic reduction (SCR) to reduce emissions. This technology uses ammonia. Adherence to the State and local safety regulations governing the transport and storage of ammonia should prevent any significant ammonia-related impacts. Use of (SCR) will result in a very small amount of extra ammonia emissions, relative to the very large NOx emission reduction. These ammonia emissions can be minimized by properly maintaining the emission control

equipment. Application of SCR technology ultimately requires the disposal or recycling of the hazardous material in the used catalyst.

7) Rule 447 Organic Liquid Loading

Terminals receive gasoline from a pipeline and store it in very large (300,000 gallon to 3 million gallon) aboveground tanks, then when needed, transfer the gasoline through a network of pipes to a loading rack to fill tanker trucks, which deliver the gasoline to local gas stations.

Bulk plants generally receive their gasoline from tanker trucks, unload into tanks through a loading rack, and store it in large (approximately 20,000 to 40,000 gallon) aboveground tanks. Then, when needed, the gasoline is transferred through a loading rack into tanker trucks for delivery to gas stations.

VOC emissions arise from a number of points, including the fittings on the fixed-roof or floating-roof tanks, fugitive emissions from the piping (valves and flanges), and from the loading rack (displaced vapor space from the tankers).

The proposed rule would lower the emission limitation to 0.5 lbs/mgal rather than 0.6 lbs/mgal. In addition, the rule would establish inspection requirements and repair time requirements. Since the practical application of the existing and the proposed rule is very similar, at this time, the District is unable to identify any emission reduction (and therefore cost effectiveness) associated with modifying its existing rule. (See 2003 Triennial Report, Appendix A, Rule 447 Organic Liquid Loading.)

8) Rule 412 Stationary IC Engines

Internal combustion engines provide primary or emergency power at a variety of stationary sources. Small standby engines may be less than 300 horsepower, while large engines providing a primary power source may be over 600 horsepower. Emergency engines commonly use diesel fuel, while primary power sources generally use natural gas.

The District is considering three control measure options to reduce NOx emissions from these engines. To comply with the more stringent emission limits, sources would most likely use selective catalytic reduction (SCR), or non-selective catalytic reduction. Selective Catalytic Reduction results in a negligible decrease in fuel efficiency. As discussed above, selective catalytic reduction results in a small increase in ammonia emissions. (See 2003 Triennial Report, Appendix A, Rule 412 Stationary I.C. Engines.)

9) Model Low Emission Vehicle & Fleet Ordinance

The District will encourage Sacramento County, and the incorporated cities within it, to adopt a model ordinance or policy that commits the jurisdiction to purchase low emission vehicles for its fleets. Preliminary analysis of this measure indicated that it may

adversely affect public transit, because it would increase the cost of local buses. (Fable, "Control Measure Number: OMNS-375," Sacramento Region Clean Air Plan Update, 10/14/03.) However, both Regional Transit and Yolobus already have purchased compliant low emission vehicles without problems. In addition, as Elk Grove prepares its plans to develop its own transit service, the city is planning to purchase low emission gasoline/hybrid vehicles. Furthermore, the City of Sacramento has already adopted the model ordinance. (Neuenburg, Personal Communication, 8/4/04.) Thus, the ordinance is not expected to adversely affect local bus service.

10) Model Low Emission Vehicle "Green" Contracting Ordinance

The District will encourage Sacramento County, and the incorporated cities within it, to adopt a model ordinance or policy that gives bidding preference on government projects to companies that operate clean vehicle and equipment fleets, and that encourage employees to use mass transit.

11) Model Limitation on Engine Idling Ordinance

The District will encourage Sacramento County, and the incorporated cities within it, to adopt a model ordinance to restrict the idling of all heavy duty off-road vehicles and equipment to no more than 5 minutes in a given location. Engine idling is a significant NOx source, and is unnecessary in most cases. In many cases, the end user will save money as a result of the ordinance, due to lower fuel and maintenance costs.

Preliminary analysis indicated that the automatic start/stop mechanisms that might be used in some trucks to comply with such a limitation might result in adverse noise impacts. (Schubert, "Control Number: ONMS-45," Sacramento Region Clean Air Plan Update, 10/14/03.) The impact analysis that follows concludes that the adverse noise impact is less than significant.

12) CEQA Construction Mitigation Program

The District currently reviews construction projects within the District that are subject to CEQA review. The District proposes air quality mitigation measures for construction projects that would otherwise result in a significant air quality impacts. Generally, this program has a beneficial impact on the environment, by reducing NOx, ROG, and particulate emissions. However, since the prior environmental review for this program, it has been learned that one of the proposed NOx emission mitigation measures (the Use of PuriNOx fuel) may have adverse ROG impacts.

D) Use of the Initial Study

This initial study will be used by the Board of the Sacramento Metropolitan Air Quality Management District in approving the 2003 Triennial Report. The initial study may also be used by the State Air Resources Board in approving the 2003 Triennial Report. This initial study may be used as a reference by other air districts, as they prepare their 2003

triennial reports. This report may be used when air districts adopt the rules that implement their plans.

III. ENVIRONMENTAL SETTING

CEQA requires that an initial study identify the project area's environmental setting. (CEQA Guidelines, sec. 15063, subd. (d)(2).) Appendix G of the CEQA Guidelines also suggests that an initial study should include a discussion of the project's environmental setting. The environmental setting section provides a description of the physical environmental conditions in the vicinity of the project. Special emphasis is placed upon the investigation and discussion of resources affected by the project. The project is compared to adopted plans to determine if there are inconsistencies. The purposes of an environmental setting section are to identify baseline conditions for evaluating the significance of impacts, and to identify conflicts between the proposed project and existing plans. The section should provide a basis for understanding the significant effects of the proposed project. (CEQA Guidelines, sec. 15125.)

A) Physical Conditions

Sacramento County is located at the southern end of the Sacramento Valley, which is bounded by the Coast and Diablo ranges on the west and the Sierra Nevada on the east. The county is 55 miles northeast of the Carquinez Strait, a sea-level gap between the Coast Range and the Diablo Range; the intervening terrain is flat.

The prevailing wind is from the south, primarily because of marine breezes through the Carquinez Strait, although during winter, the sea breezes diminish and winds from the north occur more frequently.

Between late spring and early fall, a layer of warm air often overlays a layer of cool air from the Delta and San Francisco Bay, resulting in an inversion. Typical winter inversions are formed when the sun heats the upper layers of air, trapping below them air that has been cooled by contact with the colder surface of the earth during the night. Although each inversion type predominates at certain times of the year, both types can occur at any time of the year. Local topography produces many variations that can affect the inversion base and thus influence local air quality. (SMAQMD, Proposed Amendments: Rule 442 – Architectural Coatings DEIR, (SCH No: 2001012006), 2001, p. III-1.)

Aesthetics

Sacramento County includes vistas of the surrounding Sierra Nevada Mountains to the east, the Coast Range to the west, and Mount Diablo to the southwest. These vistas can be obscured by visible emissions. Also, visibility reducing particles are transported from the valley to the Tahoe Basin. (Elliot-Fisk, et al., "Lake Tahoe Case Study," SNEP: Final Report to Congress, 1996, Addendum, Chapter 7, p. 226-227.)

Agriculture

The agricultural lands in Sacramento County are dominated by crop lands in the valley and rangelands in the foothills. Sacramento County produces a wide variety of crops including hay, melons, fruits and vegetables, beans and peas, flowers and seeds. The value of these crops exceeds 200 million dollars per year. (Sacramento County 2002 Crop and Livestock Report.) Crop yields can decline as a result of long-term exposure to elevated concentrations of ground-level ozone. Ozone sensitive crops include four of the most valuable crops grown in Sacramento County: grapes, corn, alfalfa hay, and rice. (Thompson, Crop Loss From Air Pollutants Assessment Programs, 1986.)

Air Quality

Sacramento County's air quality exceeds the California ambient standard for ozone. (2003 Triennial Report, p. 4-1.)

In the lower atmosphere, ozone is the main component of photochemical smog. Ozone is not directly emitted into the air, but is generated through photochemical reactions between nitrogen oxides (NOx) and reactive organic gases (ROG). Mobile sources (vehicles) represent the primary source of these ozone precursors in Sacramento County. Some ozone is transported to the Sacramento region from other regions to the south and to the west. Ozone generally remains in the atmosphere for one or two days. It can be eliminated through chemical reactions with plants, through absorption by water droplets in clouds, or by attaching to rain droplets. (SMAQMD, DEIR Proposed Amendments: Rule 442 – Architectural Coatings. (SCH No: 2001012006), 2001, p. III-2.) Exposure to ozone levels above the State standard can cause inflammation and irritation of the respiratory tract, coughing, chest tightness, shortness of breath, worsening asthma symptoms, and exacerbation of respiratory and cardiovascular diseases. (CARB, Recent Research Findings: Health Effects of Particulate Matter and Ozone Air Pollution, January 2004 , pp. 1,2, 5.)

The State 1-hr. standard for ozone is .09 parts per million (ppm). In 2003, the District exceeded State 1-hour standard on 40 days. (2003 Triennial Report, p. 4-1.) The Expected Peak Day Concentration (EPDC) for ozone is calculated for specific monitoring sites. For example, for the 2000-2002 period, the EPDC for Folsom was 0.135 ppm., for Del Paso Manor was 0.128 ppm., for North Highlands was 0.118 ppm., and for T Street was 0.109 ppm. Another measure, the population-weighted exposure indicator, identifies the annual exposure per person to ozone concentrations above the State standard. Both the EPDC and the population-weighted exposure indicator reflect a downward trend in ambient ozone concentrations, and in personal exposure to ozone levels above the state standard. (2003 Triennial Report, pp. 4-1 to 4-6.)

Biological Resources

Sacramento County hosts an array of habitat types. These include annual grasslands and croplands, valley-foothill riparian habitat, valley-foothill woodlands, freshwater emergent wetlands, and riverine habitat. These habitats support a variety of protected special status

plant and animal species, as well as game animals. (See Sacramento County General Plan Update Environmental Impact Report, Volume I, 1992, Chapter 4, pp. 4.4-1 – 4.4-13.)

To the east of Sacramento, the middle elevation landscape is dominated by the conifer forests of the Sierra Nevada. Studies show that long-term exposure to ozone concentrations above 60 parts per billion can cause foliar damage to conifers. (Arbaugh, et al., Ambient Ozone Patterns and Ozone Injury Risk to Ponderosa and Jeffrey Pines in the Sierra Nevada, 2002.) This forested region is among the downwind areas to which ozone is transported from Sacramento County. (2003 Triennial Report, pp. 3-1 to 3-3.)

Hydrology & Water Quality

Surface water resources in Sacramento County include the Sacramento, American, Cosumnes and Mokelumne Rivers, all of which flow to the Sacramento-San Joaquin Delta. The County includes the southern portion of Folsom Lake, as well as Stone Lake, and Beach Lake. Sacramento County also relies on groundwater for a significant portion of its water supply. A network of dams, levees, and bypasses provides flood control for much of the urbanized areas of the County.

Beyond the crest of the Sierra Nevada, lie the uniquely clear waters of Lake Tahoe. Studies indicate that the lake's water clarity is diminishing, due to the presence of higher concentrations of algae in the water. The algae are nourished by nitrogen compounds in the lake water. (Elliot-Fisk, et al., "Lake Tahoe Case Study," SNEP: Final Report to Congress, 1996, Addendum, Chapter 7, p. 227.) One source of these nitrogen compounds is emissions from the Sacramento area that are transported over the mountain crest, and deposited into the lake. (Carroll, et al., Keeping Lake Tahoe Blue through Atmospheric Assessment: Aircraft & Boat Measurements of Air Quality & Meteorology near and on Lake Tahoe, 2004, pp. 17-18, 20-21.)

Land Use

A broad spectrum of land uses characterizes the developed lands in Sacramento County. Sacramento County has high-rise office buildings and high density housing in downtown Sacramento, surrounded by sprawling suburban development to the north, south and east. Land use patterns have an impact on motor vehicle use. Land uses that generate many vehicle trips are considered indirect sources of air pollution.

Population and Housing

The population of Sacramento County continues to grow. From 1990 – 2000, the County's population grew from approximately 1,047,000 to 1,213,000. (CARB, e-mail from Larry Hunsaker, 7/9/04.)

Public Services

Residents of Sacramento are provided with a number of public services, including fire protection, police protection, schools and libraries. The rules under consideration could affect these services. Government buildings throughout Sacramento County use large

water heaters and small boilers. Thus, if a rule required more expensive replacement units, there might be a fiscal impact, though not an environmental impact. Similarly, if lower volatile organic compound (VOC) limits on solvents resulted in the use of more flammable substitute solvents, fire protection services could be in greater demand.

Recreation

Sacramento affords visitors and residents a number of outdoor recreational opportunities. Some choose to hike or bike along regional trails; others will swim, or fish, or boat in the rivers; while other will run or play ball at neighborhood parks and golf courses. These outdoor activities can be limited on spring and summer days when ozone exceedances make outside recreation unpleasant and/or hazardous to human health.

Transportation

Sacramento County has a well-established and comprehensive transportation system. The infrastructure is dominated by highways and freeways. The City of Sacramento is the hub where Highway 50, Highway 99, Interstate 5, Interstate 80 crisscross. Rail transit in the area includes Amtrak and Sacramento Regional Transit's Light Rail. In addition, to Sacramento Regional Transit's intra-county bus service, there are many public and private bus services that provide inter-county transportation. From 1990-2000, vehicle miles traveled in Sacramento County grew from 24,774,000 per day to 27,090,000 per day. (CARB, http://www.arb.ca.gov/app/emsinv/trends/ems_trends.php, 4/7/04.) On-road mobile sources have been, are, and are projected to remain the largest source of NOx emissions in Sacramento County. (2003 Triennial Report, Table 5-2.)

Utilities and Service Systems

The State of California has experienced electricity supply shortages in recent years. The adequacy of future electricity supplies in the State of California is a matter of great concern. A potential control measure that increases the peak period demand for electricity may contribute to brown outs and black outs that adversely affect the human environment.

B) Comparison to Adopted Plans

The 2003 Triennial Report includes measures to reduce air pollution in Sacramento County. In this respect, it is consistent with the State Implementation Plan. (SMAQMD, et al., Sacramento Regional Ozone Attainment Plan, 1994.)

As listed in Table 1 of this initial study, the 2003 Triennial Report includes control measures to reduce emissions from stationary, mobile, and indirect sources of air pollution. The measures encourage the use of low-emission vehicles and other transportation alternatives. The measures promote public education on air quality issues, and the mitigation of air quality impacts from new developments. These air pollution control measures in the 2003 Triennial Report are consistent with the goals and policies found in the Sacramento County General Plan, and with the general plans of cities in the District:

- The City of Rancho Cordova's Vision Book and Interim General Plan calls for improving air quality, expanding the use of alternative transportation, and for using low-emission vehicles in the City's fleet. (Rancho Cordova Vision Book and Interim General Plan, p. 20.)

- The City of Elk Grove has 8 air quality policies and 18 air quality actions in its general plan. These provisions promote the use of transportation alternatives, encourage city vendors to use low-emission vehicles, require new developments to assess and mitigate their air quality impacts, and support public education on air quality issues. (Elk Grove General Plan, 2003, pp. 53-55.)

- The City of Citrus Heights has 7 air quality policies and 10 air quality actions in its general plan. These provisions support mitigating the air quality impacts of new development, require the City to incorporate low-emission vehicles into its fleet, encourage city vendors to use low emission vehicles, promote the use of alternative transportation, and support public education on air quality issues. (Citrus Heights General Plan, pp. 94 -96.)

- The Circulation Element of the Sacramento City General Plan includes numerous policies to improve air quality through supporting buses and light rail use, increasing vehicle occupancy, increasing the use of the pedestrian mode, improving bikeways, and encouraging mixed use development. (Sacramento City General Plan, pp. 5-7 to 5-14, 5-21 to 5-27.)

- The 1993 County of Sacramento General Plan includes a detailed air quality element that supports SMAQMD efforts to minimize emissions from point sources, mobile sources, and indirect sources. The element includes many policies to encourage the use of transportation alternatives, to promote public education on air quality issues, and to mitigate the air quality impacts of new development. (1993 County of Sacramento General Plan, Air Quality Element, pp. 11-19.)

In addition, the 2003 Triennial Report includes air pollution control measures that will reduce ozone transport to neighboring air districts. These control measures supplement the primary efforts of these districts to reduce their ozone levels.

Finally, the reduction of NOx pollutants that may be transported to the Tahoe Basin is consistent with plans to maintain water clarity at Lake Tahoe, and to improve visibility in the Tahoe Basin. (TRPA, Regional Plan for the Lake Tahoe Basin, 1986.) The ozone reduction is consistent with the United States Forest Service's plans to improve forest health in the Sierra Nevada. (USFS, Sierra Nevada Forest Plan Amendment, 2004.)

GENERAL INFORMATION

Name of Proponent:	Sacramento Metropolitan Air Quality Management District
Address of Proponent:	777 12th Street, 3rd Floor Sacramento, CA 95814
Lead Agency:	Sacramento Metropolitan Air Quality Management District
CEQA Contact Person:	Greg Tholen (916) 874-4834
Triennial Report Contact Person:	Bruce Katayama (916) 874-4844
Name of Project:	2003 Triennial Report

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The following environmental factors checked below would be potentially affected. An explanation relative to the determination of impacts can be found following the checklist for each area.

☐	Aesthetics	☐	Geology and Soils	☐	Population and Housing
☐	Agricultural Resources	☑	Hazards and Hazardous Materials	☐	Public Services
☑	Air Quality	☑	Hydrology and Water Quality	☐	Recreation
☐	Biological Resources	☐	Land Use and Planning	☑	Solid/Hazardous Waste
☐	Cultural Resources	☐	Mineral Resources	☐	Transportation/ Traffic
☐	Energy	☑	Noise	☐	Mandatory Findings

DETERMINATION

On the basis of this initial evaluation:

☑ I find that the proposed project could NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will NOT be significant effects in this case because revisions in the project have been made by or agreed to by the project proponent. A NEGATIVE DECLARATION will be prepared.

☐ I find that the project MAY have a significant effect(s) on the environment, and an ENVIRONMENTAL IMPACT REPORT will be prepared.

☐ I find that the proposed project MAY have a "potentially significant impact" on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Date: January 24, 2005 **Signature:**

ENVIRONMENTAL CHECKLIST AND DISCUSSION

I. AESTHETICS. Would the project:	Potentially Significant Impact	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☑
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☑
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☑
d) Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?	☐	☐	☑

No Impacts

The potential control measures under consideration are measures that affect stationary and area sources at school, office, construction, commercial or industrial sites. No aspects of the rules adversely affect scenic vistas, damage scenic resources, degrade the visual quality of the surroundings, or create light and glare problems. These land uses are located in appropriately zoned areas, which are normally removed from scenic vistas and scenic resources. Moreover, modifications to stationary sources would almost always occur within the confines of existing facilities. Most of the equipment would typically be located inside the buildings of the affected facilities where they will not be noticeable. Modifications to the formulations of adhesives, sealants, unspecified coatings and solvents will not alter the visual quality of scenic resources. Measures to reduce vehicle and equipment emissions, and to reduce the air quality impacts of construction activity, will not adversely impact scenic resources.

Scenic vistas can be adversely affected by high ambient concentrations of particulate matter. Historically, both the nitrates formed from NOx emissions, and the direct emission of particulates from motor vehicles, have been significant components of PM2.5 in Sacramento. (CARB, Characterization of Ambient PM10 and PM2.5 in California, 2001, pp. 31-32.) The control measures in the 2003 Triennial Report both reduce NOx

emissions, and encourage the use of alternative transportation. These measures should have beneficial effects on visibility in the area.

Conclusion

Based on the above considerations, significant adverse aesthetic impacts are not expected to occur and no further environmental analysis is required.

	Potentially Significant Impact	Less Than Significant Impact	No Impact
II. AGRICULTURE RESOURCES. Would the project:			
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☑
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☑
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	☐	☐	☑

No Impacts

The potential control measures under review would not encourage the conversion of farmland to other non-agricultural uses or conflict with existing agricultural zoning. These potential control measures affect stationary and area sources at school, office, construction, commercial or industrial sites. They also reduce vehicle and equipment emissions, and reduce the air quality impacts of construction activity.

Rule 411 will reduce emissions from food and agricultural processing boilers and process heaters. Also, the Vehicle and Engine Technology Market-Based Incentive Program for Off-Road Vehicles and Ag. Pumps provides financial incentives for replacing agricultural water pumping engines with lower emission models. These measures should not result in the conversion of farmland to non-agricultural uses.

As mentioned earlier, the District is only studying the possibility of developing a Food Product Manufacturing and Processing rule, and a Concentrated Animal Feeding Operations rule. The mere studying of the concepts does not have any environmental impacts. As noted previously, there is insufficient information regarding the nature and extent of these rules to assess their impacts at this time.

Conclusion

Based on the above considerations, significant adverse impacts to agricultural uses are not expected to occur, and no further environmental analysis is required.

III. **AIR QUALITY.** Would the project:	**Potentially Significant Impact**	**Less Than Significant Impact**	**No Impact**
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☑
b) Violate any air quality standard or contribute to an existing or projected air quality violation?	☐	☐	☑
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?	☐	☐	☑
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☑	
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☑
f) Diminish an existing air quality rule or future compliance requirement resulting in a significant increase in air pollutant(s)?	☐	☐	☑

The purpose of the 2003 Triennial Report is to move toward attainment of the State ambient air quality standards for ozone, through implementation of additional control measures. Updating the District's California Clean Air Act Plan will have the effect of reducing overall emissions from stationary, area, and mobile sources. In order to realize some of the potential reductions from stationary and off-road mobile sources, it may be

necessary for these sources to make modifications to their processes and equipment. While these modifications are designed to reduce ozone precursors, some control equipment and reformulated products may have the secondary effect of increasing other pollutants.

Similarly, it will be necessary for manufacturers to modify the formulations of their products. Changes in the manufacturing processes may also have the effect of increasing amounts of toxic air contaminants (TACs) if sources decide to comply with new or strengthened regulations by replacing high Reactive Organic Gas (ROG) materials with substitute materials that are lower in VOCs but contain higher amounts of TACs. TACs have been shown to increase the risk of cancer at certain concentrations.

Finally, one existing program, the CEQA Construction Mitigation Program, has had to address the issue of limiting excess ROG emissions from the alternative fuel PuriNOx. (See page 25.)

Less Than Significant Impacts

The control measures discussed within this category have been identified as resulting in less than significant impacts. Existing Air District regulations, authority or programs would help ensure this conclusion.

A) Reformulated Products

Three of the control measures (Rules 460, 454/456, and 440) would require the reformulation of products by replacing high-ROG materials with alternative chemicals or water-based formulations that may contain toxic compounds. As a result, material replacement or reformulation to reduce the use of high-ROG materials has the potential to result in health risks associated with exposure to both carcinogenic and non-carcinogenic toxic air contaminants. The potential impacts associated with toxic air contaminants will need to be evaluated for each control measure during the rulemaking process. In addition, most of the control measures are aimed at reducing emissions of VOCs and many toxic air contaminants are also VOCs. Therefore, reducing emissions of VOCs also tends to reduce emissions of toxic air contaminants as well. Therefore, no significant impacts on non-criteria or toxic air contaminant emissions are expected.

1) Rule 460, Adhesives and Sealants.

This rule would reduce the VOC limit for adhesives and sealants. This would result in a reduction in emissions from solvent-based adhesives of 0.06 tons per day. Available reformulated products do not generally contain greater amounts of materials that could be hazardous to human health. One exception may be the use of the toxin methylene chloride as a solvent. A toxic risk evaluation found that, to trigger the toxic risk threshold of one cancer case per million exposed, an individual would have to be exposed to approximately 1 gallon of methylene chloride per day. Methylene Chloride would only be one ingredient in reformulated adhesives and sealants. Under normal conditions,

one would not typically be exposed to 1 gallon of methylene chloride per day. (Wilson, "Control Measure Number: D3", from Sacramento Region Clean Air Plan Update, 10/14/03.)

2) Rule 454/466 Degreasing Operations/Solvent Cleaning

The rule would lower the VOC limit to 25 grams per liter for materials used in general cleaning and degreasing operations. Sacramento reduced the VOC limit for degreasing to 50 grams per liter in May of 2002. The environmental evaluation at that time concluded there were no significant impacts associated with reducing the VOC limit for degreasing operations. (SMAQMD, Initial Study: Amendment to Rule 454 and Adoption of Rule 466, April 2002, Board Packet pp. 100-112.) No circumstances have changed since that environmental evaluation to suggest a different conclusion at this time.

The rule change would have had an adverse impact, if the replacement solvents exposed individuals to more toxic air contaminants than the conventional solvents they replace. This issue was reviewed by the South Coast Air Quality Management District. It compared the toxicity of conventional solvents to that of likely replacement solvents, such as acetone, methyl acetate, and PCBTF. It found that the replacement solvents were no more toxic than the conventional solvents. It concluded that, "there is no substantive evidence that shows the use of those solvents identified as possible replacement solvents would result in significant adverse toxic air contaminant impacts." (SCAQMD, Final Environmental Assessment for: Proposed Amended Rule 1171 – Solvent Cleaning Operations, 10/28/2003, pp. 2-13 to 2-19.)

3) Rule 440 Unspecified Coatings

This category includes VOC emissions coatings that are not otherwise covered by specific coating rules. These sources include coatings of glass or plastics parts and products, wood and metal parts and products, aerospace coatings, and automotive refinishing. To meet the lower VOC limits, manufacturers would most likely choose to reformulate their products using exempt solvents, or to develop waterborne products. It is possible that manufacturers could comply with the rule by using more acetone. However, ARB indicates that the industry trend is to replace traditional solvents with new solvents that are both less toxic and less hazardous. The analysis of this rule did not reveal any potentially significant environmental impacts. (Prasetyo Jo, "Control Measure Number: D9," from Sacramento Region Clean Air Plan Update, 10/14/03.)

B) Stationary Source Controls:
Rule 411 Boilers, Steam Generators, and Process Heaters/Space Heaters & Rule 412 Stationary I.C. Engines

The purpose of these rules is to reduce NOx emissions from boilers, process heaters, and stationary internal combustion engines. Some sources may use selective catalytic reduction (SCR) to reduce emissions. This technology uses ammonia. Use of SCR will result in a very small amount of extra ammonia emissions, relative to the very large NOx

emission reduction. These ammonia emissions can be minimized by properly maintaining the emission control equipment. Furthermore, the use of SCR is only cost effective for larger boilers; those rated at 40 mmBtu/hr or greater. Currently, there are only approximately 14 boilers of that size in the District. (Mohamad, personal communication, 8/23/04.) Thus, both the potential application of SCR, and its potential impacts, are very limited, and less than significant.

C) Land Use Construction Mitigation

With regard to the existing program for land use construction mitigation, new information has come to light about a low NOx emission fuel, PuriNOx. To meet District mitigation targets for NOx emissions, contractors have used PuriNOx instead of conventional diesel fuel in heavy-duty construction equipment. The District also has funds to provide an economic incentive of up to $0.25 per gallon to promote the use of PuriNOx.

However, it has been learned that PuriNOx produces more ROG emissions than conventional diesel fuel. The District has determined that, if the increased ROG emissions exceeded a threshold level of 65 lbs. per day, the impact would be significant. District calculations show that usage of PuriNOx would have to exceed 3,400 gals./day in order to increase ROG emissions 65 lbs. per day. (Damkier, PuriNOx Numbers, 8/23/04.) Thus, the District now limits its use recommendations and its PuriNOx incentives to avoid triggering PuriNOx use in excess of 3,400 gallons per day.

No Impacts

It is anticipated that the odor impacts of lower-VOC products will be similar to the odor impacts from the products currently in use. (SCAQMD, Final Environmental Assessment for: Proposed Amended Rule 1171 – Solvent Cleaning Operations, 10/28/2003, p. 2-21.)

The remaining control measures under consideration (Rules 414 Natural Gas Fired Water Heaters, 461 Oil & Gas Fugitive Emissions, 447 Organic Liquid Loading, Model Low Emission Vehicle & Fleet Ordinance, Model Low Emission Vehicle "Green" Contracting Ordinance, and Model Limitation on Engine Idling Ordinance) are not expected to have any adverse impact, either directly or indirectly, on local or regional air quality, existing air quality plans, or create objectionable odors impacting a large number of people. The 2003 Triennial Report recommends new control measures, or improves and strengthens existing control measures. Consequently, no existing air quality rules will be weakened. This will help the Sacramento Region meet its air quality goals.

Conclusion

Based on the above considerations, significant adverse impacts to air quality are not expected to occur, and no further environmental analysis is required.

	Potentially Significant Impact	Less Than Significant Impact	No Impact
IV. BIOLOGICAL RESOURCES. Would the project:			
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☑
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☑
c) Have a substantial adverse effect on federally protected wetlands as defined by §404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☑
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☑
e) Conflicting with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☑
f) Conflict with the provisions of an adopted Habitat Conservation plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☑

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

PROPOSED AMENDMENTS TO REGULATION 8, RULE 3: ARCHITECTURAL COATINGS

FINAL

ENVIRONMENTAL IMPACT REPORT

State Clearinghouse # 2001092074

November 8, 2001

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1. INTRODUCTION

1.1 Background

Architectural coatings are coatings applied to stationary structures and their appurtenances at the site of installation, to portable buildings at the site of installation, to pavements or to curbs. Architectural coatings include house paints, stains, sealers, primers, industrial maintenance coatings, roof coatings, swimming pool coatings and traffic coatings. The use of architectural coatings in California results in substantial emissions of volatile organic compounds which contribute to the formation of ozone and particulate matter. These two pollutants pose the Bay Area's, and California's, most serious air quality problems.

Control of emissions from architectural coatings has historically been the responsibility of local air pollution control and air quality management districts. Widespread regulation of architectural coatings began in 1977, when the California Air Resources Board (CARB) adopted a Suggested Control Measure (SCM) for architectural coatings. Many districts adopted architectural coatings rules based on this SCM and on revisions to the SCM approved by CARB in 1985 and 1989. The Bay Area Air Quality Management District Board of Directors adopted Regulation 9: Architectural Coatings, on March 1, 1978, and later recodified it as Regulation 8: Organic Compounds, Rule 3. Rule 3 was subsequently amended the Rule in 1982, 1983, 1986, 1990, and 1998.

In September, 1998, the Environmental Protection Agency promulgated a national rule for architectural coatings, based on authority derived from Section 183 (e) of the Clean Air Act. The national rule does not preempt state or local authority, nor did the promulgation of the national rule provide emission reductions for the Bay Area. From 1998 through June of 2000, staff of CARB, in cooperation with the staff from air districts and based on a comprehensive coating survey, developed another SCM for architectural coatings. This SCM and the accompanying Program Environmental Impact Report was adopted and certified, respectively, by the California Air Resources Board on June 22, 2000. It is this SCM on which the District's proposed amendments are based.

In accordance with the California Environmental Quality Act (CEQA)[1], the CARB, as lead agency, prepared a Program Environmental Impact Report prior to approving the architectural coatings SCM. The CEQA Guidelines permit the use of a Program EIR when agencies are evaluating the issuance of "rules, regulations, plans, or other general criteria."[2] CARB anticipated that local air districts would rely upon the Program EIR when conducting their own environmental evaluation of amendments to district rules based on the SCM.[3]

The Program EIR developed by CARB staff included an analysis of environmental impacts that could potentially result from implementation of architectural coatings rules based on the SCM. CARB staff prepared and published a Notice of Preparation and Initial Study (NOP/IS) for the Program EIR and allowed a 30-day review and comment period, which ended July 22, 1999. The NOP/IS identified the potential for adverse impacts in the following areas: air quality, water, public services, transportation and circulation, solid and hazardous waste, and hazardous substances. CARB staff prepared a Draft Program EIR, which was distributed to responsible agencies and interested parties for a 45-day review and comment period. The comment period ended April 7, 2000. The Draft Program EIR contained a detailed discussion of the environmental impacts identified in the NOP/IS, mitigation measures for the potentially significant impacts, and alternatives to the adoption of the proposed SCM. CARB staff then prepared a final Program EIR, which was certified on June 22, 2000.

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[1] Pub. Resources Code, § 21000 et seq.
[2] 14 CCR § 15168, subs. (a)(3)
[3] ARB Final Program EIR, pp. I-2 to I-4.

The draft EIR and final EIR are tiered from the CARB-certified Program EIR. CEQA allows environmental impact reports be tiered whenever feasible. Tiering means that the use of information and analyses of matters contained in a broader EIR may be incorporated into an EIR for a specific project.[4] Accordingly, this draft Environmental Impact Report incorporates the CARB Program EIR by reference. Relevant sections of the CARB Program EIR are summarized as appropriate throughout this final EIR.

In addition, this final EIR looks at the CARB Program EIR and analyzes whether the proposed amendments to Rule 3 may cause significant effects on the environment as a result of unique or peculiar conditions of the Bay Area environment that may not have been examined in the CARB Program EIR.

Copies of the CARB Final Program EIR are available at:

Street Address:	California Air Resources Board CalEPA Headquarters Building 1001 I Street Sacramento, CA 95814	*or*	Bay Area AQMD 939 Ellis Street San Francisco, CA 94109

Internet Address: www.arb.ca.gov/arch/CEQA/FEIR.htm

A discussion of the technical, economic and legal rationale for the proposed rule amendments will be contained in the staff report developed for the amendments to Rule 3: Architectural Coatings.

1.2 Legal Authority

The California Clean Air Act (CCAA) establishes a comprehensive air pollution control program[5]. Under this program, the responsibility for controlling air pollution in California is shared by CARB and the local districts. The districts have the primary responsibility, subject to CARB oversight, to adopt control measures for nonvehicular sources of air pollution, including architectural coatings.[6]

CARB has the responsibility to adopt control measures for vehicular sources of air pollution,[7] . The CCAA also assigned numerous other duties to CARB. For example, CARB is charged with coordinating efforts to attain and maintain ambient air quality standards, and conducting research into the causes of and solution to air pollution[8]; providing technical assistance to the districts when appropriate;[9] coordinating, encouraging, and reviewing the districts' efforts to attain and maintain air quality standards[10]; and doing such acts as may be necessary for the proper execution of the powers and duties imposed upon the CARB by the CCAA and any other provision of law.[11] To fulfill these statutory mandates, the CARB often provides guidance and other assistance to the districts, including the development of model rules such as the SCM for Architectural Coatings.

The District is designated as a serious nonattainment area for the California ozone standard. The California Clean Air Act requires areas designated as serious nonattainment for ozone to

[4] 14 CCR, § 15152, subs. (a)
[5] California Health & Safety Code, § 39000 et seq.
[6] California Health & Safety Code, §§39002, 40000, 40001, and 40702
[7] California Health & Safety Code, §§39002 and 40000
[8] California Health & Safety Code, §39003
[9] California Health & Safety Code, §§39605, 40916
[10] California Health & Safety Code, §§39500, 41500
[11] California Health & Safety Code, §39600).

adopt control measures required in Sections 40913, 40914, and 40919 of the California Health and Safety Code (CHSC).

Section 40913 requires districts to develop a plan to achieve California's ambient air quality standard by the earliest practicable date. The District's 1991 Clean Air Plan for attaining the state ambient air quality standard for ozone includes proposed amendments to the architectural coatings rule. The proposed amendments to Rule 3 that constitute the scope of this project will meet this requirement.

Section 40914 requires each district plan to demonstrate that the plan includes "every feasible measure". Districts must adopt the most effective control measures to reduce VOC emissions from architectural coatings. A CARB letter dated December 8, 2000 identifies the SCM as a "feasible measure" that should be adopted by districts that are required to prepare California Clean Air Act triennial progress reports and plan revisions. The proposed amendments to Rule 3 will meet this requirement.

Section 40919 requires districts with serious nonattainment for ozone to adopt Best Available Retrofit Control Technology (BARCT) for all existing sources. BARCT means an emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts by each class or category of sources (CHSC Section 40406). Staff have found that the SCM requirements meet the BARCT requirement and therefore the proposed rule will meet the requirements of CHSC Section 40919.

1.3 Purpose and Intended Use of the Draft and Final Environmental Impact Report

The draft Environmental Impact Report was intended to identify any significant effects that the proposed amendments to Rule 3: Architectural Coatings may have on the Bay Area environment. The draft EIR also identifies several alternatives to the proposed amendments and analyzes those alternatives.

The draft EIR was circulated and available for review by the public, interested parties, agencies and organizations for a forty-five day period, and the review process included a public workshop at which staff was available to receive comments on the draft EIR as well as on the proposed amendments to Rule 3. No comments were submitted at the workshop. The comment period closed on November 5, 2001 with only one comment submitted. This Final Environmental Impact Report, consisting of this draft EIR incorporating any changes, the sole comment letter and the responses to those comments will accompany the proposed amendments to Rule 3 when the Board of Directors of the Bay Area Air Quality Management District considers adoption of those amendments.

Reviewers were requested to focus on the adequacy of the environmental review in discussing possible impacts on the environment, ways in which potentially significant adverse effects might be minimized, and any alternatives to the proposed amendments to Rule 3 that might accomplish the same objectives. The sole comment was received on November 5, 2001, but was not characterized as commentary on the EIR, nor were most of the comments directed towards environmental impacts associated with the rule, but rather on technical feasibility of the suggested VOC limits in the proposed Rule 3 and costs associated with meeting those limits. Nevertheless, staff have responded to those comments which infer environmental impacts in this Final EIR. The comments regarding technical feasibility and economic impacts are responded to in the staff report accompanying the propopsed amendments. The Final EIR has been prepared by:

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4 EXECUTIVE SUMMARY

2.1 Introduction

Architectural coatings are coatings applied to stationary structures and their appurtenances. They include a wide variety of products for use on a wide variety of substrates. The use of architectural coatings in California results in substantial emissions of volatile organic compounds (VOC) which contribute to the formation of ozone, for which the District is classified as a nonattainment area. District Regulation 8, Rule 3 controls emissions from architectural coatings. The project for which this document is being prepared consists of proposed amendments to Rule 3 that will reduce the emissions from architectural coatings. The proposed amendments are derived from a Suggested Control Measure (SCM) for Architectural Coatings adopted by the California Air Resources Board on June 22, 2000. Along with the SCM, a Final Program Environmental Impact Report (EIR) was certified.

Legal authority to produce the SCM is derived from the California Clean Air Act. The California Environmental Quality Act requires projects that may have a significant impact on the environment to be analyzed so that decision making bodies can understand any environmental consequences of their actions. The authority and necessity for the proposed amendments are derived from the California Health and Safety Code and from the California Clean Air Act. Staff distributed the draft EIR for comments prior to producing this final EIR for consideration by the District Board along with proposed amendments to Rule 3.

2.2 Project Description

The project location is defined as the boundaries of the Bay Area Air Quality Management District. The project consists of amendments to the existing VOC limitations in Rule 3 which would reduce the allowable VOC contents of many types of architectural coatings, resulting in an emission reduction of 3.75 tons VOC per day. This is an integral part of the proposed 2001 San Francisco Bay Area Ozone Attainment Plan and of the stationary source control measures in the 2000 Bay Area Clean Air Plan and Triennial Assessment.

2.3 Environmental Settings, Impacts and Mitigation Measures

CEQA Guidelines §15126.2(a) require the following: "An EIR shall identify and focus on the significant environmental effects of the proposed project. Direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects."

The following subsections briefly summarize the analysis of environmental impacts that were identified as potentially resulting from implementation of the proposed rule amendments.

2.3.1 AIR QUALITY

The adoption and implementation of the proposed amendments into Rule 3 are expected to produce substantial VOC emission reductions. The analysis concludes that no significant adverse air quality impacts will result from the proposed rule amendments. Some companies in the architectural coatings industry have claimed that lowering the VOC content of coatings will result in increased VOC emissions for a variety of reasons, including an increase in coating thickness, an increase in thinning, an increase in topcoats used to do an adequate job, an increase in the amount of touch-up and recoating required to do an adequate job, an increased need for priming, an increase in the amount of substitution of low VOC coatings with higher VOC coatings, and greater reactivity of low-VOC coating solvents. The analysis reveals that, overall, the proposed rule amendments will achieve significant VOC emission reductions and the claimed adverse impacts will not occur. Also, staff analyzed the potential impacts of the proposed

exemption for methyl acetate and found that, although methyl acetate emissions would be expected to increase, there would not be any significant adverse impacts expected. The analysis also concludes that cumulative impacts are insignificant, and that no mitigation measures are necessary.

2.3.2 WATER

Impacts on water resources are divided into two categories - water demand and water quality. Increased water demand from the manufacturing and use of compliant water-borne coatings was evaluated. The analysis concluded that water demand impacts associated with the proposed rule amendments will be insignificant. The proposed rule amendments are also not expected to adversely impact water quality for several reasons. Due to the existing knowledge of and education programs for coating users, improper disposal is not currently and is not expected to be a problem. The use of toxic solvents that might impact water quality is expected to decline. Also, because many currently available coatings are already water-borne technology, the current impacts on publicly owned treatment works are not expected to significantly change. Finally, any increase in water demand cannot possibly impact the salinity of the Bay. The analysis also concludes that cumulative impacts are insignificant, and no mitigation measures are necessary.

2.3.3 PUBLIC SERVICES

Public service impacts were examined from the viewpoint of potential adverse impacts on public facility maintenance and on the need for increased fire protection. Infrastructure needs at public facilities are not expected to be impacted due to more frequent touchups or recoating to maintain any facility appearance, function or safety. Implementation of the proposed rule amendments is also not expected to result in the need for new or altered public facilities. The increased use of exempt solvents or other replacement solvents as a result of implementing the proposed rule amendments will not result in any significant increased need for fire protection. Although acetone, which is flammable, is expected to be used to reformulate a limited number of coatings it is unlikely that implementation of the proposed rule amendments will increase the need for fire protection, because the solvents that acetone would replace carry the same fire hazards. Finally, risks from accidents or spills was analyzed as a result of the proposed rule amendments and the risk was anticipated to stay the same or decrease. The analysis concludes that cumulative impacts are insignificant, and no mitigation measures are necessary.

2.3.4 TRANSPORTATION AND CIRCULATION

The potential for additional trips to supply newly compliant coating to retailers and distributors, additional trips to solid waste disposal sites to dispose of unusable coating, and additional trips to job sites to finish jobs made longer by inadequate coating were analyzed. Among the reasons cited for these trips were the possibility of shorter shelf or pot lives of coatings or lesser freeze-thaw capabilities, as well as the need for more topcoats. The analysis found that there was no expectation for additional trips and that no adverse impacts were anticipated. The analysis concludes that cumulative impacts are insignificant, and no mitigation measures are necessary.

2.3.5 SOLID AND HAZARDOUS WASTE

The solid and hazardous waste analysis examined increased disposal of compliant coatings due to the possibility of shorter shelf or pot lives or lesser freeze-thaw capabilities, and as, for the potential for additional trips, found that any impact could not be significant. In addition, as hazardous compounds are expected to decrease in the future, the analysis found no potential for additional hazardous waste impacts. The analysis concludes that cumulative impacts are insignificant, and no mitigation measures are necessary.

2.3.6 HAZARDS

Hazards impacts were analyzed for risk of accidental releases that would expose hazardous response workers or members of the public to an increase in exposure to a hazardous substance. It was found that, consistent with the public facilities impacts, no significant adverse impacts were anticipated. In addition, human health impacts were analyzed for short term and long term exposure to solvents used to replace conventional solvents. The analysis concluded that the general public would not be impacted from additional exposure to replacement solvents. Manufacturers are replacing toxic solvents with less toxic solvents in existing low VOC coating formulations. Furthermore, professional coatings applicators' long-term exposure to more toxic replacement solvents such as diisocyanates in industrial maintenance coatings is expected to be minimal due, in part, to existing required and recommended safety procedures. The analysis concludes that cumulative impacts to human health, including lifetime exposures, are insignificant, and no mitigation measures are necessary.

2.4 Other Required CEQA Topics

2.4.1 ENVIRONMENTAL IMPACTS FOUND NOT TO BE SIGNIFICANT

The CEQA Initial Study prepared by CARB staff for the SCM includes an environmental checklist of 15 environmental categories. For the remaining nine environmental areas not analyzed above, the Initial Study concluded that the project would have no significant direct or indirect adverse effects. In addition, no comments were received on these topics at the public meetings for development of the SCM that changed this conclusion. District staff also conclude that there is not possibility of significant impacts to the following environmental resources in the Bay Area resulting from proposed amendments to Rule 3: Land Use and Planning; Population and Housing; Geophysical; Biological Resources; Energy and Mineral Resources; Noise; Aesthetics; Cultural Resources; and Recreation.

2.4.2 IRREVERSIBLE ENVIRONMENTAL CHANGES

CEQA requires EIR's to address the potential for irreversible environmental changes. Consistent with CEQA, additional analysis of the proposed amendments confirms that it would not result in irreversible environmental changes or the irretrievable commitment of resources.

2.4.3 POTENTIAL GROWTH INDUCING IMPACTS

CEQA requires EIR's to address the potential for growth-inducing impacts. Consistent with CEQA, additional analysis of the proposed amendments confirms that it would not foster economic or population growth or the construction of new housing.

2.4.4 CONSISTENCY WITH OTHER PLANS

CEQA requires that an EIR address any inconsistency between the proposed project and applicable general plans and regional plans. Analysis of the proposed amendments to Rule 3 confirms that the project is consistent with the State Implementation Plan, the District's Clean Air Plan, and other regional plans, including the San Francisco Bay Plan, the Suisun Marsh Protection Plan, the Regional Airport System Plan, the San Francisco Bay Area Seaport Plan, regional housing allocation plans, habitat conservation plans, natural resource conservation plans, and smart growth plans.

2.4.5 PROJECT ALTERNATIVES

The alternatives analyzed include alternate measures for attaining the objectives of the proposed amendments to Rule 3. There were alternative methods of structuring a regulation that were analyzed that were rejected as infeasible because they did not meet the project objectives or they were deemed inconsistent with other rule elements, such as EPA policies. These included a rule

with performance based standards, seasonal regulation, regional regulation, exceedance fees for non-compliant coatings, an exemption based on tonnage excess emissions, a low vapor pressure exemption, and reactivity based standards.

Some alternatives were also analyzed that were deemed to be feasible. Those were: No Project, Extended Compliance Dates, Further VOC Reductions, Permanent Product Line Averaging and Different VOC Limits. Although an analysis of each of these alternatives revealed a varying degree of environmental impact with each alternative, staff concluded that the most desirable project alternative is the amendments to Rule 3, as proposed.

3. PROJECT DESCRIPTION

3.1 Project Location

This project location is coincident with the boundaries of the Bay Area Air Quality Management District. The District includes all of seven counties; Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa, and portions of two others; southwestern Solano and southern Sonoma.

The San Francisco Bay Area is an area of exceptional physical and cultural diversity. It covers 5,600 square miles or 3.6 million acres. It includes 98 cities and approximately 6.75 million people, living in approximately 2.5 million homes. The Pacific Ocean, San Francisco Bay, coastal mountain ranges and inland valleys are among the more prominent features that create a physical setting among the most distinct in the world.

The climate and physical features of the Bay Area in combination with emissions from natural and human activities can result in the buildup of pollutants in the atmosphere, causing periodic exceedances of air quality standards. The combination of the amount of emissions generated and the natural factors acting on those emissions to disperse the pollutants or allow them to accumulate and react is referred to as the atmospheric pollution potential. The sheltered inland valleys of the Bay Area with their tendency for light winds, atmospheric stability, abundant sunshine and high summer temperatures, have a high pollution potential. Coastal areas, which experience less atmospheric stability, less sunshine, higher winds and more moderated temperatures, have a lower pollution potential.

3.2 Background

The project consists of amendments to an existing rule. Regulation 8, Rule 3: Architectural Coatings imposes volatile organic compound (VOC) limits on paints and coatings applied to architectural structures. Coatings with VOC contents (a measure of the amount of organic solvent) above the limits may not be sold, distributed or used in the District. Architectural coatings are those coatings to be applied to stationary structures and their appurtenances at the site of installation, to portable buildings at the site of installation, to pavements and to curbs. The rule was originally adopted in 1978, and subsequently amended in 1982, 1983, 1986, 1990 and 1998[12]. Staff of the California Air Resources Board (CARB) , in conjunction with staff of California air districts and under the direction of the California Air Pollution Control Officers Association (CAPCOA), developed a suggested control measure (SCM) for architectural coatings in 1999 and 2000. Although control of stationary sources, including architectural coatings, is the jurisdiction of air pollution control districts, the CARB staff was able to devote sufficient resources to conduct and analyze a survey of architectural coatings sold in 1998 in California, which in turn became the basis for proposed VOC limits in the SCM. Because of the nature of distribution patterns of various companies, a greater resolution of sales data, such as on a district by district basis, is often not possible. In addition, the state had the resources to conduct a series of public workshops for manufacturers, distributors, sellers and users of coatings in a more efficient manner than would each district, if done separately. The SCM was approved by the CARB on June 22, 2000. The proposed amendments to District Rule 3 are derived from the SCM, as was expected from the statewide process.

In association with the development and adoption of the SCM, CARB staff, as lead agency under the California Environmental Quality Act, also prepared a Program Environmental Impact Report

[12] Of these amendments, in 1990 the District adopted amendments that were overturned by action of the San Francisco Superior Court, Dunn-Edwards Corp. v. Bay Area Air Quality Management District (1992) 9 Cal. App. 4th 644,650

(State Clearinghouse No. 99062093). The Program Environmental Impact Report was certified at the June 22, 2000 CARB hearing when the SCM was approved.

The California Environmental Quality Act (CEQA) allows a Program Environmental Impact Report to be prepared when a series of actions that can be characterized as one large project are related either as logical parts in the chain of contemplated actions, or in connection with issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program.[13] The SCM, as designed to be adopted into law in California districts, may be considered the large project that leads logically to actions at the district level. CARB anticipated that local air districts would use the Program Environmental Impact Report when conducting their own environmental assessments as part of adoption of the SCM.[14] The draft and final Environmental Impact Reports (EIR) are tiered from the CARB certified Program Environmental Impact Report. CEQA allows tiering when agencies prepare separate but related projects. Tiering is appropriate when the sequence of analysis is from an EIR prepared for a general program to an EIR for another program of lesser scope, such as a rule adopted based on, and not different from, an SCM.[15] Consequently, the CARB certified Program Environmental Impact Report is adopted by reference as part of this analysis, and this analysis will concentrate environmental impacts unique or peculiar to the Bay Area.

The Bay Area District is designated as a non-attainment area for the federal one hour ozone standard. Ozone, a criteria pollutant, is formed from a reaction of hydrocarbon and oxides of nitrogen in the presence of ultraviolet light. Ozone in the lower atmosphere is an air pollutant that is harmful to humans because it causes respiratory problems. Ozone also reduces crop yields, and accelerates deterioration of paints, finishes, rubber products, plastics and fabrics. The EPA has set primary national ambient air quality standards (NAAQS) for ozone and other air pollutants to define the levels considered safe for human health The District is designated as an unclassified non-attainment area, meaning that the District is not classified into one of the federal categories of moderate, serious or extreme pursuant to the 1990 Clean Air Act Amendments. EPA had redesignated the Bay Area to attainment status for the national 1-hour ozone standard on May 22, 1995. The agency did this because the Bay Area attained the ozone standard at the end of the 1992 ozone season (having had three "clean" years – 1990, 1991 and 1992), and had maintained the standard in 1993 and 1994. In the summers of 1995 and 1996, the Bay Area experienced a number of episodes of hot, stagnant weather. This led to exceedances of the standard. EPA received two petitions requesting redesignation of the Bay Area to nonattainment status (see 63 Fed. Reg. 37261). EPA determined that the "contingency measures" in the *Ozone Maintenance Plan*, approved by EPA in 1995 were not adequate to bring the region back into compliance with the standard and that the region's adopted and projected actions would not be sufficient to re-establish attainment of the standard.[16]

EPA published a final notice that revoked the region's ozone attainment status on July 10, 1998.[17] The co-lead agencies responsible for air quality planning in the Bay Area, the District, the Association of Bay Area Governments, and the Metropolitan Transportation Commission, prepared the *1999 Ozone Attainment Plan* to comply with these requirements. The 1999 Plan was submitted to EPA in August, 1999. The deadline EPA set for attaining the 1-hour national ozone standard was November 15, 2000. The region continued to experience exceedances of the 1-hour ozone standard in 1999 and 2000. Emission reductions from control measures in the *1999 Ozone Attainment Plan* did not prove to be sufficient to bring the Bay Area back into compliance. On March 30, 2001, EPA proposed to make a formal finding that the Bay Area has not attained the national 1-hour ozone standard. The notice also proposed partial approval and

[13] 14 California Code of Regulations, §15168
[14] Final Program Environmental Impact Report; CARB; June, 2000; I-4
[15] 14 California Code of Regulations, §15152
[16] San Francisco Bay Area Ozone Attainment Plan, June 2001, BAAQMD
[17] 63 FR 37258

partial disapproval of the 1999 Plan[18]. The notice set new planning requirements for the District and co-lead agencies. On October 17, 2001, the Board of Directors of the District approved the San Francisco Bay Area Ozone Attainment Plan for the 1-Hour National Ozone Standard. The Plan, submitted to the CARB as an amendment to the California State Implementation Plan, and approved on November 1, contains new transportation, mobile source and stationary source control measures. Among the stationary source control measures is a commitment to adopt amendments to District Regulation 8, Rule 3: Architectural Coatings, based on the provisions of the SCM.

The Bay Area District is also designated as a non-attainment area for the state one hour ozone standard. The CARB set the ozone standard at a level of 9 parts per hundred million (pphm) for a one-hour average, significantly more stringent than the national standard of 12 pphm. Under the requirements of the California Clean Air Act of 1988, areas not complying with the standard must prepare plans to reduce ozone. Plans were required in 1991 and each three years thereafter. The most recent District Clean Air Plan to meet this requirement was prepared in 2000 and adopted by the District Board of Directors on December 20, 2000.[19] In the 2000 Plan, and in fact, in every triennial Clean Air Plan, a control measure has been listed to reduce emissions of VOC by amendments to Regulation 8, Rule 3 that would lower allowable VOC limits for architectural coatings. Initially, as the 1991 Clean Air Plan was adopted, the District was still subject to the lawsuit that eventually overturned the 1990 amendments to Rule 3. Subsequently, District staff, along with staff of CARB and representatives of industry, other state agencies, environmental groups and EPA, participated in a national regulatory negotiation for architectural and industrial maintenance coatings[20]. EPA chose to regulate architectural coatings under Section 183(e) of the Clean Air Act. This effort lasted nearly two years, until 1994, but concluded without consensus on a regulation. EPA then promulgated a national rule for architectural coatings on August 14, 1998.[21] Generally, it is believed that California districts would not see emission reductions from the national rule, as the majority of VOC limits set were higher than, or, at best, equal to, VOC limits in effect in the District, and in many areas of California, since the late 1980's. The significant exception was for traffic coatings. However, Caltrans, the largest user of traffic coatings, already used coatings that were in compliance with the national VOC standard, except in the extreme northwest area of California. It was estimated in the SCM that the national rule would only reduce VOC emissions from traffic coatings by 0.36 tons/day statewide.[22]

3.3 Purpose and Objectives of the Project

The purpose of this project is to reduce ozone forming emissions of volatile organic compounds from architectural coatings by setting maximum allowable VOC contents for various categories of architectural coatings sold and used in the Bay Area. The objective of this project is to reduce emissions of VOC by 3.75 tons/day from an architectural coatings emissions inventory of about 24.7 tons/day. According to the proposed 2001 Ozone Attainment Plan, these emissions reductions are necessary to meet and maintain the federal ambient air quality standards for ozone.[23] They are also necessary to make progress toward the California state ozone standard of 0.08 ppm.

3.4 Description of the Proposed Amendments to Regulation 8, Rule 3

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[18] 66 FR 17379
[19] Bay Area 2000 Clean Air Plan and Triennial Assessment, December 2000, BAAQMD
[20] 57 FR 1443
[21] 63 FR 48877
[22] Staff Report for the Proposed Suggested Control Measure for Architectural Coatings, CARB, June 2000, p. 218.
[23] SF Bay Area 2001 Ozone Plan, op. cit.

The proposed project is to revise BAAQMD Regulation 8, Rule 3: Architectural Coatings, to incorporate, with minor modifications, the VOC maximum allowable limits and other requirements contained in the state SCM for Architectural Coatings approved by the California Air Resources Board on June 22, 2000. The SCM sets allowable VOC content limits based on existing and currently developing coating technologies for a number of architectural coating categories, including flats, nonflats, industrial maintenance, lacquers, floor, roof, rust preventative, stains, and primers, sealers, and undercoaters.

The amended Rule 3 would apply to any person who supplies, sells, offers for sale, or manufactures any architectural coating for use within the District, as well as any person who applies or solicits the application of any architectural coating within the District. The appendix presents the proposed amendments to Rule 3 in strikeout/underline regulatory format. Further information regarding CARB's SCM for architectural coatings is presented in the CARB Final Program EIR.

The proposed revisions to Rule 3 involve lowering the VOC content limit for a number of architectural coating categories. The proposed revisions also include increasing VOC content limits for several coating categories. The proposed revisions to increase the VOC content limits for certain architectural coating categories are being proposed because coatings that meet the current VOC limits in Rule 3 for those categories may not be available, or the lowered VOC content limits require new categorization of these coatings. These revised VOC limits will be consistent with the corresponding limits in the SCM. The subject categories are Antenna Coatings, Anti-fouling Coatings, Faux Finishing Compounds, Flow Coatings, Rust Preventative Coatings, and Temperature-Indicator Safety Coatings. The current and proposed VOC limits for these categories are indicated in the appendix.

Provisions for product-line averaging are included in the proposed rule amendments. These provisions add an averaging compliance option to the rule. It allows manufacturers to average designated coatings such that their average cumulative emissions are less than or equal to the cumulative emissions that are allowed under the rule. The averaging compliance option is only in effect from January 1, 2003 until January 1, 2005. The language includes a VOC ceiling, or maximum VOC limit for coatings that may be used in an averaging compliance option. This issue came up as ARB and the South Coast AQMD were working on specific guidelines for the averaging program. The VOC ceiling was adopted by the Sacramento Metropolitan Air Quality Management District at the first District adoption of the state SCM in May, 2001. The maximum limits represent the most common district limits in effect when the SCM was approved in June, 2000. On June 7, 2001, Michael P. Kenny, Executive Officer of CARB, reinforced the emissions averaging VOC limit ceiling in a letter to the air districts. In an effort to maintain statewide consistency, an important element of the averaging compliance option since the averaging may be done on a statewide basis, and to prevent high VOC coatings that have previously been illegal entering the District, Rule 3 proposes the same maximum VOC ceiling limits for averaging.

4. ENVIRONMENTAL SETTINGS, IMPACTS AND MITIGATION MEASURES

4.1 Introduction

Under CEQA, an Environmental Impact Report must identify the potentially significant adverse environmental effects that may result from a proposed project. The EIR analysis must include direct and indirect significant adverse effects of a project, including short and long-term impacts. The discussion of environmental impacts should include, but is not limited to: the resources involved; physical changes; alterations of ecological systems; health and safety problems caused by physical changes; and other aspects of the resource base, including water, scenic quality, and public services. If potentially significant adverse environmental impacts are identified, the EIR must then discuss mitigation measures that could either avoid or substantially reduce those adverse environmental impacts.

This section describes the environmental setting for the project, any adverse impacts that may result from the project, and mitigation measures that would be proposed to lessen or reduce the adverse impacts fro the project. CEQA Guidelines establish a checklist for use by public agencies, which lists 16 environmental categories to be addressed when determining whether to prepare an EIR. CARB staff prepared an initial study based upon this checklist prior to preparing the Draft Program Environmental Impact Report for the SCM. District staff reviewed the CARB Initial Study, draft Program EIR and final Program EIR, as well as the Sacramento Metropolitan Air Quality Management District's draft and final EIR prior to preparation of the draft EIR for the Bay Area. On August 2, 2001, District staff sent a Notice of Preparation to responsible and trustee agencies. Of the 16 potential environmental impact categories on the checklist, District staff determined that an EIR should be prepared to address potential adverse effects on the following environmental categories: air quality, water, public services, transportation and circulation, solid and hazardous waste, and hazards. The following sections analyze the potential adverse environmental impacts associated with implementing the proposed amendments to Regulation 8, Rule 3: Architectural Coatings.

4.2 Air Quality

4.2.1 ENVIRONMENTAL SETTING

The jurisdictional boundaries of the Bay Area Air Quality Management District, known as the Bay Area air basin, encompasses the Counties of Alameda, Contra Costa, Marin, Napa, San Francisco, Santa Clara and portions of western Solano and Southern Sonoma, totaling approximately 5,600 square miles. The Bay Area physiograpy is characterized by a large shallow basin surrounded by coastal mountain ranges tapering into sheltered inland valleys. The combined climatic and topographic factors present in the Bay Area result in an increased potential for accumulation of air pollutants in the inland valleys and a reduced potential for buildup of air pollutants along the coast.

The climatology of the Bay Area, in combination with the topography and pollutant emissions, determines the atmospheric pollution potential. The atmospheric pollution potential is the potential for a given quantity of air emissions to be dispersed as a result of the combined influence of atmospheric and geographic conditions, either lowering or increasing the potential for exceedances of ambient air quality standards. In the Bay Area there is a wide range of atmospheric pollution potential resulting predominantly from four factors; winds, atmospheric stability, solar radiation and sheltering terrain.

Winds can disperse pollutants. Atmospheric pollution potential increases in the sheltered valleys of the Bay Area because the terrain tends to reduce wind speeds. Reduced wind speed in the valleys combined with daytime up-valley and nighttime down-valley air flow can result in the accumulation of pollutants. Temporally, these low wind speeds usually occur in conjunction with periods of high pollution emissions, typically during the early morning and late afternoon or evening commute traffic, and on clear, cold winter nights.

Whereas winds are indicative of horizontal dispersion of air pollution, atmospheric stability determines the ability of air pollutants to dispersed vertically. In the Bay Area, the ability of air pollutants to be dispersed vertically is frequently limited by inversions. An inversion, a blanket of warm air trapping a layer of cooler air underneath, forms an almost impenetrable barrier to the vertical dispersion of air pollutants at the boundary between the two air masses. Inversions result from a variety of climatic factors and the different types of inversion have a wide seasonal variation.

Between late spring and early fall, a layer of warm air often overlays a layer of cool air from the Delta and San Francisco Bay, resulting in an inversion. Typical winter inversions are formed when the sun heats the upper layers of air, trapping below them air that has been cooled by contact with the colder surface of the earth during the night. Although each inversion type predominates at certain times of the year, both types can occur at any time of the year. Local topography produces many variations that can affect the inversion base and thus influence local air quality.

Solar radiation plays an integral role in the formation of photochemical smog. In the presence of sunlight and warm temperatures, hydrocarbons, referred to as volatile organic compounds, or VOC, and oxides of nitrogen (NO_x) combine through a complex series of chemical reactions to produce photochemical smog, the largest fraction of which is ozone. The inland valleys of the Bay Area experience higher temperatures and more abundant sunshine than coastal areas and, therefore, have a higher atmospheric pollution potential with respect to the formation of photochemical smog.[24] Ozone is primarily a summer and fall pollution problem due to the hotter temperatures, longer exposure of precursor pollutants to solar radiation, and potential for less vertical and horizontal dispersion.

The Bay Area violates the federal and state standards for ozone. According to the 2001 Ozone Plan, emissions of VOC from stationary sources must be reduced by over 8 tons/day to meet the federal air quality standard for ozone.[25] Figure 4.1 illustrates the contribution of various sectors of VOC producing activities to the Bay Area total.[26] It is important to note that the BAAQMD does not have jurisdiction over all sources of VOC. Motor vehicles and other mobile sources are under the jurisdiction of CARB and the federal government. Also, CARB has jurisdiction over consumer products and aerosol paints. In Figure 4.1, architectural coatings are included in the category labeled, "Petroleum and Solvent Evaporation". Architectural coatings, specifically excluded from the definition in the California Health and Safety Code as consumer products[27], emit about 25 tons/day of the approximately 550 tons/day Bay Area VOC emissions, or about 4.5 % of the total. Of the VOC emissions that BAAQMD has jurisdictional control of, emissions from architectural coatings represent a little over 14%. Figure 4.2 shows the contributions of various sectors of NO_x producing activities. NO_x functions as both a precursor to ozone and as a reactant with ozone, acting, in effect, to scavenge ozone out of the atmosphere.

[24] Environmental Impact Report for the 1991 Bay Area Clean Air Plan, BAAQMD, 1991
[25] 2001 SF Bay Area Ozone Plan, op. cit.
[26] Bay Area 2000 Clean Air Plan, op. cit.
[27] CH&C 41712(a)(1)

FIGURE 4.1
2000 Summer Emissions: Ozone Precursors
Volatile Organic Compounds (VOC)
551 tons/day

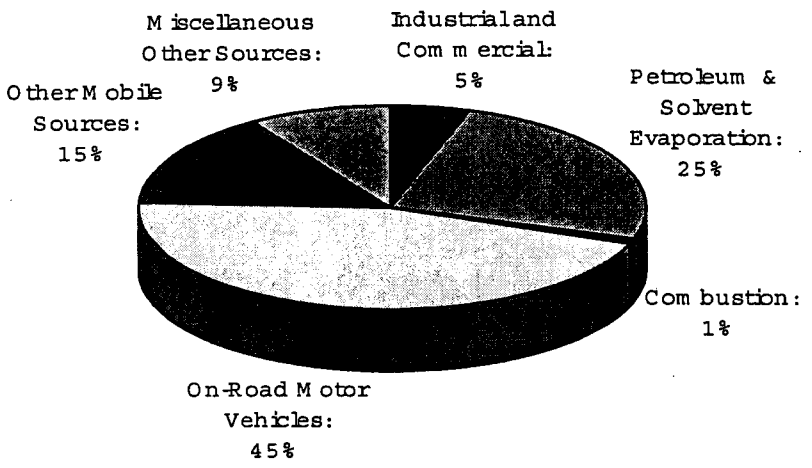
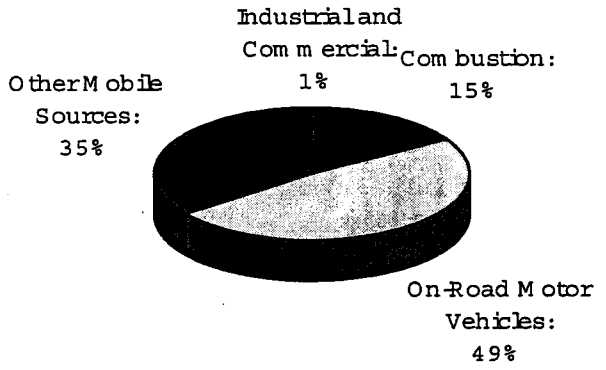


FIGURE 4.2
2000 Summer Emissions: Ozone Precursors
Oxides of Nitrogen (NOx)
571 tons/day



Under Section 185B of the federal Clean Air Act, the National Academy of Sciences was charged with studying the role of VOC and NO_x emissions in ozone formation. Its study, *Rethinking the Ozone Problem in Urban and Regional Air Pollution*, was conducted by the National Research Council and published in 1991. A central finding of the study was that the relative effectiveness

of VOC and NO_x controls for reducing ozone depends on the ambient VOC to NO_x ratios within an air basin. At ambient VOC to NO_x ratios of about 10 or less, VOC control is more effective, and NO_x controls may be counterproductive. At VOC to NO_x ratios of 20 or more, NO_x control is generally more effective. The Bay Area ratio of VOC to NO_x is less than 10. The Bay Area is a VOC limited area, meaning that formation of ozone is limited by the amount of VOC in the air, and NO_x is in excess. Therefore, the most effective strategy for reducing Bay Area ozone concentrations is to limit VOC emissions.[28] It is estimated that VOC reduction alone is sufficient to meet the federal standards for ozone, however, both VOC and NO_x reductions are necessary to meet the more stringent California standards. Also, reductions in NO_x are required to reduce transport emissions to air districts downwind from the Bay Area.

4.2.2 SIGNIFICANCE CRITERIA

The District has established thresholds of significance for air quality impacts. The threshold of significance for a given environmental effect is that level at which the District finds the effects of the project to be significant. According to the California Office of Planning and Research (OPR), a threshold of significance can be defined as: "A quantitative or qualitative standard, or set of criteria, pursuant to which the significance of a given environmental effect may be determined." The following table lists the threshold of significance established in 1996.[29]

Table 1. Thresholds of Significance for Air Quality Impacts

Pollutant	ton/yr	lb/day	kg/day
VOC	15	80	36
NO_x	15	80	36
PM_{10}	15	80	36

In addition, thresholds of significance exist for potentially odorous projects and for toxic air contaminants. The threshold of significance for toxic air contaminants is defined as a project that has either; 1) a probability of contracting cancer for the Maximally Exposed Individual (MEI) that exceeds ten in one million, or 2) a ground level concentration of non-carcinogenic toxic air contaminants that would result in a Hazard Index of greater than 1 for the MEI. The threshold of significance for odorous projects is somewhat more subjective. It is based on distance between potential receptors and the project source, the type of source and any history of complaints.

4.2.3 ANALYSIS OF POTENTIAL ENVIRONMENTAL IMPACTS

The following is a discussion and analysis of issues raised by some members of the coating industry. For each issue area, District staff reviewed the detailed analysis of these issues prepared by CARB staff and contained in Section IV, Subsection C of the Program EIR prepared for the SCM for architectural coatings. Staff also reviewed the comments received in response to the Program EIR, and the responses to those comments. In addition, staff considered the information compiled to date through ongoing studies by the South Coast Air Quality Management District (SCAQMD) with National Technical Systems (NTS), a testing program by the essential public service agencies (EPSA), a testing program by the Southern California Alliance of Publically Owned Treatment Works (SCAP), and an analysis of the Harlan Associates Study prepared by Stan Cowen of the Ventura County Air Pollution Control District. The analysis and discussion in this EIR also considers the following update of the studies prepared since certification of the CARB Program EIR.

<u>SCAQMD Phase II Assessment Study of Architectural Coatings</u>. In 1998, the SCAQMD initiated a performance study with National Technical Systems (NTS) to evaluate the following six

[28] Bay Area 1997 Clean Air Plan and Triennial Assessment, BAAQMD, December 17, 1997
[29] BAAQMD CEQA Guidelines, Assessing the Air Quality Impacts of Projects and Plans, BAAQMD, April, 1996 and December, 1999

architectural coating categories: Industrial Maintenance, Non-flats, Primers/Sealers/Undercoaters, Quick Dry Enamels, Quick Dry Primers/Sealers/Undercoaters, and Waterproofing Sealers. The objective of the performance study was to conduct side-by-side laboratory and outdoor exposure tests for coatings with varying VOC contents.

The study involved 31 manufacturers or brands, 94 coatings, 46 coating systems (e.g., primer and topcoat), and over 3000 test panels. The laboratory portion of the study was completed in 1999, and is summarized in Appendix E of the CARB staff report for the proposed SCM, which was approved by CARB concurrent with the adoption of the SCM on June 22, 2000. In general, the laboratory portions of the study revealed similar performance among high and low-VOC coatings.

The outdoor real time exposure testing is ongoing and includes a desert and coastal environment. The outdoor real time exposure will last for two years, and will not be completed until 2002. CARB staff will summarize the data at that time.

Essential Public Service Agencies Testing Program. In response to comments provided by the essential public service agencies (EPSA), the SCAQMD's May, 1999 architectural coatings rule amendments established a new specialty category called "essential public service coating." The category is for protective coatings applied to components of power, municipal wastewater, water, bridges and other roadways, transmission or distribution systems during repair and maintenance procedures. The category includes coatings used by the EPSA that were previously included in the industrial maintenance coatings category. The essential public service category was created to allow additional time for the ESPA to complete the lengthy administrative processes to identify, evaluate, budget and purchase new coatings to replace those currently used for public infrastructure. The category's VOC limit decreases to 100 g/l by 2006 in the South Coast rule, then matching the SCAQMD industrial maintenance category limit. Thus, the ESPA testing program will primarily focus on coatings capable of meeting the 100 g/l VOC limit. However, the program is also evaluating some coatings at the 250 g/l VOC level.

Earlier this year, the members of EPSA entered into a memorandum of understanding (MOU) to accomplish their common coating performance testing goals. The EPSA membership consists of: Caltrans (California Department of Transportation); California Department of Water Resources; Los Angeles Department of Water and Power; and Metropolitan Water District of Southern California.

A technical steering committee consisting of representatives from each public service agency, SCAQMD, and CARB has been established. The technical steering committee has approved a test program design that includes test sequences, test procedures, and performance evaluation criteria. Coating selection and application is ongoing. The scope of testing will involve laboratory and field tests of compliant coatings and is expected to last a number of years even with expedited testing efforts. For example, the coating evaluation process at Caltrans entails a laboratory screening and characterization, including health and safety review (4 months), cyclic corrosion testing in the laboratory (8 months), field application tests (2 years), and specification development (2 years).

Southern California Alliance of Publicly Owned Treatment Works Testing Program. The Southern California Alliance of Publicly Owned Treatment Works (SCAP) represents over 55 government agencies involved in the treatment and recycling of water and wastewater. As a result of VOC limits specified in SCAQMD Rule 1113 and the SCM, SCAP has committed to evaluate the performance, durability and application requirements of low VOC (less than 100 g VOC/liter to 340 gram VOC/liter) coatings suitable for wastewater environments. The testing program includes laboratory and field tests and is scheduled to conclude in 2003.

Harlan Associates Study. In February 1995, CARB published the results of performance testing of architectural coatings by Harlan Associates, Inc. The purpose of the study was to determine

the physical properties and performance of representative products in eight coating categories. A total of 110 coating products, purchased during late 1993 and throughout 1994, were tested in the following categories: industrial maintenance primers and topcoats, high-temperature industrial maintenance coatings, lacquers, varnishes, non-flats (including quick-dry enamels), primer/sealers (including quick-dry primer/sealers), sanding sealers and waterproofing sealers (wood and concrete).

While the raw data from this study were published in 1995, an analysis of the overall comparison of the coatings' test performance was not published. In developing the proposed SCM, CARB and districts' staff analyzed and summarized the raw data. This performance study, although somewhat dated, is used to supplement the newer NTS study.

i) Industry Issue: Increased Thickness of Lower VOC Coating Films

Industry has commented that, in order to meet the VOC limits proposed, manufacturers would need to reformulate many of their coatings to increase the amount of solids contained in those coatings, and would correspondingly reduce the amount of solvent. According to industry, this increase in solids content would lead to an increased thickness of the low-VOC coatings being applied. Increased coating thickness would have two main effects. First, the coatings would become more difficult to handle during application due to increased viscosity. Secondly, a set amount of coating would cover less surface area, resulting in application of more coating to cover the desired surface, canceling the benefit of a lower VOC content per unit of coating. Industry representatives have contended that it is mainly high-solid, solvent-based alkyds, non-flats in particular, that will have this problem. During the review period of the draft Program EIR, CARB received comments from industry that they had misinterpreted earlier comments that addressed this issue. Industry stated that CARB had focused too narrowly on increased thickness as it applied to waterborne coatings, not high solid, solvent-based alkyds.

CARB staff response to these comments indicated that more attention was paid to water-borne coatings because water-borne coatings made up a very large percentage (95%) of non-flats. CARB also stated that there are a number of options manufacturers could choose which would allow them to reformulate coatings that would comply with the rule while not increasing solids. These include using exempt solvents or moving to a water-based system. If a manufacturer does decide to reformulate a coating to increase solids content, less viscous resins exist which would allow compliant coatings to be manufactured while not increasing overall thickness. CARB used labels and product data sheets in part to determine the coverage expected from use of coating products. According to CARB staff, in evaluating product data sheets[30] from 500 different coatings and the results of its 1998 Architectural Coatings Survey, there was no apparent relationship between VOC content and the amount of solids that are present in the coating and no relationship between solids content and coverage. CARB also stated that an indicative way to determine whether low-VOC levels corresponded to increased solids and increased thickness was to see whether there had been an increase in overall per-capita sales over time. It was found that coatings sales had remained constant on a per-capita basis over the last 12 years.

CARB staff analysis of this issue in the Program EIR is relevant to the Bay Area. District staff looked at this issue to see if there were any local issues that might alter CARB's conclusion and found that CARB's analysis is applicable to the Bay Area. There is nothing to suggest that reformulated coatings that work in other parts of the state would not also work in the Bay Area, nor is there any reason why coatings would exhibit an increase in viscosity or film thickness in humid coastal areas. Although a decrease in temperature would result in higher viscosity, coatings typically carry advisories regarding application temperatures. For example, labels on

[30] Product data sheets contain the performance specifications made by coatings manufacturers to their customers. These specifications are generally based on laboratory tests performed by the manufacturers. Manufacturers usually use test methods approved by the American Society for Testing and Materials (ASTM).

water based coatings often advise application at 50°F or above. Typically, although coastal regions are cooler than inland areas in the summer, they are often warmer in the winter and rarely have diurnal temperatures of less than 50°F.

ii) Industry Issue: Illegal Thinning of Lower VOC Coatings

When commenting on CARB's draft Program EIR, industry representatives also raised the issue of possible illegal thinning that would occur if the proposed VOC limits were adopted. The coatings affected by this are supposedly the same kinds of coatings that would be affected by the increased thickness problem discussed previously. According to industry, individual users will add solvent to thin products that have been made more viscous due to increased solids content, potentially exceeding the maximum allowable VOC limits. Representatives from industry also commented that the CARB field study on thinning was flawed due to inaccurate sampling because the focus was on higher-VOC specialty coatings that are less likely to be thinned.

Coatings can be reformulated to a lower VOC content in three ways: 1) by the use of solvents, determined by the US EPA to have a negligible contribution to photochemical reactivity and exempted by the District in Rule 3, as substitutes for regulated organic solvents; 2) by the substitution of water for organic solvent; and 3) by an increase in the solids content and a corresponding decrease in organic solvent per unit volume of coating. In the case of the first two options, the addition of exempt solvents or water to further thin coatings does not increase the VOC content of coatings. The third option could be thinned with organic solvents as alleged, however, as stated previously, low-VOC coatings were found to exhibit similar thickness and coverage to higher VOC coatings when applied without excessive thinning. In addition to the 1991 CARB field study on thinning, South Coast AQMD staff conducted two field studies in connection with amendments to the South Coast architectural coatings rule (Rule 1113). The studies, conducted in 1993 and 1996, summarized in the CARB Program EIR, indicated that coating applicators rarely thinned coatings, and, when they did, most of the time they followed the manufacturer's instructions and so did not exceed allowable VOC limits.

In the Bay Area, lower coastal temperatures and higher humidity would not encourage a coating applicator to thin coatings to decrease viscosities or film thickness, in fact, these Bay Area attributes would discourage thinning. Inland valleys in the Bay Area have a climate more akin to the other areas in the state where amendments to architectural coating rules have already been adopted, the South Coast and Sacramento County. Coatings should be expected to be used and thinned in the same way.

iii) Industry Issue: Lower VOC Coatings Require More Priming

Industry representatives have commented that adopting the proposed VOC limits will lead to an increase in the application of primers that would be necessary to get low-VOC water-based latex enamels to adhere and perform adequately. The contention is that water-based latex enamels have poorer adhesion when being used to coat difficult substrates, and because the coatings have poor sealing and stain-blocking properties.

Product data sheets reviewed by CARB staff for low-VOC coatings do not indicate that priming is recommended to a greater extent than for higher VOC coatings. Typically, both high and low-VOC coatings are recommended to be applied only to "clean, dry surfaces." Many products are marketed as having excellent adhesion properties. Also, the NTS study demonstrated that adhesion characteristics of low-VOC coatings are similar to conventional coatings. No increase in primer sales is evident that would correspond with previous restrictions on VOC contents of topcoats. Finally, the SCM includes a category for "Specialty Primers." Those are primers that are recommended for use to seal fire, smoke or water damage, condition chalky surfaces, or block stains. The VOC content limit set by the proposed amendments to Rule 3 for specialty primers will be the same as currently exists, 350 g VOC / liter.

The allegation of increased use of primers associated with low VOC topcoats is a function of the surfaces to be coated and the preparation of those surfaces. In cooler coastal conditions, higher humidity might be expected to be a factor if surfaces are wetter as a result. However, if surfaces are excessively wet, neither low nor higher-VOC primers nor topcoats should be applied, and application in these conditions is not recommended by manufacturers. The proposed amendments to Rule 3 incorporate several provisions to address exposure of substrates to humid environments. The first is the creation of a category for "Rust Preventative" coatings. This category is not found in the existing Rule 3. The category is specifically for prevention of corrosion of non-industrial metal surfaces, as might be expected in high-humidity environments. The VOC limit proposed is 400 g/liter, sufficient to accommodate existing solvent-borne coatings used for this purpose. Also, although the amendments propose a reduction in the allowable VOC content for Industrial Maintenance Coatings in 2004, from 420 g VOC/liter to 250 g/VOC/liter, there is a special provision in the SCM and in the proposed amendments that allow the Bay Area to allow Industrial Maintenance coatings of up to 340 g VOC/liter, provided the applicator can demonstrate a need (for example, application to coastal bridges). This allowance was instituted by CARB in the SCM after consultation with Caltrans about the need for non-water borne coatings for some applications in high-humidity environments. The allowance, however, can also be used for the use of other industrial maintenance painting projects throughout the Bay Area, provided need for a coating with a VOC content greater than 250 g/l is demonstrated.

iv) Industry Issue: The Necessity for More Topcoats

Industry representatives have commented that the proposed VOC reductions will result in an increased usage of topcoats. This is because low-VOC products will not exhibit satisfactory coverage, film build, or flow-and-level, described as the movement of a coating during and after application so as to obliterate surface irregularities caused by the application equipment such as brush marks or of the coating itself during drying and curing, such as cratering or "orange peeling". The contention is that the problems that would lead to more topcoat use are mostly exhibited in water-based latex topcoats and that CARB staff, in producing the Program EIR, relied in part on studies that focused mostly on solvent based products. Industry also stated that the NTS study used by CARB was flawed because test panels were coated by draw down method that does not reflect real-world application, and because industrial maintenance topcoats were not subjected to real-world exposure levels for a sufficient amount of time. Industry representatives, however, were on the NTS technical advisory committee that approved the testing protocol, including draw downs.

CARB staff have noted that the data showed that water based latex products did not demonstrate the deficiencies iterated by industry. These products examined make up the majority of latex non-flats available on the market. The use of the draw down method to coat test panels was thought to be appropriate because this helps to standardize the application process, important to establish a consistent base from which to judge results. CARB staff also responded to the issue of insufficient exposure, stating that the tests represent a reasonable amount of exposure, and that to subject coatings to all possible types of exposure and lengths of service would be an unrealistic undertaking. The length of exposure was not deemed to be an important factor for measuring characteristics that can be measured shortly after application, such as coverage, build, and flow-and-level.

There is nothing in the characteristics of the Bay Area climate that indicate that there would be any difference in these issues. Cooler summertime temperatures and higher coastal humidity would, if anything, help expand the window of time for coatings to flow-and-level. Nothing in climatic conditions would indicate greater or lesser film build or coverage.

v) Industry Issue: More Touch-Ups and Coating Repair Will Be Needed

Some coatings manufacturers and contractors claim that water-borne and low-VOC solvent-borne formulations do not dry as fast as conventional coatings and, therefore, are susceptible to damage such as sagging, wrinkling, or "alligatoring" during drying or curing, or becoming scraped

and scratched before forming a sufficiently resistant coating film. Also, some industry representatives contend that low-VOC and water-borne topcoats will require more touch-up and repair work because longer drying times allow for the contamination of the coated surface with airborne dust and construction debris. Industry representatives also claim that water-based coatings tend result in severe blocking problems, the undesirable sticking together of two coated surfaces. Because of these problems, there will be a need to apply additional coating to touch-up or repair surfaces.

CARB staff reviewed product data sheets to analyze the recommended drying time between coats, which would be the cause of wrinkling or sagging, and found that the dry time recommended for low-VOC coatings was similar or less than the average drying time for conventional coatings in all categories except lacquers. Also, per-capita coating sales have not increased since 1988 which indicates that there is no increase in touch-up and repair due to the increased use of water-borne coatings. The NTS study examined blocking characteristics of coatings, and results of the study demonstrated that blocking characteristics of low-VOC coatings are similar to conventional coatings. Consequently, more coating usage due to an increased need for touch-up and repair work is not anticipated. The NTS study did note a greater dry time for lacquers, specifically acetone based lacquers. The difference noted was a 1/2 hour longer dry time between lacquers of greater than the current standard of 680 g/l VOC, and lacquers compliant with the proposed 550 g/l standard, and 18 minutes longer between lacquers of less than 680 g/l and the proposed 550 g/l standard.

The climatic conditions of the Bay Area, cooler and more humid environments along the coast, might create a longer dry time for lacquer products, particularly water based lacquers. However, acetone based lacquers should not experience this problem. Acetone is a very fast evaporating solvent, to the extent that blushing, a product of over-rapid drying can sometimes occur. This is the reason for the provision to add VOC in cool and humid conditions, to retard drying to aid film formation. For other categories of coatings, as demonstrated by the NTS study and analysis of product recommendations, there would not be expected to be any significant impact on coating application in coastal areas.

vi) Industry Issue: The Necessity for More Frequent Re-coating

Some coating manufacturers and contractors assert that durability of compliant water-borne and low-VOC solvent-borne coatings are inferior to that of traditional solvent-borne coatings. They claim that the new coatings have many finish and durability problems that become apparent over time, such as cracking, peeling, excessive chalking, blistering and color fading. Therefore, low-VOC coatings result in more frequent re-coating and, consequently, result in more VOC emissions than traditional coatings over time due to this lack of long term durability.

The long term durability of a coating is affected by many factors, such as surface preparation, application method, environment (mechanical stress, thermal weathering), type of binder or resin in the formulation, and the substrate coated. Generally, of these factors, surface preparation recommendations, application methodology, environment and substrate are the same for older high-VOC coatings as for newer low-VOC ones. Although conventional binder systems and newer low-VOC compatible binder systems have different performance attributes, results of the NTS study show that low-VOC coatings overall have similar or superior performance and application characteristics to higher-VOC coatings. The CARB Program EIR found that low-VOC coatings are as durable and long lasting as conventional coatings. In addition, poorer long term performance would result in higher coating sales, which would be evident on a per capita basis. This is not the case. Advancements in coatings technology, including modification of the binder systems and in the many additives that impart special characteristics such as UV light resistance, color retention, flexibility, and preservatives have resulted in improvement of the durability of new coatings. Therefore, claims of increased VOC emissions from more frequent re-coating are unfounded.

In the Bay Area, cooler or more humid coastal conditions would not result in long term durability consequences. In fact, many of the allegations are based on exposure to solar radiation, which would be less of a factor at the coast. One other attribute of coastal conditions that could affect coatings is the corrosive properties of a salt spray environment. The NTS study did examine salt spray, and found that newer, low-VOC coatings tend to resist salt spray environments equally well as do higher-VOC coatings. As mentioned above, the Bay Area is incorporating special provisions from the SCM into the proposed Rule 3 that will allow for a higher VOC content for industrial maintenance coatings when surface needs dictate. Consultation with Caltrans, especially regarding coastal structures such as bridges, led to the implementation in the SCM of this provision.

vii) Industry Issue: Illegal Substitution of Higher-VOC Coatings for Lower Due to Consumer Dissatisfaction

Some coating manufacturers and contractors assert that because water-borne and low-VOC solvent-borne coatings are inferior in durability and more difficult to apply than conventional coatings, consumers and contractors will substitute allegedly better performing, higher VOC coatings, the use of which might be applicable to other categories, for use in coating categories with low VOC compliance limits (e.g., use of a rust preventive coating, which has a higher VOC content limit allowance, in place of an industrial maintenance coating or nonflat coating with a lower VOC limit.)

The Program EIR did not find that widespread substitution is likely as a result of adopting a rule based on the SCM for several reasons: 1) the results from the NTS study show that low-VOC coatings with similar performance characteristics to conventional coatings are currently available; 2) the SCM, on which the Rule 3 proposal is based, does not allow the application of certain categories of coatings except in some specific settings. For those coatings, labeling requirements make it clear for what uses the coating is recommended and where it is prohibited (e.g., rust preventative coatings cannot be used in industrial settings.); and, 3) the SCM requires that when a coating can be used in more than one coating category, the lower VOC limit of the two categories is applicable, with the exception of some specified categories where the performance needs of the higher VOC coatings are paramount. It is not expected that consumers and contractors will substitute higher-VOC coatings for low-VOC coatings when recommendations make it clear that coatings are recommended for specific purposes and additional uses are restricted. In addition, reporting requirements for some categories that require manufacturers to report California sales in will highlight a shift from one category to another if one occurs.

This allegation of substitution based on dissatisfaction has no bearing on any special climatic considerations that might be present in the Bay Area. As iterated above, tested performance characteristics that compare low-VOC coatings to high-VOC coatings do not lead to a conclusion that consumers will be less than satisfied with low-VOC products.

viii) Industry Issue: Solvent Species Used in Low-VOC Coatings Have More Reactivity

Some industry representatives claim that requiring manufacturers to reformulate to water-borne technology will lead to increases in ozone formation because the VOC's used in water-borne coatings are more reactive than those used in solvent-borne coatings. Industry also suggested that the VOC's used in architectural coatings, such as mineral spirits, have an atmospheric reactivity potential that is low enough to have an effectively negligible contribution to ozone formation. It has also been also suggested that NOx control alone may be most appropriate for reducing ground level ozone. Finally, it has been claimed that mass-based controls may not be effective and that reducing VOC under certain conditions may be counterproductive and may actually lead to ozone nonattainment.

Existing data do not support the claim that water-borne coatings are more reactive than solvent-borne. Using the Maximum Incremental Reactivity (MIR) scale developed by Dr. William Carter

at UC Riverside, and others, as the basis for comparing reactivities of different species of VOC, it is true that, on a per gram basis, a typical VOC used in water-borne coatings, such as propylene glycol, is two to three times more reactive than a typical mineral spirit used in a solvent-based coating. However, considering the typical difference in mass of VOC between waterborne low-VOC coatings and solvent-borne high-VOC coatings, which can be characterized as the total, or weighted, reactivity of a product (or product category), CARB staff found out that solvent-borne coatings are over two times more reactive than water-borne coatings. In addition, the reactivity of propylene glycol is approximately three times less reactive (on a per gram basis) than that of some species of VOC used extensively in solvent-borne coatings, such as xylene and toluene. Analysis also showed that the reactivity of some solvents used in water-borne coatings is similar to a typical mineral spirit used in solvent-borne coatings. An additive complication is that "mineral spirits" is a generic term used to describe a non-specific mix of petroleum distillates. The reactivity of some blends of mineral spirits may be low, however, as the proportion of some species, such as aromatic hydrocarbons, increases, the reactive potential increases. In any case, studies show that the reactivity of mineral spirits is several times that of ethane, which is considered by EPA to be the cut point for determination of whether a VOC should be regulated or would be considered a negligible contributor to photochemical smog, and therefore not regulated. Therefore mineral spirits cannot be unregulated. The analysis is described in greater detail in CARB's Program EIR for the SCM.

The allegation that VOC control is less effective than NOx control at reducing ozone is true in some conditions in atmospheres characterized by ratios of VOC to NOx where VOC is predominant. However, those conditions are not typical in California and are certainly reversed in the Bay Area, where ozone formation is VOC limited, as discussed previously. Quite the opposite of this allegation, in the Bay Area, NOx control may be counterproductive, however, is believed to be necessary for long term ozone attainment planning and ozone transport considerations. The allegation that mass based controls are counterproductive is refuted by the long history of mass based controls in California and in the Bay Area and, in spite of increased population, the declining levels of measured ozone over the time period.

ix) Industry Issue: The Synergistic Effects of the Eight Issues

Industry representatives have stated that the synergistic effect of the eight issues discussed above should be analyzed. Synergy occurs when two or more effects interact to produce a subsequent effect and the subsequent effect is not evident in any individual effect. However the information analyzed in the Program EIR does not indicate any significant adverse impacts as a result of the individual impacts that would combine in a way to produce a synergistic effect. Most of the impacts are related to application and performance issues, including long term performance. The analysis of information available found that low-VOC coatings have similar application and performance characteristics to conventional higher-VOC coatings. Further, manufacturers' recommendations are consistent, indicating that the alleged need for extra primers or topcoats is not founded. Finally, the allegations of synergistic issues should be especially borne out over time and reflected in sales data on a per capita basis. This is not the case, as the sales data per capita analyzed by CARB staff in the Program EIR shows there to have been no significant increase in sales.

In the Bay Area, characterized by some cooler and more humid coastal regions, but inland areas climatologically consistent with the rest of the state, there is no evidence of a synergistic effect of the above alleged impacts. The Bay Area Rule 3 proposes to include a provision in the SCM for the Bay Area and other coastal districts that will allow for a limited amount of industrial maintenance coating to be used that does not meet the proposed VOC limit for the industrial maintenance category of 250 g / liter. This provision, negotiated with Caltrans and applicable to more than just Caltrans' areas of responsibility (roads, bridges, etc), will alleviate some concerns associated with implementation of lower VOC coating limits in cool, humid coastal areas.

x) Issue: Exemption of Methyl Acetate

On April 1, 1998, the US EPA exempted methyl acetate from control based on a determination that methyl acetate had a negligible effect on atmospheric photochemical reactions.[31] An exemption from the definition of VOC in a district rule serves as an encouragement to consider formulations with an increased amount of that exempt compound. Therefore, the environmental effects of a possible increase in the use, and subsequent evaporation into the atmosphere, of an exempt compound must be considered. In November, 1991, the Board of Directors of the BAAQMD adopted an ozone depletion policy that stated that staff should consider the environmental effects of any exemption, including possible toxic exposure. Since that time, staff have considered the possible ramifications of increased usage of any chemical compound via an exemption in a District rule, and not recommended any without consideration of the potential benefits of reducing VOC emissions balanced against the potential environmental detriments and the need for a test method to quantify the compound for compliance testing purposes. In Rule 3, the currently exempt compounds are all useful as replacements for regulated solvents to varying degrees. They are: acetone, methylene chloride (a toxic air contaminant), 1,1,1 trichloroethane (an ozone depletor), parachlorobenzotrifluoride, and the family of volatile, completely methylated siloxanes. To this list, staff propose to add methyl acetate.

Methyl acetate is a low boiling ester solvent that rapidly evaporates. It usefulness is suggested because it is soluble in water, alcohol, acetone and a variety of other solvents. It is not an ozone depleting chemical and has not been found to be toxic by the US EPA or state of California. It is flammable and has a fruity odor characteristic of esters. The odor threshold, that concentration at which the chemical can be detected, is 4.6 parts per million, just slightly lower than methyl ethyl ketone, a commonly used coating solvent. It is not considered to be a significant contributor to global warming.[32]

Staff have examined the "de-listing" or de-regulation of methyl acetate and found that, even if usage increases as a substitute for ozone forming solvents, it should not present any potential adverse air quality impacts. Typically, the odor of esters is not found to be unpleasant to most people compared to a variety of other solvents. Architectural coatings often have esters already in the solvent mixture so it is not expected that the addition or substitution of methyl acetate will result in the creation objectionable odors.

xi) Issue: VOC Definition for Low Solids Coating

On November 4, 1998, the Board of Directors amended Rule 3 to include provisions for low solids coating. Those provisions include a definition for low solids coating, "A coating containing 0.12 kilograms or less of solids per liter (1 pound or less of solids per gallon) of coating material"; a VOC standard for low solids coating, 120 grams VOC per liter; a reference to the appropriate test method, Laboratory Method 31: Determination of Volatile Organic Compounds in Paint Strippers, Solvent Cleaners and Low Solids Coatings; and an amendment to the definition of Volatile Organic Compounds, "For the purposes of calculating VOC content of a low solids coating, any water shall be considered part of the coating." These amendments were based on a variance request by the Sherwin Williams Company in 1991, re-granted by the District Hearing Board until the 1998 amendments, to manufacture and sell a water based low solids exterior stain in the District that did not meet the VOC limit for stains as calculated in the test methods for water based coating. The reason the product, which was demonstrated to have coverage equivalent to a compliant stain and has only a small portion of organic solvent in the coating, did not meet the VOC limit is because the calculation to measure VOC content is what is termed a "less water calculation".

A "less water calculation" subtracts water and any volatile organic solvents that do not contribute to the formation of photochemical smog from the mass of the total volatile content and also

[31] 63 Fed Reg 17331, US EPA, April 9, 1998
[32] Hazardous Substance Fact Sheet, New Jersey Dept. of Health and Senior Services, Dec., 1996

subtracts the volume of these components from the total volume of the coating. Because the standard is stated in terms of mass of VOC per volume of coating, a smaller volume of coating, due to the subtraction, "calculates" to a greater VOC mass. For example, a liter of coating with 0.5 liters water, 0.25 liters VOC and 0.25 liters coating solids would calculate to a volume of 0.5 liters, because the water is subtracted from the total volume. The mass, then, of the VOC would be multiplied by 2 because the standard is in terms of grams VOC per (full) liter of coating. For a coating which is not intended to form a significant surface film, such as a stain that is only intended to color but not hide the surface, the amount of coating solids is typically low. For a coating which has a large amount of water, but only a little coating solids and VOC, the less water calculation would show a large amount of VOC, in some cases making it impossible for the coating to comply. A liter of the Sherwin Williams exterior stain for which the variance was sought had only 100 grams of VOC, but calculated to 570 grams per liter, exceeding the 400 grams/liter VOC limit for stains.

The effect of the 1998 amendments was allow low solids coatings to include the water in the volume of the coating, but it did not allow the inclusion of any exempt VOC. The purpose was to allow and encourage water based low solids coating but not to encourage inclusion of large amounts of exempt VOC solvent in the calculation of the volume of a coating, due to the deleterious environmental effects of some exempt solvents. However, for the proposed amendments, staff propose to allow exempt solvents to be included in the volume for the purposes of the VOC calculation of a low solids coating. There are two exempt compounds in the list that have the potential for significant adverse environmental effects, should a significant amount of low solids coating be manufactured using these compounds. They are methylene chloride, a hazardous air pollutant and a carcinogen; and 1,1,1 trichloroethane, or methyl chloroform, a hazardous air pollutant, mutagen and ozone depleting substance. The other exempt compounds, including methyl acetate, have not been identified as being hazardous air pollutants, toxic or ozone depleting substances. The proposed amendments will allow exempt compounds to be included in the calculation of the volume of a low solids coating, but will not allow methylene chloride or 1,1,1 trichloroethane to be considered exempt for any coating, low solids or not. Although this would not prohibit the use of these substances, it would remove any incentive to use them, fulfilling the objectives of the District's 1991 Ozone Depletion Policy.

The proposed change in the VOC definition for low solids coating could have adverse environmental impacts if a significant amount of low solids coating were manufactured and used that contained acetone or methyl acetate as a base or large volume diluent instead of water. This is because acetone has an approximately 33% greater reactivity than ethane, generally the cut point for EPA's consideration of whether or not the compound is a negligible contributor to ozone formation, although that of methyl acetate and the other exempt compounds are significantly less reactive than ethane.[33] The use of a large amount of acetone instead of water or a less reactive compound could create more ozone than would otherwise be formed under the current definition which only encourages water based low solids coating.

It is not expected that an increase in acetone as a result of the proposed change in the low solids coating definition would result in a significant increase in ozone formation for two reasons. First, although the impact of acetone is greater than water, the VOC standard for low solids coating is quite low at 120 grams/liter, so that the use of a low solids coating, even containing a low reactive compound like acetone, would displace the use of a higher VOC non-low solids coating, most likely a waterproofing sealer with a current VOC limit of 400 g/l and a proposed future VOC limit of 250 g/l (wood waterproofing sealers only, concrete and masonry waterproofing sealers proposed to remain at 400 g/l), a stain with a current VOC limit of 350 g/l and a proposed future VOC limit of 250 g/l, or a wood preservative with a current and proposed future VOC limit of 350 g/l. Second, low solids coatings accounted for only 4 tons of emissions statewide per year in

[33] Regulation for Reducing the Ozone Formed from Aerosol Coating Product Emissions, 17 CCR 95420 *et. seq.*

CARB's 1998 Architectural Coatings Survey (1996 data). This is the result of sales volumes too low to be reported on the survey due to confidentiality. The use of low solids coating technology is not expected to grow to a degree that the use of acetone could be expected to promote ozone formation to a greater degree than it would reduce. Finally, it should be noted that the proposed deletion of toxic and ozone depleting exempt compounds from the list of exempt compounds in the VOC definition is expected to reduce emissions of methylene chloride in the Bay Area by approximately 52 tons per year and the emissions of 1,1,1 trichloroethane by approximately 80 tons per year, again based on the CARB survey.

4.2.4 CUMULATIVE IMPACTS

There is no evidence of any incremental adverse impacts to air quality from review of the nine industry concerns, nor from the issue of the exemption of methyl acetate, nor from the addition of non-toxic, non-ozone depleting substances to the definition of VOC for low solids coatings. Adoption of the proposed amendments to Rule 3 based on the SCM will result in a net air quality benefit to the District, and no adverse impacts, individually or in combination, are expected to be significant.

4.6.5 MITIGATION MEASURES REQUIRED TO REDUCE SIGNIFICANT IMPACTS

Since the proposed project is not expected to result in significant adverse environmental impacts to the air quality of the Bay Area District, no mitigation measures are required.

4.3 Water

4.3.1 ENVIRONMENTAL SETTING

The San Francisco Bay Basin includes all or major portions of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano and Sonoma Counties. The Bay Basin is bounded by the Santa Cruz Mountains to the west, the Diablo Range to the east, and the Bayside foothills to the north and northeast. About 40 percent of the land in California drains into the San Francisco Bay and the Bay functions as the only drainage outlet for waters of the Central Valley. The San Francisco Bay system is the most extensive and significant estuary on the California coast.

San Francisco Bay has been greatly altered from its natural condition by human activities. Between 1853 and 1884, hydraulic mining of gold in the Sierra Nevada washed tens of million of tons of sand and mud into San Francisco Bay, reducing the extent of open water and creating new mud banks. Later, much of the tidal marsh surrounding the Bay was filled for urban and agricultural use. In this century, as industry expanded and urban sewerage systems were built, increasing quantities of wastewater were discharged into the Bay. Freshwater inflows to the Bay diminished, as large quantities of water were diverted, and exported to the San Joaquin Valley and Southern California for urban and agricultural use. Despite the changes, the Bay remains a prized natural resource.

The Sacramento and San Joaquin Rivers contribute almost all the of the fresh water inflow to the Bay. These major rivers are at the eastern boundary of the San Francisco Bay Basin and enter the Bay system through the Delta at the eastern end of Suisun Bay. There are many small streams and rivers within the basin, including the Petaluma River, Sonoma Creek, Napa River, Suisun Marsh and Alameda Creek. Other major receiving water segments, in addition to the Pacific Ocean and Bay include Suisun Bay, San Pablo Bay, Richardson Bay and Tomales Bay.

Rainfall ranges in the Bay Area from an average of 12 inches a year in San Jose to over 60 inches in parts of the Santa Cruz Mountains. Stream flow in the Bay Area is highly seasonal with 90 percent of the average runoff occurring between November and April. Many streams go dry during the summer months.

The quality of San Francisco Bay and other major receiving waters in the Bay Area varies seasonally. For most of the year, the quality of these waters is similar to that of the water of the Pacific Ocean. From December through April, water quality is affected by freshwater inflow from the Sacramento-San Joaquin delta and from other, smaller tributaries. The rivers that feed the Bay are it's major source of metal pollutants. City streets are the major source of hydrocarbons in the Bay.

The San Francisco Bay Area has 18 major reservoirs with a total capacity of 697,000 acre-feet of water. Historically, the average amount of water in these reservoirs is 403,900 acre-feet. All private an public suppliers of municipal and domestic water are required to meet the water quality standards set forth in the California Code of Regulations.

There are several major groundwater basins in the Bay Area. The Regional Water Quality Control Board (RWQCB) maintains a groundwater monitoring network of wells in the Bay Area. The network is used to record existing conditions, establish baseline conditions, evaluate trends in quality, detect pollution and water quality degradation at an early stage, and evaluate the effect of point and non-point source pollution on groundwater quality.

Areas susceptible to groundwater contamination include areas where wells or permeable soils serve as pathways for contaminants; areas of rapid percolation; areas susceptible to flooding; surface water infiltration areas; and areas where there are no impermeable layers of clay or other material to shield the natural aquifers. Sources of groundwater contamination include wastewater treatment facilities; septic tank leach field; agriculture or landscaping activities that use pesticides or fertilizers; spills or leaks of hazardous materials and waste; leachate from improperly located or mismanaged solid waste disposal sites; and illegally dumped materials and wastes. Abandoned and unused wells can act as conduits to transfer contaminated water form an upper to a lower aquifer.[34]

4.3.2 SIGNIFICANCE CRITERIA

A significant adverse impact to water resources could result if the project would result in either an increase in demand for water or if the project would result in a decline in water quality. As determined by CARB in the Program EIR, a significant impact would result if the proposed amendments to Rule 3 would result in a demand for water by more than 5,000,000 gallons per day, or if the project would result in the construction of any new water conveyance infrastructure. If any one of the following resulted from adoption and implementation of the proposed amendments, there would be a significant impact on water quality: 1) a substantial increase in mass inflow of effluents to public wastewater treatment facilities; 2) a substantial degradation of surface water or groundwater quality; 3) a substantial increase in the area of impervious surfaces, so that interference with groundwater recharge efforts occur; or 4) an alteration to the course or flow of floodwaters. In addition, in the San Francisco Bay, a variety of salinities due to the variable influx of fresh water from the Sacramento River and San Joaquin River and from many other smaller water courses mix with the salt water from the Pacific Ocean that is pushed into the Bay by tidal actions. The varying degrees of salinity are closely associated with Bay and river plant and animal communities. A significant impact would result if the project resulted in a change in salinities by diluting saline water or by diverting fresh water that would normally dilute saline or brackish water, resulting in an increase in salinity in an area.

4.3.3 ANALYSIS OF POTENTIAL ENVIRONMENTAL IMPACTS

i) Water Demand

[34] EIR for the 1991 Clean Air Plan, op. cit.

A projected increase in water demand as a result of the proposed project could occur based on the manufacturing, use and cleanup of water-borne coatings. The CARB Program EIR presented a worst-case scenario for water demand, which assumes that all currently solvent-borne coatings would be replaced by waterborne coatings, and that all waterborne coatings used in California would be manufactured in California. In reality, other coating technologies might be used to substitute for solvent technology, exempt solvent formulations or very high solids formulations. Also, an assumption of no imports of coatings when currently, many major coating manufacturers are based outside of California, is unrealistic. However, based on that scenario, the total demand on water resources from an increase in manufacture of waterborne coatings and water usage to clean up waterborne coatings would be 17,196 gallons per day by 2010. This represents an increase in demand of 0.000334% (3.34×10^{-4}%). This increase in demand, one third of one thousandth of one percent, could not be considered a significant impact.

ii) Water Quality

Potential impacts that might occur as a result of implementing the proposed rule include an increase in the improper disposal of waste. A significant impact could result if there were difficulties associated with waste disposal, however it is relatively easy for sources to safely dispose of waste generated from architectural coatings. As described in the CARB Program EIR for the SCM, based on the South Coast Air Quality Management District's unannounced site visits conducted for its 1996 architectural coatings rule amendments, the majority of contractors currently either dispose of the waste material properly or recycle the waste material.

In addition, the National Paint and Coatings Association has made significant efforts to educate coating users about potential re-use and proper disposal of painting waste products. They have developed online guidance and manuals to assist consumers and communities to set up paint disposal facilities[35]. Also, a number of communities around the Bay Area have set up city or county household hazardous waste disposal programs, often with specific facilities for water based paint. These programs often include educational material for consumers about proper disposal to prevent water and air contamination. The availability of these programs is expected to significantly reduce the amount of paint, especially from consumers, that would be disposed of in a way that would impact water quality, and, in fact, the improper disposal of paint waste products is expected to decline.

Based on a concern for usage of materials determined to be toxic, one trend in the paint and coatings industry is to replace more toxic solvents with less toxic solvents, resulting in less impact on the environment for any waste materials that are improperly disposed. The staff report for the SCM concludes that manufacturers will be able to formulate coatings that will meet the proposed VOC limits without increasing the amount of toxic air contaminants (TAC's) used in coatings. However, to verify this, the SCM and the proposed Rule 3 provide for new annual reporting requirements for coatings containing perchloroethylene or methylene chloride. The purpose of these reports is to assess the need for further regulation of these toxic solvents.

If more water is used for clean up of waterborne coatings, there could be expected to be an increase in the amount of wastewater that would require treatment at publicly owned treatment works (POTW's). In the CARB Program EIR, this increase has been projected for the year 2010 as a result of adoption of the SCM. The following table, part of Table IV-9 in the CARB Program EIR, gives the results for the nine Bay Area counties:

Table 2: Projected POTW Impact from Reformulated Coatings

County	2010 Coatings Disposal (gal/day)	Percentage Increase in Wastewater due

[35] NPCA 2001 Publications and Online Services Update, National Paint and Coatings Association, July/August, 2001

		to Rule 3
Alameda	2,207	0.0014 %
Contra Costa	1,368	0.0021 %
Marin	345	0.0018 %
Napa	191	0.0113 %
San Francisco	1,044	0.0012 %
San Mateo	1,088	0.0019 %
Santa Clara	2,696	0.0016 %
Solano*	639	0.0018 %
Sonoma*	726	0.0029 %
Bay Area Total	**10,304**	**0.0062 %**

* Only a portion of Solano and San Francisco Counties are included in the proposed amendments to Rule 3, however, the table includes projected wastewater increases for the entire county.

The table shows that the impact on the amount of wastewater generated in the Bay Area from adoption of the proposed amendments to Rule 3, less than two thirds of one hundredth of one percent, would not have a significant impact.

iii) Salinity

An increase in water usage would reasonably be expected to be commensurate with a decrease in the availability of water for other uses, including dilution of saline or brackish water with fresh. The assumption, however, of an increase in water usage being all derived from surface water is not founded. However, even if the expectation of increased water usage would all result from surface waters, the amounts projected above could not be expected to have any significant impact on salinities associated with areas in or around San Francisco Bay.

4.3.4 CUMULATIVE IMPACTS

There is no evidence of any adverse incremental effect on water quality. However, there is a potential cumulative impact on salinity if the increase on water demand is considered for the up river regions of the Sacramento and San Joaquin Rivers. An analysis of the increase in water demand, similar to the above for San Francisco Bay, shows an increase in demand of 6,493 gallons/day for manufacture and clean up of waterborne coatings for the Sacramento River and an increase in demand of 6,460 gallons/day for the San Joaquin River, both of which are major tributaries of the San Francisco Bay. Combined with the increase in demand of 17,196 gallons/day for the Bay, one might assume that, if the water reaching and in the Bay would be decreased, there would be less fresh water to dilute the salinity of ocean water coming into the Bay by a total of 30,149 gallons/day. This, however, equates to a decrease in available water of only 5.85×10^{-4}%,or less than six tenths of one thousandth of one percent. This cannot be considered a significant cumulative impact.

The negligible incremental increase in wastewater flow to wastewater treatment plants as well as the negligible increase in water demand cannot be considered cumulatively significant when viewed in context of past, present and future projects.

4.3.5 MITIGATION MEASURES REQUIRED TO REDUCE SIGNIFICANT IMPACTS

Since the proposed project is not expected to result in significant adverse environmental impacts to the hydrology, water quality or salinity of the San Francisco Bay or any of the associated waters or groundwater, no mitigation measures are required.

4.4 Public Services

4.4.1 ENVIRONMENTAL SETTING

Residents of the San Francisco Bay Area are provided with a number of essential public services. These services include fire and police protection, schools, water, electricity and natural gas, sewage and waste disposal, and library services. The services are provided by cities or counties or special districts, such as flood control districts, transit districts and school districts funded through tax monies; or private companies, such as electricity and gas providers or waste disposal funded directly by service users.

Architectural coatings are used by public facilities and public utilities to the extent that they have structures or appurtenances subject to Rule 3, which include bridges owned by the state of California or transit districts, streets and highways owned by the cities, counties and state, school buildings owned by the various school districts, power plants and gas and electricity transmission infrastructure owned by private power providers and distributors, and water storage and transmission infrastructure owned by cities and wastewater infrastructure and processing facilities owned by cities, counties or special districts. Additional examples of publicly owned buildings and structures, the coating of which is subject to this rule, are police and fire stations, prisons, hospitals, administrative buildings, park structures, streetlights and statues.

4.4.2 SIGNIFICANCE CRITERIA

The proposed amendments to Rule 3 would have significant impacts to public services if they resulted in either new or altered government services in any of the following areas: fire protection, police protection, schools, parks and recreational facilities, maintenance of public facilities, or other governmental services. The proposal would have a significant impact on utilities if it would result in a need for new systems or substantial alterations to water, wastewater or solid waste facilities. Public service impacts may also include increased demand on local city or county agencies. Condition baselines for public services in the Bay Area are established by local service standards or ratios. The impacts on utilities must be evaluated based on whether or not the proposal would result in a substantial increase in the consumption of potable water or a substantial increase in demand for water supply treatment or distribution facilities, wastewater treatment and collection capacity, storm water drainage systems, or landfill capacity. Utility impacts may also include an increased demand for hazardous waste-related services and wastewater treatment.[36]

4.4.3 ANALYSIS OF POTENTIAL ENVIRONMENTAL IMPACTS

i) Industry Issue: Additional Maintenance of Public Facilities

A potential significant impact could occur if local agencies were forced to use inferior coatings as iterated under industry issues associated with air quality, above, which would lead to increased maintenance under the proposed rule. Industry has commented that the proposed VOC limits for coatings may cause local agencies to use products that are of an inferior quality or lack the durability of coatings that are currently used. This could lead to an overall greater use of architectural coatings and of agency staff resources to use them. Also, a longer drying time could restrict coating operations in parks to the sunniest and driest time of the year, the summer, when park usage is highest. This would create an impact by restricting public access to at least part of the park in the time period when access was most desirable.

In addition to all the coatings used on the interiors and exteriors of any building, public or private, the following coatings, derived from the specialty coating category in the SCM and the proposed amendments, might see particular use by public agencies: fire resistive and fire retardant coatings, flow coatings, industrial maintenance coatings, recycled coatings, rust preventative coatings, swimming pool and swimming pool repair and maintenance coatings, and traffic marking coatings. Among these coating categories, the ones that currently do not exist in Rule 3

[36] EIR for the 1991 Clean Air Plan, op. cit.

are fire resistive coatings, flow coatings, recycled coatings, rust preventative coatings and swimming pool repair and maintenance coatings. Of the remaining categories, fire retardant coatings and swimming pool coatings are presently exempt, meaning that the VOC content of these coatings is not limited. Fire resistive coatings are a subcategory of the existing category of fire retardant coatings. It was created to accommodate a need for a VOC limit that is not as low as the general flat or non-flat category, as the definition of a fire retardant coating has become more restrictive, allowing only coatings that meet certain flame spread standards and are required by state or local building officials to meet the definition. Flow coatings address a need for a high VOC coating for electrical transformer units. Recycled coatings are an attempt to reduce liquid or solid waste by the reuse of water based latex emulsion coatings, they are required for use by state and some local agencies. The VOC limits accommodate existing formulations even though new latex emulsions will have a lower VOC limit as the proposed limits go into effect. Rust preventative coatings are in part a subcategory of industrial maintenance coatings, used for exterior exposure of metal surfaces, and in part a method to preserve solvent based alkyd technology formerly sold under the category of quick dry enamels when necessary for use on metal. The VOC limit proposed for this category is higher than the proposed future limit for industrial maintenance coatings and quick dry enamels. Finally, swimming pool repair and maintenance coatings are a subcategory of swimming pool coatings. Although the proposed VOC limit, to become effective in January, 2003 would unify the VOC limits for these two categories at 340 grams VOC per liter, in many districts the limits are currently different, usually with a higher VOC limit for the repair and maintenance coatings, so as to repair and maintain older coating systems. In the proposed Rule 3, the 340 g/l limit is effective on different dates for the two categories.

Data collected by CARB staff show that there are many coatings available that will perform at a level equal to that of coatings with higher VOC limits. In fact, these tests conclude that low-VOC coatings compare well with other coatings in all areas of performance, including drying times and durability. CARB analysis of the coatings currently sold in California also found that a fairly large percentage of the coatings marketed meet the proposed VOC limits. Also, the SCM and proposed Rule 3 have many new categories of coating utilized by public service agencies where consideration of coating needs have been shown, resulting in higher VOC limits. Regarding park usage, low VOC coatings were found to have dry times similar to conventional higher VOC coatings, and many of the structures found in a park would tend to be coated with rust preventative coatings, which accommodate solvent-borne formulations as explained above. In the Bay Area, summertime is often not the driest time of the year, particularly in coastal regions. As the rest of the land mass cools in the autumn, or before it heats up in the spring, coastal areas are likely to see more sunny and dry days amenable to painting activities. It cannot be concluded that the public's ability to use parks will be significantly impacted by the proposed amendments. Potential impacts to public services related to water demand and wastewater discharge have been previously discussed, above, in Section 4.3.

ii) Industry Issue: Increased Need for Fire Protection Due to the Increased Use of Acetone

A potential impact could occur if the use of coatings dictated by the SCM and proposed amendments to Rule 3 would result in releases of hazardous or flammable material that would cause a greater fire hazard or a need to store greater quantities of hazardous or flammable material that would need to be inspected by fire agencies at a greater frequency. Industry representatives have commented that the lower VOC limits proposed will lead to a greater use of acetone based coatings, which would result in a greater fire hazard.

CARB staff responded to this concern in the Program EIR for the SCM. It is unlikely that most coatings will be reformulated with acetone to meet VOC limits. The exceptions are lacquers, some floor coatings and some waterproofing sealers. Storage requirements for acetone based coatings are the same as the requirements for other solvent based coatings. In fact, the National Fire Protection Association assigns the same flammability classification to acetone as to toluene, xylene, methyl ethyl ketone, ethyl alcohol and methyl alcohol, all commonly used coating

solvents. Among these compounds, acetone has the lowest flashpoint, the temperature at which the solvent will form an ignitable mixture with air, but the highest lower explosive limit (LEL), the concentration in air at which ignition will cause an explosion. An expected painting temperature of 60°F is above the flashpoints of all the solvents listed except xylene. Acetone also has the highest evaporation rate of the solvents listed, and a lower odor threshold than the two alcohols, approximately the same as methyl ethyl ketone and much higher than toluene and xylene[37]. This indicates that the distinctive odor of acetone may be more noticeable or noticeable sooner than the other solvents. Although it is dangerous to rely on odor as an indicator of fire or explosive danger, this analysis indicates that acetone based coatings do not present a significant increase in flammability or explosivity danger than the solvent-borne coatings they replace. Existing fire codes address paint spraying in confined and open situations, as would be the case with most architectural coating applications. There would, therefore, not be an additional impact on fire service resources.

The Bay Area has no climatic conditions or special provisions of local public services that would suggest a different or more severe impact than those discussed above. In a cooler coastal area, there might be a greater incentive to use coating reformulated with acetone, if both waterborne and solvent-borne formulations were available, but the cooler and more humid air would retard the evaporation rate of any solvent. The provision previously discussed that will allow the use of a higher VOC content for industrial maintenance coatings, based on a petition demonstrating need, was discussed extensively with and agreed to by Caltrans, the state agency primarily responsible for maintaining bridges and road works along coastal areas in the Bay Area. The provision, however, is also available to other users of industrial maintenance coatings, which include many public agencies. Although CARB staff believe that many low-VOC coatings are available, the provision will alleviate expressed concerns about potential difficulty of coating application and curing.

4.4.4 CUMULATIVE IMPACTS

There is no evidence of any adverse incremental impact on the maintenance of public facilities due to the application, performance or durability of coatings subject to this proposal. There is also no indication that any public services would be adversely impacted, including fire services. Consequently, there cannot be considered to be any cumulative impacts that would be considered significant.

4.4.5 MITIGATION MEASURES REQUIRED TO REDUCE SIGNIFICANT IMPACTS

Since there will be no increase in the amount of public services needed to provide maintenance for public facilities, and no increase in the amount of fire protection necessary, the proposed rule amendments to Rule 3 will not exceed any significance threshold in place for the Bay Area. Because there is no significant impact to public services or to fire protection needs from the proposed project, no mitigation measures are required.

4.5 Transportation and Circulation

4.5.1 ENVIRONMENTAL SETTING

The proposed project, amendments to Rule 3 based on the SCM for architectural coatings developed by the staff of the CARB, will affect the jurisdictional area of the BAAQMD. In the District, the nine counties, incorporated cities in the counties and District 4 of Caltrans are the primary agencies responsible for planning, funding, designing, constructing, operating and maintaining streets and highways in the region. The Metropolitan Transportation Commission is responsible for regional transportation planning and general oversight of the efforts of local

[37] New Jersey Hazardous Substance Fact Sheet, op. cit.

agencies. A special service district, the Golden Gate Bridge, Highway and Transportation District, maintains the Golden Gate Bridge and operates inter-county bus and ferry services between Marin, Sonoma and San Francisco counties. Some public transit services in the Bay Area are funded and operated by counties and cities. These include the City and County of San Francisco (MUNI), Fairfield and Suisun City (Fairfield Transit), the City of Napa (Napa Transit), Santa Rosa (CityBus), Sonoma County (Sonoma County Transit), Vallejo (Vallejo Transit), and Marin County (Marin Transit). Various other special service districts also plan, fund, design, construct, and operate public transit services. These include the Alameda Contra Costa Transit District (AC Transit), the Bay Area Rapid Transit District (BART), the Central Contra Costa Transit Authority (CCCTA), the Livermore Amador Valley Transit Authority (LAVTA), the San Mateo County Transit District (SamTrans), the Santa Clara County Transit District (SCCTD), the West Contra Costa Area Transit District (WestCat), and the Delta Transit District (Tri-Delta). Caltrans operates CalTrain service between San Jose and San Francisco.[38]

In spite of a variety of public transit options, the majority of trips in the Bay Area are by automobile. The Bay Area road network is characterized by interstate highways running along both sides of the San Francisco Bay, by highways coming into and exiting the Bay Area from the south, the east along the Sacramento River and over the Altamont Pass, and from the north along through Marin and Sonoma Counties to the Golden Gate. Major arteries also exist along the spine of the San Francisco-San Jose peninsula, and roughly parallel to and further east from the Bay in Contra Costa, Alameda and Santa Clara Counties. The Bay and major rivers are transversed by bridges, the Golden Gate Bridge from Marin to San Francisco Counties, the Bay Bridge, San Mateo Bridge and Dumbarton Bridge across the South Bay, and the Carquinez Bridge, Benicia Bridge and, further east, the Antioch Bridge across the Carquinez Straights, and Sacramento River. The Caldecott Tunnel bores through the hills of the East Bay between Orinda and Oakland. Between the year 2000 and 2010, the number of auto-person trips is expected to increase by over 2,000,000 per weekday, and the vehicle miles traveled per weekday is expected to increase by over twenty million miles. In this time period, trips on public transit are expected to increase by somewhat less than 200,000 per weekday.[39] Traffic congestion is a major concern for Bay Area residents. The bridges and the Caldecott Tunnel, as well as intersections between major traffic arteries, represent congestion points during heavy traffic times. According to the 1998 Highway Congestion Monitoring Program by Caltrans, 112,000 vehicle hours are spent in congested traffic each weekday and the Bay Area has 327 miles of congested roadways each weekday at a daily cost to motorists of over $1.2 million. It has been estimated that commute hours, at which times traffic peaks, now occupy over 5 hours each weekday.

4.5.2 SIGNIFICANCE CRITERIA FOR TRANSPORTATION AND CIRCULATION

During development of the Program EIR for the SCM, CARB staff considered that an impact on transportation or circulation would be considered significant if one of the following criteria were met in any district: 1) the project would result in the need for 350 or more employees; 2) the project would increase heavy-duty truck traffic to or from any facility by more than 350 truck trips per day; or 3) the project would increase customer traffic by more than 700 trips per day. However, in the EIR for the 1991 Bay Area Clean Air Plan, a project impact was considered significant if one of the following criteria were met: 1) a 10 percent increase at any location or time of day in travel time or delay to vehicle drivers, transit passengers, bicycle riders and/or pedestrians associated with increased traffic congestion; 2) an increase in accident hazards for vehicle drivers, transit passengers, bicycle riders, and/or pedestrians associated with an increase in the number of persons or vehicles exposed to a potential accident hazard situation; 3) an increase in travel discomfort associated with overcrowding of passengers on transit vehicles; or 4) an increase in parking demand likely to overflow existing lots and impact local streets.

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[38] 1991 Bay Area Clean Air Plan, op. cit.

[39] San Francisco Bay Area Regional Demographic and Traffic Characteristics, Metropolitan Transportation Commission, (www.mtc.ca.gov, accessed 8/23/01)

4.5.3 ANALYSIS OF POTENTIAL ENVIRONMENTAL IMPACTS

Concern was expressed by industry representatives that the cost analysis does not take into account the additional distribution costs associated with distribution of reformulated coating as a result of modified VOC limits. Based on available data, however, there is no reason to believe distribution costs would increase in a significant way. The proposed amendments to Rule 3 include a sell-through provision. This means that coatings manufactured before the effective dates for VOC limit changes, provided they were in compliance with the requirements of Rule 3 before the changes, could be distributed, offered for sale or sold for three years after the effective dates, and applied at any time after the effective dates. An expectation that stores would be likely to carry coating inventory for over three years, resulting in a necessity for increased distribution trips to deliver newly reformulated coating and take away old, unsellable coating is unrealistic. This is reinforced by manufacturers' recommendations regarding dates by which the coating should be used.

Another issue expressed was the potential for transportation or circulation impacts created by increased trips to landfills due to a need to dispose of additional waste materials. This waste, it was proposed, would come from coatings and containers due to problematic performance characteristics, including shelf life, pot life and freeze-thaw characteristic of certain waterborne low VOC coatings. Comments were also received indicating that out-of-state manufacturers would have to ship coatings to California during the three non-winter seasons to avoid potential freezing en route. It was proposed that this would cause an increase in traffic during spring, summer and fall, especially impacting the high ozone periods.

However, manufacturers have indicated that addition of surfactants will improve freeze-thaw capabilities of water-borne coatings. Large amounts of waterborne coatings are currently in use, and the assertion does not take into account the propensity of consumers to use coatings, especially waterborne coatings, during warmer and dryer weather anyway. Water-borne technology is not new, and consumers can be considered to be familiar with manufacturers' recommendations regarding ambient temperatures and humidity for painting. Also, the NTS study showed that compliant water-borne coatings passed freeze-thaw stability tests. Based on this information, it is determined that there would be no significant increase in distribution or landfill trips.

Another commenter stated that drying times would be longer for low-VOC coatings. As a result, more commute trips would be generated due to the additional days required to complete a project. However, the NTS evaluation of coating products indicates that low-VOC coatings in all categories except lacquers have comparable drying times to conventional coatings. Thus, additional commute trips would not be required for the workers applying the low-VOC coatings. The lacquer category has dry times of from 18 to 30 minutes longer than higher VOC lacquers. This additional dry time is unlikely to result in additional commute trips.

In the Bay Area, one might expect concerns about the impacts from application of coatings in cool and moist climates to be most raised in coastal areas. As mentioned above, concerns about the application of lacquer should be partly alleviated by the provision to add some VOC solvent. In addition, the proposed amendment to Rule 3 that will allow a higher VOC content for industrial maintenance coating upon approval of a petition will also alleviate concerns about application of industrial maintenance coatings. Consequently, there should be no additional amount of truck traffic generated that could be considered significant. In addition, there is nothing in the characterization of the transportation network in the Bay Area that would indicate that there would be any unique or additional impacts beyond what has been considered in the context of the CARB Program EIR.

4.5.4 CUMULATIVE IMPACTS

The expected impacts of the proposed project cannot be considered significant individually. In addition, there is insufficient evidence of individual impacts that could be considered significant if combined. Therefore, the proposed amendments to Rule 3 would not result in cumulative impacts.

4.5.5 MITIGATION MEASURES REQUIRED TO REDUCE SIGNIFICANT IMPACTS

No significant impacts in transportation or circulation are anticipated from the proposed project. Staff does not find any of the significance criteria, either that used by the state or by the district, to have been exceeded. Thus, there are no significant impacts that will require mitigation measures.

4.6 Solid and Hazardous Waste

4.6.1 ENVIRONMENTAL SETTING

The Bay Area has a number of solid waste disposal sites, both active, inactive and closed. Neither closed nor inactive solid waste disposal sites accept waste, however to be closed a site must complete satisfy all the requirements of a solid waste disposal site closure plan filed with the California Integrated Waste Management Board. The Bay Area sites are:

County	Site	Status
Alameda	City of Alameda	Closed
	City of Berkeley	Closed
	Tri-Cities Recycling	Active
	Waste Management of Alameda County	Active
	Browning-Ferris Industries	Active
	Pleasanton Garbage Service	Closed
	GSF Energy	Active
	Turk Island Solid Waste Disposal Site	Closed
	Tony Lema Landfill	Closed
Contra Costa	Contra Costa Sanitary Landfill	Inactive
	Acme Fill Corp	Active
	Keller Canyon Landfill Company	Active
	West Contra Costa Sanitary Landfill	Active
Marin	Redwood Landfill, Inc.	Active
	West Marin Landfill	Closed
Napa	Clover Flat Landfill	Active
	Napa-Vallejo Waste Management Authority	Active
San Mateo	Sunquest Properties (Tuntex)	Inactive
	City of Burlingame	Inactive
	Cypress Amloc Land Company	Active
	Metro Bay Centre	Closed
	Browning-Ferris Industries	Active
	City of Menlo Park	Closed
Santa Clara	South Valley Refuse Disposal	Active
	International Disposal Corporation	Active
	Shoreline Amphitheatre	Closed
	City of Mountain View	Closed
	City of Palo Alto Landfill	Active
	City of San Jose (Singleton Road Landfill)	Closed
	County of Santa Clara	Closed
	Guadalupe Rubbish Disposal	Active

County	Site	Status
	Kirby Canyon Landfill	Active
	Zanker Road Resource Management	Active
	City of Santa Clara	Closed
	City of Sunnyvale Solid Waste Program	Closed
Solano	Potrero Hills Landfill	Active
Sonoma	Sonoma County Department of Public Works	Active

There is currently in excess of 200 million tons of solid waste currently in these Bay Area landfills, which does not include that which is in dozens of small, old landfills that have long since closed. About eight and a half million tons of waste is accepted each year into Bay Area landfills and existing landfills have a total maximum design capacity of approximately 385 million tons.

Leftover coating that has dried may be disposed of as solid waste. Coating which have not dried must be disposed of at a Class I landfill. None of the disposal sites in the Bay Area are active for disposal of Class I hazardous waste. However, most active landfills have hazardous waste collection facilities, often free for consumers for household hazardous waste, which includes paint products. In addition, counties and cities often offer separate locations for disposal of household hazardous waste. Waterborne latex emulsions are often collected for recycling into usable paint product as part of the household hazardous waste disposal program. Contractors can usually use the same disposal facilities, but for a fee.

4.6.2 SIGNIFICANCE CRITERIA FOR SOLID AND HAZARDOUS WASTE

According to the Program EIR for the SCM developed by CARB staff, the proposed amendments would have significant adverse impact on solid or hazardous waste if either: 1) the generation and disposal of hazardous or non-hazardous waste would exceed the capacity of designated landfills; or, 2) the project would not comply with federal state or local statutes and regulations related to solid waste and hazardous waste. In addition, it could be considered a significant impact if the project generated an amount of waste significant enough to impact existing solid waste reduction plans.

4.6.3 ANALYSIS OF POTENTIAL ENVIRONMENTAL IMPACTS

The potential environmental impacts for the proposed amendments deal with increased generation of solid waste or hazardous waste and its disposal. Comments received by CARB staff related to the Program EIR allege that compliant lower-VOC coatings that are water based will not have the same freeze-thaw capabilities as existing coatings, resulting in coating shipped during colder months becoming unusable and requiring disposal in landfills. Also, reformulated coatings will have shorter shelf lives, and, therefore, a certain portion of inventories will have to be disposed of. Further, it was alleged that, as a result of more stringent VOC content limits, specifically for industrial maintenance and floor coatings, manufacturers will formulate more two-component systems that may have, on average, a shorter pot life compared to conventional coatings. Therefore, low-VOC coatings could cure and solidify during the application process, resulting in a portion of coating being unusable, and would need to be discarded into a landfill. Finally concern was expressed that, because the proposed amendments to Rule 3 will require the use of water-borne technologies, more surface preparation in the form of sandblasting will be required. Because sand mixed with cured coating would need to be disposed of in a landfill, this would increase the total amount of waste deposited.

The issue of freeze-thaw characteristics of new water-borne coatings was previously discussed in connection with Section 4.5, Transportation and Circulation, above. A CARB staff investigation into manufacturers' recommendations regarding shelf life revealed that low VOC coating has a recommended shelf life at least as long as conventional higher-VOC coating. In response to the issue of shorter pot life, coating for metal parts and products, subject to another District rule, was reformulated to two component, lower-VOC content coating in the mid-1980's. Although initial

formulations had significantly shorter pot lives, manufacturers quickly added retarders to slow catalytic reactions and allow paint to stay usable longer. The technology since that time has become widely recognized and adopted. Two component coatings are typically not used by consumers. They are used by professional contractors, often for industrial maintenance applications. The contractors are well acquainted with calculations of necessary paint for a job without creating excess waste and with manufacturers' recommendations concerning pot life. Finally, because surface preparation recommendations are the same for low VOC coating as for higher VOC coating, there should not be an expectation of additional sand/paint waste to be disposed of.

For the purpose of the Program EIR, CARB staff estimated impacts on solid waste generation if 5% of coating that currently does not comply with the VOC limits in the SCM and proposed in Rule 3 were produced, suffered freeze-thaw problems and had to be disposed of in landfills, 1% of these coatings were produced, suffered unacceptably short shelf lives and had to be disposed of in landfills, and 10% of floor and industrial maintenance coatings were produced, suffered unacceptably short pot lives and had to be disposed of in landfills. Although this probably overestimates the actual amount of waste that would be generated, the analysis shows that the total amount of solid waste and hazardous waste materials created would not be a significant impact. For the Bay Area, anticipated solid waste impacts based on this analysis would equal 1.7 tons per day. This equates to 0.003%, three thousandths of one percent, of the total permitted Bay Area throughput. Since the average capacity of a refuse truck is 10 tons, the total Bay Area daily waste generated according to this analysis would be less than one fifth of one truck. This cannot be considered a significant increase in the amount of hazardous waste generated.

4.6.4 CUMULATIVE IMPACTS

The analysis referenced above combines estimates of increases in solid waste from separate issues and found that the impacts, considered separately or together, cannot be considered significant. Even in the unlikely event that waste increases as described above, in future years, that waste would decrease as manufacturers improve freeze-thaw characteristics, transportation of product is arranged to avoid freezing conditions, manufacturers adjust formulations to lengthen shelf life, stores arrange more rapid inventory turn-around, and manufacturers will two component coating reaction times or users will mix less for use to avoid product setting before application can be complete. Consequently, any solid waste impacts from new formulations over time will be reduced. Therefore, cumulative impacts cannot be considered significant.

4.6.5 MITIGATION MEASURES REQUIRED TO REDUCE SIGNIFICANT IMPACTS

District staff reviewed potential solid waste impacts regarding local issues that might alter the conclusions reached in the CARB Program EIR and that the analysis and conclusions are equally applicable to the Bay Area. The proposed amendments to Rule 3 would not result in a significant increase in the generation and disposal of solid wastes or hazardous wastes. Disposal of wastes and landfill development and maintenance practices are extensively regulated on a local, state and federal level. The proposed project will not alter any of these requirements. Therefore, staff conclude that no mitigation measures are required.

4.7 Hazards

4.7.1 ENVIRONMENTAL SETTING

When considering hazards associated with the proposed amendments to Rule 3, the environmental setting must consider the context in which architectural coatings are manufactured, distributed and used. Although many coatings used in the Bay Area are not manufactured locally, some are. The basic ingredients of an architectural coating can be broken down into solids and liquids. The solid portion of the coating includes resins, also called binders, and pigment, and some minor ingredients. This is the portion of the coating that ultimately

remains on the surface coated. The liquid portion includes solvent to dissolve and suspend the solid portion, and liquid additives that add a number of functional properties, such as preservatives, flow levelers, wetting agents and freeze-thaw stabilizers. For one component coatings, the liquid portion, which include water and organic solvents, may be generally be considered to enter the atmosphere as the coating dries and cures. For two component coatings, mixed at the application point or shortly before application, some of the liquid may function as a catalyst to a chemical reaction that forms the coating film, and may not enter the atmosphere, although a reaction by-product might.

Coating manufacturers receive solid and liquid ingredients in bulk and process and mix those ingredients at their facilities. The transportation of these bulk materials, depending on the nature of the material, may present certain hazards, the use of these materials may present others. The distribution of manufactured coating may represent hazards, either distribution into the Bay Area from outside or distribution to sales outlets and directly to users from manufacturing facilities inside the District. Finally, use of coating may present hazards, through exposure of users or the public at large to the coatings in the process of application or drying and curing. Hazards include the risk of fire, explosion or the release of hazardous materials in the event of an accident or upset, and the hazards associated with human health through exposure to toxic or carcinogenic materials, either acutely or chronically.

There are certain hazards associated with architectural coating that exist as background for the proposed project. Those include the transportation of solvents in bulk to manufacturers that have flammable, explosive and human health properties associated with them. Those solvents have the potential to cause problems in the event of an accident or upset. In addition, the use of solvents in bulk in manufacturing may cause workers to be exposed to compounds that might have an impact on human health. Generally speaking, the solid content of coating presents much less of a potential for a hazard in the manufacturing process. One exception is the use of pigments. Some pigments traditionally have been made from materials, or compounds of materials, that are considered toxic, such as cadmium and chromium. These can present a hazard in manufacturing when workers are exposed to the materials in dry bulk form that may not be present in the final product, when pigments are bound in resin systems and emulsified in liquid. The distribution of coating presents the potential for additional hazards. The coatings in finished form may be flammable or explosive and may, if released in bulk in the event of an accident, present a human health hazard that may be absent in smaller quantities. Finally, the application of coatings may present hazards. Of particular concern in this final category is the exposure of either coating applicators or the general public to materials that may be released as the coating is applied or as it dries and cures. In this final category, liquids and reaction by-products that do not end up in the final coating film must be considered for their impact on human health.

Coatings use a number of solvents in the manufacturing at present that are flammable, explosive or have human health impacts. A partial list of solvents used in existing coating formulations, both water-borne and solvent-borne, follows: toluene, xylene, methyl ethyl ketone, stoddard solvent, ethyl alcohol, methyl alcohol, ethylene glycol monobutyl ether (EGBE), ethylene glycol monoethyl ether (EGEE), and ethylene glycol monomethyl ether (EGME). These represent the most commonly occurring solvents, by volume. There are established health effects associated with these solvents. Threshold Limit Values (TLV's) have been established by the American Conference of Governmental Industrial Hygiene, Permissible Exposure Limits (PEL's) and Short Term Exposure Limits (STEL's) have been established by the Occupational Safety and Health Administration, and Immediately Dangerous to Life and Health (IDLH's) levels have been established by the National Institute for Occupational Safety and Health. In addition to these, in development of the Program EIR, CARB staff utilized established Health Risk Assessments (HRA's) to evaluate conventional and replacement solvents. An HRA determines the likelihood of an individual contracting cancer or experiencing other adverse health effects from exposure to a toxic air contaminant. Risks from exposure to carcinogens are expressed as an added lifetime risk of contracting cancer due to exposure to a carcinogen.

4.7.2 SIGNIFICANCE CRITERIA

The proposed amendments to Rule 3 would be considered to have significant adverse hazard impacts if any one of the following criteria is exceeded: 1) the project results in a substantial number of people being exposed to a substance that causes irritation; 2) the project results in one or more people being exposed to a substance causing serious injury or death; or 3) the project creates substantial human exposure to a hazardous chemical. In the April 1996 BAAQMD CEQA Guidelines, the threshold for significance for exposure to toxic air contaminants is when either: 1) the probability of contracting cancer for the Maximally Exposed Individual (MEI) exceeds 10 in one million; or 2) ground level concentrations of non-carcinogenic toxic air contaminants would result in a Hazard Index greater than 1 for the MEI. The Hazard Index (HI) is defined as the ratio of the estimated exposure level to the reference exposure level.

4.7.3 ANALYSIS OF POTENTIAL ENVIRONMENTAL IMPACTS

i) Industry Issue: Increased Use of Acetone Might Increase Exposure to Hazards

The proposed rule amendments will require the reformulation of prospectively non-compliant coatings in order to achieve more stringent VOC standards. Coating manufacturers may choose to reformulate coatings using exempt solvents as a replacement for existing, regulated solvents. To the extent that exempt solvents, in particular, acetone, could be accidentally released into the environment, exposure to this hazardous substance could result. Acetone usage has been increasing as a result of a finding of negligible photochemical reactivity by the US EPA and exemption in district coating rules. Acetone was made exempt in Rule 3 by action of the District Board on November 4, 1998.

An increase in the amount of acetone used to reformulate coatings may increase the number of trucks or rail cars that transport acetone to Bay Area manufacturers. However, individual trucks and rail cars that ship flammable and hazardous materials are already equipped to safely transport this solvent and will not be affected by the proposed rule amendments. In the event of a spill, the procedures involved are not different for acetone than for solvents that acetone would replace, which are also flammable. Therefore, the probability of a release of acetone that would expose a proportion of the population to this hazardous substance would be offset by the reduction in probability of a release of some conventional solvent. The flammability characteristics of acetone compared to other solvents have previously been discussed in Section 4.4, Public Services, above. There is also a risk of exposure to hazards associated with an increased use of acetone in a manufacturing facility. Manufacturing facilities routinely deal with solvents and must be cognizant of the flammability and explosivity of each solvent they deal with. Consequently, they are already equipped with grounded equipment to eliminate the possibility of an explosion due to an electrical spark, and have numerous safety procedures associated with handling and blending solvents to produce coatings. The coatings themselves, once reformulated with acetone, would not become significantly more flammable than solvent based coatings using regulated solvents. For users, handling, storage of and solvent laden waste from acetone reformulated coatings might be an issue. Manufacturers of conventional solvent based coatings, however, already include use, handling and storage instructions. For example, recommendations for storage, cleaning and disposal of brushes and rags might proscribe procedures to avoid spontaneous combustion, such as immersion of rags in water. The CARB Program EIR did not find any significant increase in hazards associated with reformulation using acetone. It should be noted that reformulation with exempt solvents is only one of the potential avenues for a manufacturer, and acetone is only one of the possible solvent replacements, although it is attractive given it's relatively inexpensive price and good solvency characteristics. The other possibilities are water-borne formulations and higher solid formulations. Each of these possibilities, especially water-borne, represents a probable decrease in exposure to flammable or explosive hazards.

ii) Industry Issue: Low VOC Compounds Increase Exposure to More Toxic Compounds

Waterborne coatings may contain glycol ethers (EGBE, EGME or EGEE) or their acetates, useful as coalescing solvents. These solvents have TLV's that are significantly lower than many standard coating solvents. In addition, the OSHA PEL's are lower, with the exception of EGEE, and STEL's have not been established. The IDLH for EGBE and EGEE is comparable to xylene and toluene, all of which are higher than the IDLH for EGME. The National Institute for Occupational Safety and Health recommended occupational exposure limit to EGME and it's acetate is only 0.1 part per million, and the recommended occupational exposure limit for EGBE and EGEE and their acetates is 0.5 parts per million. The CARB Program EIR indicates that the trend in coatings technology is to replace EGME with less toxic/less hazardous coalescing solvents such as Texanol® and propylene glycol. Additionally, the Program EIR indicates that a majority of water-based formulations (flats and nonflats) do not contain solvents that are classified as hazardous air pollutants (HAP's). The CARB Program EIR concluded that the potential for increased use of toxic compounds to reformulate coatings is not significant. In addition, there is a provision in the SCM, and proposed in Rule 3, that requires annual reporting of the amount of exempt, but toxic, solvents used to monitor for the possibility of increased use. These toxic compounds, methylene chloride and perchloroethylene, are unlikely to be significantly used as reformulation alternatives. Although exempt, they are not particularly good solvents for many coating resin systems. Perchloroethylene is not exempt in Rule 3. Methylene chloride is proposed to be deleted from the list of exempt compounds in the VOC definition.

Some reformulated two-component industrial maintenance coatings contain diisocyanate compounds. Diisocyanates are liquids that are part of the chemical reaction of the two component systems. One particular diisocyanate, TDI, is a carcinogen, however, there are replacement diisocyanates which are not. Industry representatives have alleged that two-component systems may increase to replace water-borne systems as a result of the proposed low-VOC standards. The use of diisocyanates in the manufacturing process may cause worker exposure, however, manufacturers routinely deal with toxic compounds and would be able to properly equip workers to deal with all manner of potentially hazardous chemicals. The greater concern is exposure of applicators and of any downwind receptors to diisocyanates released in the coating application process. As mentioned, diisocyanates are not intended to be emitted in the way that solvents used in one component coatings are, instead they are designed to be part of the catalytic reaction that forms the coating film. The application of two-component industrial maintenance coating is usually done by applicators who are specialists in this type of application. Training courses exist which feature safety procedures, and coating application companies frequently participate in these courses so that they can add that certification to their advertising. The specialization required to apply diisocyanate systems implies that applicators will likely be acquainted with employing proper respiratory procedures to protect workers. Also, the use of a plural component application system, a spray gun that mixes to a specification in the gun, can reduce the probability of diisocyanate emissions caused by improper mixing. It is therefore unlikely that an increase in diisocyanate-containing systems will result in a significantly higher amount of worker exposure to toxic compounds.

The CARB Program EIR evaluated the potential for impacts on downwind receptors. For TDI, the increase in cancer risk of one in one million for a MEI would occur at less than a gallon of coating usage per day for individuals less than 100 meters away. However, the calculation is based on chronic exposure, that is, for individuals exposed for seventy years or for forty-six years in a worker setting. Because exposure is expected to be limited due to the infrequent nature of painting and to the industrial setting of most applications of industrial maintenance coating, the risk to a receptor exposed occasionally every several years for several days or, at most, several weeks is significantly less. For example, for painting once every five years for five days, the worker exposure level would not be significant until the project used over 85 gallons of coating per day. The residential exposure level would not be significant until the project used 130 gallons of coating per day. The Program EIR concludes that potential impacts to downwind receptors from diisocyanate exposure are not significant.

There is no discernable reason why any aspect of the Bay Area environment should create any significantly greater hazard for workers or the general public from the adoption of the proposed amendments to Rule 3 than would any other area of the state. Therefore, the findings in the CARB Program EIR are equally applicable to the Bay Area. As previously noted, the proposed amendments to Rule 3 also include a provision to allow a limited amount of industrial maintenance coating at higher VOC levels than would otherwise be required. This provision would offset some of the potential impacts from conversion to low-VOC coating alleged by industry representatives, such as increased use of diisocyanates and increased use of glycol ethers.

One aspect of the Bay Area environment that might lead one to conclude that more industrial maintenance type coating would be used, is in coastal environments where it is cooler and more humid. However, in addition to the provision mentioned above, rust preventative coating is a new category created in the SCM and in proposed amendments to Rule 3. Rust preventative coating is to be used on metal substrates, to protect them from corrosion. The category accommodates existing solvent-borne formulations, so it can reasonably be expected that metal substrates that were formerly protected with industrial maintenance coating, but that were not in industrial settings, such as schools, hospitals, and commercial establishments, will now be protected with solvent-borne rust preventative coating.

4.7.4 CUMULATIVE IMPACTS

Potential cumulative impacts related to a potential increase in fire danger or accidental spills are not considered to be significant. This is because any new solvents used in manufacturing coating would be replacing existing solvents with equally as great a potential to cause a fire or accident hazard. Potential cumulative impacts related to human health due to potential exposure to toxic or carcinogenic compounds over time may be assessed by examining chronic exposure. The CARB Program EIR examined chronic exposure of conventional and replacement solvents in terms of gallons per day use that would result in a downwind receptor experiencing a Chronic Hazard Index of 1.0. To exceed the Chronic Hazard Index (ratio of lifetime expected exposure to a lifetime reference exposure) of 1.0, far fewer gallons of coating containing the conventional solvents toluene, xylene and methyl ethyl ketone need be used than do coatings containing replacement solvents propylene glycol or ethylene glycol. Although unlikely to be used as a replacement, even methylene chloride-containing coating usage may exceed that of toluene, xylene or methyl ethyl ketone-containing coating usage before triggering the Chronic HI of 1.0. The glycol ether-containing coatings (EGBE, EGEE, and EGME) have a lesser gallonage allotment to exceed the HI than do conventional solvent-containing coatings for downwind receptors (EGEE-containing coating is equivalent to toluene-containing coating). The glycol ethers are used in coatings currently. CARB staff reviewed product data sheets for coatings that currently comply with the proposed VOC limits and found that the use of glycol ethers is being replaced by less hazardous coalescing solvents.

For downwind receptors at a distance of 25 meters, the only coating usage that would exceed the Chronic Hazard Index of 1.0 at an expected usage of 25 gallons per day or less is the diisocyanates. However, as previously discussed, chronic exposure is based on continuous exposure for 46 years or 70 years for workplace or residential exposure. Exposure to emissions from architectural coatings, in particular, to industrial maintenance coatings that might contain diisocyanates, is infrequent. Industrial maintenance coating is expected to be durable and provide long-lasting protection for substrates in harsh conditions. The exposure of a downwind receptor to emissions from industrial maintenance coating would be expected to be less than would be expected from non-industrial types of coating, more often single component systems designed for the non-sophisticated consumer or unspecialized contractor.

Cumulative impacts should also be considered for any potential impacts due to combined usage of industrial maintenance coating and other architectural coating. However, as previously

mentioned, the use of toxic materials such as glycol ethers and their acetates in coating that complies with the proposed VOC limits is declining. That trend is expected to continue. The exposure to emissions from non-industrial architectural coating and to industrial maintenance coating has little probability of being additive. This is because existing sites are set in different areas, and planning requirements, already in place in all cities and counties in the Bay Area will not allow the type of industry that would typically use industrial maintenance coating to be located in or near residential settings. Consequently, any cumulative impacts from adoption of the proposed amendments to Rule 3 cannot be considered to be significant.

4.7.5 MITIGATION MEASURES REQUIRED TO REDUCE SIGNIFICANT IMPACTS

Potential hazard impacts in the Bay Area that result from the proposed Rule 3 amendments are not expected to be significant. The increased use of acetone will generally be balanced by reduced usage of other hazardous materials. Emergency contingency plans that are already in place throughout the Bay Area are expected to minimize potential hazards impacts posed by an increased use of acetone in future compliant coatings. In addition, existing fire codes ensure adequate conditions are in place to protect against hazard impacts. Thus, no mitigation measures are required.

It is expected that resin manufacturers and coatings formulators will continue the trend of away from usage of toxic or hazardous solvents in future low-VOC coatings. Future architectural coatings, even projecting changes due to the imposition of lower VOC limits, will likely contain less toxic and carcinogenic compounds than do existing architectural coatings. Although manufacturers will continue the trend away from these compounds, the a reduction in the allowable VOC content of industrial maintenance coating might increase the use of diisocyanates. However, applicators of these coatings will have adequate safety procedures to protect against exposure and the exposure of downwind receptors is not expected to be individually or cumulatively significant. Consequently, no mitigation measures to protect human health are required.

5. OTHER REQUIRED CEQA TOPICS

5.1 Introduction

This section presents the following topics that are required to be addressed in the EIR pursuant to CEQA and the CEQA Guidelines: Environmental Impacts Found Not to be Significant, Irreversible Environmental Changes, Potential Growth-Inducing Impacts, and Consistency with Other Plans. The findings in this section incorporate, by reference, the findings in the CARB Program EIR.

5.2 Environmental Impacts Found Not to be Significant

The CARB Program EIR found no possibility of significant impacts resulting from adoption and implementation of the SCM for each of the following CEQA considerations. In addition, District staff reviewed the following considerations and found that there were no potential significant impacts in the Bay Area based on the proposed amendments to Rule 3: Architectural Coatings.

5.2.1 LAND USE AND PLANNING

Implementation of proposed amendments to Rule 3 will not cause any adverse impacts to land uses or land use planning in the Bay Area. Although no significant increase in architectural coating activity is expected, if it were, it would not result in any new construction not already planned or that would be planned and would not result in any land use impacts.

No new development or alterations to existing land use designations will occur as a result of the proposed Rule 3 amendment adoption. It is not anticipated that existing land uses would require additional land or require rezoning to continue current operations. Land use and other planning considerations are determined by local governments. No additional planning considerations are necessary nor will existing planning considerations be altered by adoption of the proposed project. Therefore, no adverse impacts affecting existing or future land uses are expected.

5.2.2 POPULATION AND HOUSING

Adoption of the proposed amendments will primarily affect the formulation of architectural coatings and cannot be expected to generate any significant effects, either direct or indirect, on the Bay Area population, as no significant amount of additional workers are anticipated to be required. Furthermore, adoption of the proposed amendments is not expected to cause a relocation of population within the Bay Area. As a result, housing is not expected to be affected by the proposed amendments. The amount or types of new housing construction is not expected to be affected by the use of reformulated lower-VOC coatings.

Additionally, adoption of the amendments to Rule 3 is not expected to contribute to any significant housing cost increases. As part of the staff report to accompany the proposed amendments to Rule 3, cost and socioeconomic conclusions are developed. It is anticipated, based on the CARB Staff Report that accompanied the SCM adoption, that there would be no significant difference in cost to consumers between compliant and existing non-compliant coatings. Direct economic impacts are not required to be analyzed pursuant to CEQA unless they also have a significant, direct effect on physical environmental parameters

5.2.3 GEOPHYSICAL

Architectural coatings are applied to buildings, stationary structures, roads, etc. The proposed amendments to Rule 3 limit the VOC content of these coatings and require certain labeling and reporting requirements of manufacturers. There is no possibility that the proposal will have

effects on any geophysical formations, nor is there any possibility that residents will be exposed to any additional geophysical hazards.

5.2.4 BIOLOGICAL RESOURCES

Adoption of the proposed amendments have no possibility to cause any adverse impact to sensitive habitats of plants or animals because all activities will occur at construction, industrial, institutional, commercial or residential sites either already in operation or planned. No new development that could potentially adversely affect plant and animal life is anticipated as a result of these amendments. Potential impacts to aquatic life from releases of any paint and associated wastewater disposed of in sewers and storm drains are discussed in Section 4.3: Water, above. The analysis of water quality impacts to both groundwater and surface water concluded that implementing the revised rule would not generate significant adverse water quality impacts.

5.2.5 ENERGY AND MINERAL RESOURCES

i) Electricity

The proposed project relies on limitations of VOC content in each container of architectural coating. Unlike many District rules, there is no alternative control potential in the Rule based on the use of add-on control equipment such as thermal oxidization or carbon adsorption. Because add-on control equipment will not be used to comply with the provisions of Rule 3, no additional energy use is expected from such equipment. Any energy use associated with increased use of specialized spray equipment (plural systems) to apply reformulated two-component coatings can be expected to be negligible. There will be no increases in electricity consumption from implementation of the proposed amendments. Consequently, electricity use impacts are not considered to be significant.

Some industry representatives have asserted that adoption of lower VOC limits in the SCM and proposed in Rule 3 would increase the demand for electrical power to manufacture more coatings than are currently manufactured. This comment is based on the allegation that low-VOC coatings are inferior to high-VOC coatings, therefore an overall increase in coatings use will result. The issues that were alleged to result in greater coating manufacturing and usage have been analyzed in the CARB program EIR and in Section 4.2: Air Quality, above. Although manufacturers in and outside of the Bay Area will be manufacturing coatings to new formulations, the potential for a significant increase in manufacturing demand is not founded, therefore an increase in electricity demand is not expected.

ii) Natural Gas

Electricity will be the source of energy used to power any additional spray equipment or manufacturing equipment operated at various sites in the Bay Area. Consequently, there are not expected to be any impact foreseeable to the usage of natural gas.

iii) Fossil Fuels

Implementation of the proposed amendments to Rule 3 is not expected to increase the consumption of nonrenewable fossil fuel resources (diesel and gasoline) within the Bay Area. As analyzed in the CARB Program EIR and under Section 4.6: Transportation and Circulation, above, it is not anticipated that there will be additional trips associated with more frequent application of reformulated coatings, nor will there be additional trips due to increased disposal of coatings. Any incremental increase in fuel usage is expected to be negligible. Therefore, fossil fuel energy impacts from implementing of this proposal cannot be considered significant.

iv) Mineral Resources

Some industry representatives have asserted that implementation of the VOC limits proposed in the SCM would require the increased production of coatings in the future. It has been alleged

that this would result in the disposal of more paint cans, resulting in a wasteful use of a mineral resource (metal). As discussed previously, available information on low-VOC coatings contradicts the assertion that more low-VOC coatings would need to be manufactured than would otherwise be necessary with conventional coatings. In addition, metal paint cans are recyclable, once emptied of paint. Recycling centers already exist for paint and metal containers. Consequently, the SCM and proposed amendments to Rule 3 cannot be expected to result in a wasteful use of mineral resources.

A comment received during the environmental review process for the CARB SCM for Architectural Coatings stated that there could be non-renewable resources impacts resulting from the use of non-paint alternatives such as vinyl or aluminum siding or interior wall coverings, in lieu of unsatisfactory paints. The allegation is highly speculative. The use of non-painted substrates such as siding or unpainted concrete are used throughout the Bay Area currently. However, the use of these products has nothing to do with the availability of coatings, but more with stylistic preferences. Implementation of proposed lower VOC limits is not expected to result in substitution of paint with non-paint alternatives.

5.2.6 NOISE

No significant noise impacts are associated with the use of architectural coatings. Coatings formulators that are potentially affected by proposed amendments to Rule 3 are predominantly located in existing industrial or commercial areas. These facilities are subject to existing local noise standards. In addition to noise generated by current operations, noise sources in each area include nearby freeways, truck traffic to adjacent businesses, and operational noise from adjacent businesses.

In general, the primary noise source at existing facilities is from vehicular traffic. Noise is primarily generated during operating hours, which generally range from 6 a.m. to 5 p.m. Monday through Friday. The proposal is not expected to alter noise from any existing noise-generating source. Because local noise ordinances are already in effect, no additional noise impacts are expected from the proposed project.

A comment received by CARB staff on the draft Program EIR indicated that because water-borne coatings require more thorough surface preparation compared to solvent-borne coatings, and because solvent-borne primers would no longer be available if the lower VOC limits in the SCM were implemented, more power washing and abrasive blasting would occur, generating noise in residential as well as industrial areas. The likelihood of the necessity of additional surface preparation was discussed in Section 4.2: Air Quality, above, as was the likelihood of the necessity of additional coats, creating the need to operate spray equipment more in residential areas, as was alleged in another comment. Low-VOC coatings do not require substantially different surface preparation than conventional coatings, nor is additional preparation recommended. Were there additional power washing or abrasive blasting, it would be subject to the same local community noise standards as are current practices. The alleged necessity for additional coats because of low VOC content is unfounded. Consequently, no additional noise is expected as a result of adoption of the proposed amendments.

5.2.7 AESTHETICS

The proposed amendments to Rule 3 do not require any changes in the physical environment that would obstruct any scenic vistas or views of interest to the public. In addition, no major changes to existing facilities or stockpiling of additional materials or products outside of existing facilities are expected because any physical changes would occur at existing industrial or commercial sites. Therefore, there is no possibility that an adverse significant impact to existing visual resources such as scenic views or vistas would occur.

A comment received by CARB staff on the draft Program EIR was that the aesthetics impacts resulting from the ban of over 90 percent of all architectural coatings must be analyzed. Implementation of the VOC limits contained in the ARB SCM and proposed for Rule 3 will not result in the ban of over 90 percent of all architectural coatings, as low VOC coatings that meet the proposed VOC limits are already available and are being used for many applications. In addition, the provisions of Rule 3 that will allow a limited amount of higher VOC industrial maintenance coating to be used and the provision that will allow rust preventative coating and a number of small volume coating categories will preserve many conventional solvent based formulations. The analysis by CARB staff on currently available coating products that will comply with the proposed VOC limits and which have performance characteristics comparable to conventional coatings, indicates that coatings will be available to meet the lower VOC limits and far fewer than 90 of coating products will be banned. Therefore, no aesthetic impacts can be expected.

Another comment received during the by CARB staff on the Program EIR stated that the aesthetics impacts from the elimination of the anti-graffiti coatings category must be analyzed. The existing Rule 3 has no anti-graffiti coatings category. Anti-graffiti coatings were traditionally either classified as tile-like glaze coatings or industrial maintenance coatings. There is no proposed category for tile-like glaze coatings in the SCM or proposed in Rule 3. Based on the availability of anti-graffiti systems that comply with the proposed VOC content limits, CARB staff found that anti-graffiti coatings will not be banned by imposition of the low VOC limits. Anti-graffiti coatings willfall into the categories of industrial maintenance coatings, flats or non-flats. Adoption of proposed amendments to Rule 3 cannot be expected to result in any significant aesthetic impacts.

5.2.8 CULTURAL RESOURCES

There are existing laws that protect and mitigate potential impacts to cultural resources. Should archaeological resources be found during the application of architectural coatings to newly constructed or existing structures, the application of such coatings, and of construction, would cease until a thorough archaeological assessment was conducted. Furthermore, the application of architectural coatings would almost always occur after construction, where archaeological resources would have already been discovered. The proposed amendments to Rule 3 are therefore not anticipated to result in any adverse impact on any cultural resources in the Bay Area.

A comment received by CARB staff on the draft Program EIR stated that implementation of the VOC limits in the SCM may jeopardize the maintenance of historic buildings because the unavailability of traditional coatings will make maintenance of these buildings more difficult. The commentator stated that it might not be possible to find acceptable substitute products to maintain both the historical and physical integrity of these structures, which is considered especially problematic with the elimination of solvent-borne primers. CARB staff did not agree that there would be any such impacts. Based upon information on currently available products that comply with proposed VOC limits, performance characteristics of low-VOC products should be sufficient to meet the weathering impacts on outdoor structures. As discussed previously in Section 4.2: Air Quality, the review of the NTS study and product data sheets indicated that water-borne coatings have durability characteristics similar to conventional, solvent-borne coatings and thus do not require more touch-up and repair work. Water-borne primers also have performance characteristics similar to solvent-borne primers. Consequently, historic structures will be adequately protected after low VOC coatings replace existing higher-VOC formulations. Also, the historic integrity of structures is not based on the use of historic coating systems, but rather the architectural detailing. Typically, historic structures, including statuary and architecture, that are by nature more difficult to preserve because of the age of their construction materials, are protected with the best technology available. The history of regulation of architectural coatings, which dates from 1978, has not resulted in the destruction of historic buildings or the degradation of historic integrity. Therefore, the historic integrity of historic

structures cannot be expected to be compromised because of proposed lower VOC limitations. No significant adverse impacts to cultural resources can be anticipated as a result of adoption of the proposed amendments to Rule 3.

5.2.9 RECREATION

It cannot be expected that adoption of proposed amendments to Rule 3 will generate additional demand for or otherwise affect land used for recreational purposes. Further, as already explained in the Land Use and Planning, Aesthetics, and Cultural Resources sections above, the proposed revisions are not expected to have any adverse effects on land uses in general. No adverse effects on recreational facilities can be expected.

In comments received by CARB staff on the SCM, some industry representatives have indicated that demand for parks would increase due to increased job losses and unemployed workers. This allegation is directly contrary to claims of increased coating usage due to lower VOC, which would create additional jobs. Adoption of lower VOC content limits as are proposed in Rule 3 is not expected to result in significant job losses and any job loss impact is properly assessed in socioeconomic analysis that will accompany the staff report for the proposed amendments. The implication that job losses would result in a significant impact on parks and recreation areas is speculative.

5.2.10 ECONOMIC IMPACTS

Under CEQA, detailed analyses of economic effects are necessary only when such effects have significant impacts on physical environmental parameters. Proposed amendments to Rule 3 would establish VOC content limits for various categories of architectural coatings, and this would have no impact on physical or environmental parameters. However, the staff report that will accompany the proposal will contain an analyses of the economic impacts associated with the rule revision.

5.3 Irreversible Environmental Changes

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

The following impact areas have been evaluated in this draft EIR, as well as in the CARB Program EIR: air quality, water, public services, transportation and circulation, solid and hazardous waste, and hazards. The analyses presented in this draft EIR and in the CARB Program EIR concluded that no significant adverse project-specific or cumulative impacts would occur to any of these environmental areas.

For example, the air quality impacts analysis included an evaluation of eleven issues, nine identified by industry, regarding potential adverse air quality impacts of the project. The analysis of these issues concluded that the proposed project would not have a significant adverse impact on air quality. Likewise, the analysis of potential water impacts, potential public service impacts, potential transportation and circulation impacts, potential solid and hazardous waste impacts, and potential hazards impacts showed that there could not be a reasonable expectation of significant adverse impacts associated with the adoption of the proposed amendments to Rule 3.

Architectural coatings are used on stationary structures and their appurtenances, and on pavements and curbs. The planning, design and construction of structures and pavements such as highways could lead to irreversible environmental changes, such as providing ready access to previously inaccessible areas or the creation of structures on what was previously undeveloped or agricultural land. These projects in themselves require CEQA analysis, however, the application or re-application of architectural coatings to structures or pavements would not trigger any irreversible changes to any environment.

The production of coatings does use a number of irreplaceable natural resources, among them minerals to produce pigments and oil resources to produce solvents. As architectural coatings are already being produced that use these resources, the proposed amendments will only dictate a change in the types of solvents being used. The natural mineral resources in use to produce pigments are expected to remain relatively unchanged. The use of oil resources are expected to decrease, as allowable VOC contents of various categories of coatings are reduced. The oil resources are expected to be replaced by water, and, to a lesser extent, synthetic chemicals. As examined previously, in Section 4.2: Air Quality, the amount of coating used is not expected to significantly increase, and, based on the CARB survey of coatings currently available to meet the proposed VOC limits, much of the potential replacement of solvents has already occurred. Also, based on the analysis presented in Section 4.3: Water, the potential impact on water resources has been determined to be less than significant. Consequently, the proposed amendments to Rule 3 are not expected to produce any irreversible environmental changes or produce any irretrievable commitment of resources.

5.4 Potential Growth-Inducing Impacts

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

Adoption and implementation of the proposed amendments to Rule 3 and will not have any direct or indirect growth-inducing impacts on population or on the economy. The production and application of architectural coatings does not affect the decision making process concerning new development or housing allocation. As iterated in Section 5.2.1: Land Use and Planning, Section 5.2.2: Aesthetics, and Section 5.2.8: Cultural Resources sections, amendments to Rule 3 will not have any effect on planning or land use decisions, or on California or Bay Area population. Any potential adverse impacts on the Bay Area economy, such as job losses, will be assessed in the economic analyses as part of the staff report for the proposed amendments.

5.5 Consistency With Other Plans

CEQA Guidelines § 15125(d) states that "[t]he EIR shall discuss any inconsistencies between the proposed project and applicable general plans and regional plans. Such regional plans include, but are not limited to, the applicable air quality attainment or maintenance plan or State Implementation Plan, area wide waste treatment and water quality control plans, regional transportation plans, regional housing allocation plans, habitat conservation plans, natural community conservation plans and regional land use plans for the protection of the Coastal Zone, Lake Tahoe Basin, San Francisco Bay, and Santa Monica Mountains." The following is a brief discussion of how the proposed amendments to Rule 3 is consistent with these plans.

5.5.1 CONSISTENCY WITH STATE IMPLEMENTATION PLAN

It has been determined that the proposed amendments to Rule 3 will result in a net benefit to air quality, so the project is consistent with EPA policy associated with the State Implementation

Plan (SIP). In the San Francisco Bay Area 2001 Ozone Attainment Plan for the One Hour Standard, there is a commitment to reduce emissions from architectural coatings based on adoption of the SCM. This commitment is expected to reduce VOC emissions to the atmosphere by 2.9 tons per day, which represents 35 percent of the specifically iterated total VOC emissions reductions from stationary sources. Consequently, the proposed amendments are not only consistent with the SIP, but an integral part of it.

5.5.2 CONSISTENCY WITH DISTRICT PLANS UNDER THE CALIFORNIA CLEAN AIR ACT

It has been determined that the proposed amendments to Rule 3 will result in a net benefit to air quality, so the project is consistent with the California Clean Air Act. Reduction in VOC emissions from architectural coatings based on Rule 3 amendments is included in the District's 1991 Air Quality Plan for attaining the state ambient air quality standard for ozone, and has been included as a stationary source control measure in each subsequent Clean Air Plan Update and Triennial Assessment, including the 2000 CAP.

5.5.3 CONSISTENCY WITH AREA-WIDE WASTE TREATMENT AND WATER QUALITY CONTROL PLANS

It has been determined that adoption of the proposed amendments to Rule 3 will not cause a significant adverse impact on the ability of Publicly Owned Treatment Works to treat and handle wastewater. It has also been determined that the proposed amendments cannot be expected to create any significant adverse impact on water usage or water quality through illegal discharge. Finally, it has been determined that the amendments will not have a significant adverse impact on the amount of solid waste that must be disposed of. Therefore, the project is consistent with existing waste treatment and water quality plans.

5.5.4 CONSISTENCY WITH REGIONAL TRANSPORTATION PLAN

The Metropolitan Transportation Commission is responsible for development of the Regional Transportation Plan. The update, required each three years, is currently in draft form and will be the subject of upcoming hearings.[40] The goals of the plan are to improve mobility of persons and freight, improve safety, promote equity for transportation system users, enhance environmental sensitivity, sustain economic vitality and to promote livable communities. In Section 4.5: Transportation and Circulation, above, it was determined that the proposed amendments to Rule 3 will not create any significant adverse impacts on traffic or congestion as a result of the low-VOC limits proposed. Any additions to the transportation infrastructure, roadways, bridges, public transit systems, stations or stops will require the use of architectural coatings, however, due to the expected availability and performance of currently available and project coating systems, it cannot be expected that any element of the regional transportation plan can be impacted by the proposed amendments.

5.5.5 CONSISTENCY WITH THE SAN FRANCISCO BAY PLAN

The San Francisco Bay Plan, and the McAteer-Petris Act, adopted by the California Legislature in 1969, and the federal Coastal Zone Management Act of 1972, recognizes the Bay as the most valuable natural asset in the Bay Area and provides for protection of the Bay from gradual destruction. The Bay Plan balances conservation requirements with appropriate shoreline development, and among the primary objectives is to prevent filling of the Bay.[41] Although architectural coatings will be used on any structures built into or on the Bay, or on any Bay fill, the

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[40] Draft Regional Transportation Plan, Metropolitan Transportation Commission, (www.mtc.ca.gov), August 14, 2001

[41] San Francisco Bay Plan, Bay Conservation and Development Commission, (www.bcdc.ca.gov), April 15, 1999

use of architectural coatings themselves, either before or subsequent to the proposed amendments to Rule 3, will have no impact on any plans or proposals that would be consistent with, or contrary to, the provisions of the Bay Plan. Therefore, the proposed amendments cannot be considered to be inconsistent with the provisions of the San Francisco Bay Plan.

5.5.6 CONSISTENCY WITH SUISUN MARSH PROTECTION PLAN

The Suisun Marsh Protection Plan, and the Nejedly-Bagley-Z'berg Suisun Marsh Preservation Act, adopted by the California Legislature in 1974, provide for the preservation and enhancement of the quality and diversity of the 85,000 acre Suisun Marsh aquatic and wildlife habitats and for compatible uses of upland areas adjacent to the Marsh[42]. The plan is focused on lack of development, however, to the extent that bridges on walking trails or roadways, culverts for water flow, or embankments are constructed to help preserve the marshland area, any structure that requires painting will be coated with architectural coatings. However, the proposed amendments to Rule 3 do not have any possibility of impacting potential decisions regarding construction or placement of these structures in the marshland or upland area. Therefore, the proposed amendments cannot be found to be inconsistent with the Suisun Marsh Protection Plan.

5.5.7 CONSISTENCY WITH THE REGIONAL AIRPORT SYSTEM PLAN

The Regional Airport System Plan provides a recognition of the need for additional airport system capacity. It's objectives include consideration of alternatives to provide capacity, and an analysis of the significant environmental tradeoffs.[43] The Regional Airport System Plan may project additional runway capacity and to the extent that it does, that additional capacity would require the use of architectural coatings such as traffic marking coatings. Any associated structures would also require the use of architectural coatings. However, the proposed amendments to Rule 3 could not have the possibility of impacting any decisions made concerning the construction or siting of any structures associated with airport expansion. Therefore, the proposed amendments cannot be considered to be inconsistent with the provisions of the Regional Airport System Plan.

5.5.8 CONSISTENCY WITH THE SAN FRANCISCO BAY AREA SEAPORT PLAN

The San Francisco Bay Area Seaport Plan designates port priority areas, and suggests needs and improvements for those port areas.[44] As with airports, above, port structures require architectural coatings, yet the proposed amendments to Rule 3 could not possibly affect any decisions made concerning the construction or siting of any structures associated with port structures, either buildings, cranes or docks. Therefore, the proposed amendments cannot be considered to be inconsistent with the provisions of the San Francisco Bay Area Seaport Plan.

5.5.9 CONSISTENCY WITH REGIONAL HOUSING ALLOCATION PLANS

The proposed amendments to Rule 3 will not have any impact on projected population, land use, or housing in the Bay Area, as iterated above in Section 5.2.1: Land Use and Planning, and Section 5.2.2: Population and Housing. Any projected marginal increase in cost for new coatings to comply with the proposed VOC limits will not create a significant enough effect on the cost of housing so as to create an impact on the availability of housing for any income group. Furthermore, the proposed amendments will not affect how housing is planned or allocated within the Bay Area. Therefore, the proposed amendments cannot be considered to be inconsistent with any housing element in any Bay Area City or County General Plan.

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[42] Suisun Marsh Protection Plan, Bay Conservation and Development Commission, (www.bcdc.ca.gov), June 28, 2001
[43] Regional Airport System Plan, Draft Regional Transportation Plan, MTC, op.cit.
[44] San Francisco Bay Area Seaport Plan, Draft Regional Transportation Plan, MTC, op.cit.

5.5.10 CONSISTENCY WITH HABITAT CONSERVATION PLANS

The use of architectural coatings do not create or cause impacts to sensitive habitats of plants or animals because all activities occur at construction, industrial, commercial, institutional or residential sites. The proposed amendments to Regulation 3 could not have any possible effect on any existing or proposed habitat conservation area or on any proposed construction activity that might be affected by a habitat conservation plan. Therefore, the proposed amendments cannot be considered to be inconsistent with any conservation element in any Bay Area City or County General Plan.

5.5.11 CONSISTENCY WITH NATURAL COMMUNITY CONSERVATION PLANS

The proposed amendments to Rule 3 cannot be found to have any impacts on any natural community conservation plans. As iterated previously in Section 5.2.4: Biological Resources, 5.2.7: Aesthetics, and 5.2.8: Cultural Resources, although architectural coatings are used on structures that may have impacts on one of these areas of concern, the coatings themselves would not have any impact on decisions made concerning construction or siting of any structures subject to these plans. Therefore, the proposed amendments cannot be considered to be inconsistent with any natural resource conservation element in any Bay Area City or County General Plan.

5.5.12 SMART GROWTH PLANS

Smart Growth Plans, or Programs, which may be integrated into the general plans of cities and counties, provide for linkages between land use and transportation plans so as to promote sustainable development, direct growth toward areas that can be served by public transit, and encourage the use of public transit.[45] Architectural coatings would be used on structures associated with housing and infrastructure elements of smart growth plans, but proposed amendments to the VOC limits for the coatings could not have any impact on decisions made concerning development connected with smart growth plans or programs. As iterated previously in Section 5.2.1: Land Use and Planning and Section 5.2.2; Population and Housing, the proposed amendments will not create any impact on the land use or housing decisions. Therefore, the proposed amendments to Rule 3 cannot not be considered to be inconsistent with any smart growth element in any Bay Area City or County General Plan.

[45] Smart Growth Programs, Draft Regional Transportation Plan, MTC, op.cit.

6. PROJECT ALTERNATIVES

6.1 Introduction

CEQA requires a description of a range of reasonable alternatives to the project that would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and an evaluation of the comparative merits of the alternatives. CEQA also requires consideration of a reasonable range of potentially feasible alternatives; it does not require consideration of alternatives that are not reasonable. The discussion and analyses of project alternatives presented below is based on and consistent with the analyses of project alternatives in the CARB Program EIR.

The following project alternatives present varying methods of regulation. They were developed by industry representatives and proposed during an public consultation meeting with CARB staff in August, 1998.

6.2 Project Alternatives Rejected as Infeasible

The Program EIR generated by CARB staff and certified at the CARB hearing on June 22, 2000 examined seven alternatives that were found to be infeasible. Following is a brief description of these alternatives, and a discussion of why these alternatives were found to be infeasible.

6.2.1 PERFORMANCE BASED STANDARDS

Rather than establish lower VOC content requirements for specified categories of coatings, this alternative would establish emission standards based on performance standards such as "substrate protectivity" or coating durability. This alternative has been rejected as infeasible by CARB staff because it would be difficult, if not impossible, to reach a consensus among involved parties as to how to create the standards to cover the multitude of coatings reformulations with varying performance characteristics, including how to characterize the degree of substrate protection. In addition, to create a regulation that relied on durability of coatings as a standard, it would take years or in some cases tens of years to enforce regulatory limits. The manufacturer, distributor, seller and applicator could all be impossible to trace in that time period. As well, because coating durability is a market driven phenomena, unlike lower VOC content, there is a natural incentive for manufacturers to create a more durable product. A performance based standard based on durability would encourage structure owners to leave coating on as long as possible to avoid enforcement actions, possibly risking damage to the structure itself. In the case of public agencies who are responsible for the maintenance of bridges, water supply systems and sewage systems, for example, the results of delayed maintenance could be disastrous. Finally, decisions to paint are often made for reasons other than that to protect substrates. Consequently, even though a coating might meet a performance or durability standard, it might be recoated, losing the benefit of the durability.

6.2.2 SEASONAL REGULATION

Under this alternative, the VOC content limits proposed for various architectural coatings would be in effect during the "high ozone season" (typically the summer months). During the "low ozone season" (typically the winter months), coatings formulators could sell and distribute, and contractors and do-it-yourself consumers could use coatings with higher VOC contents. This alternative was found infeasible for the project area because it is too difficult to implement and enforce. It would be difficult for coatings formulators, distributors, and retail stores to manage their inventories to ensure that only complying coatings are sold during the high ozone season. In addition, regulation of end users is effective only when there can be a presumed knowledge base at the level of the end user and the numbers and locations of end users were within reason to contact and inspect. In the case of architectural coatings, end users are potentially everyone

in the Bay Area. As the use of architectural coatings is not connected with most peoples' jobs, it is unlikely that users would be able to develop a sufficient knowledge base to be able to predict the likelihood that their use of any of the many architectural coatings were being done in compliance with the law. It is for this reason that sales of non-compliant products are prohibited. Finally, because of different ozone seasons in different areas of California, typically longer in the south than in the north, the rule would not be consistent across regulated areas of the state at some times of the year. There have been exceedances of the California state ozone in all months of the year except February and December, based on data from 1980-1995.

6.2.3 REGIONAL REGULATION

Under this alternative, areas within the District that do not have an ozone problem or contribute to the District's ozone problem would be exempted from the VOC requirements of Rule 3. This alternative was rejected as infeasible for two main reasons. First, in order to determine the viability of such an approach, the District would have to conduct an extensive analysis involving ambient air quality modeling to determine which geographical areas would be subject to the lower VOC requirements and which would be exempted. The proposal also ignores the fact that ozone is a regional and trans-regional problem, emissions from one part of the District will impact other parts of the District and may impact other air districts.

Second, the problem of enforcing this regulatory approach remains. Enforcement at the retail level, as well as the end-user level would be difficult and would require significant additional resources from distributors to ensure that only compliant products were delivered to the "clean air" areas, as well as significant additional enforcement resources. District boundaries already present a problem for activities conducted barely inside as opposed to barely outside the district. With the creation of boundaries within the largely urbanized Bay Area, this problem would be severely compounded.

6.2.4 EXCEEDANCE FEES

This alternative would allow manufacture, sale and purchase of non-compliant coatings on payment of a fee, similar to the system that exists in the national Architectural and Industrial Maintenance coatings rule. The system used in the national AIM rule allows coatings manufacturers and importers to sell coatings that exceed the applicable VOC limit if they pay a fee of $0.0028 per gram of excess VOC. This is sometimes termed a "pay-to-pollute" approach. It is a market based program, the theory being that companies would be driven to reduce the VOC content of their coating to avoid the fee. However, there are several unknowns associated with any market based approach of this type. Chief among them is that there is a presumption that this fee will steer the market for architectural coatings. If it does not, the rule will generate revenue but it will not produce the intended emission reductions and may actually hinder efforts to attain both the state and federal ozone standards. In a typical gallon of flat house paint, a company that chose to not reformulate their coating from the existing standard of 250 grams VOC per liter to the proposed standard of 100 grams VOC per liter would have to pay a fee of $1.59 per gallon. The question of whether a consumer who purchased a gallon of paint that might range in price from $15 to $40 a gallon, depending on brand and quality, would notice and react to this increment cannot be answered, and has not been answered as a result of the exercise of the exceedance fee in the national rule. The company that chose to pass this cost on to the consumer would reasonably be expected to have that cost partly balanced by the expected cost increase to recover the research and testing that went into reformulation efforts made by a competitor.

An additional problem is that, if it were determined that the fee was insufficient to drive the market, this approach would necessitate more rulemaking, putting a strain on District resources. Even if the fee would be sufficient to drive market behavior, rulemaking would be required periodically simply to recover value lost to inflation that would be expected to retard market driven behavior. Finally, the District does not have the legal authority to directly levy taxes, which is

what the exceedance fee would be considered. For all of these reasons, an exceedance fee approach is not considered a feasible alternative.

6.2.5 TONNAGE EXEMPTION

As with the "Exceedance Fees" alternative, this type of alternative is part of the national Architectural and Industrial Maintenance Coatings rule. A tonnage exemption would allow coatings manufacturers to produce and sell some quantities of coatings that exceed the applicable VOC limit in Rule 3, based on the mass of VOC emissions that were in excess of the limits in the Rule. The tonnage would set a limit on these excess emissions. The national rule contains a 25 ton per manufacturer exemption in the first year of the rule that would decrease in subsequent years to 10 tons.

The tonnage exemption approach in the national rule is additive with the small container exemption (also in the existing and proposed District Rule) and the exceedance fee. The District would have to calculate the foregone emissions due to each manufacturer's share of the exemption that would reach the Bay Area market, and, given the pressures to create emission reductions to satisfy state and federal ozone attainment plans, produce emission reductions from other source categories or from within the source category of architectural coatings. Also, to enforce this sort of provision on a district level, labeling, reporting and record keeping would have to be instituted which would include tracking of "tonnage exempt" coatings through distribution and sales channels. For these reasons, a tonnage exemption is not considered a feasible alternative.

6.2.6 LOW VAPOR PRESSURE (LOW VOLATILITY) EXEMPTION

Under this alternative, VOC's with low vapor pressures (i.e., "low vapor pressure VOC's" or "LVP-VOC's") would be exempted from the determination of the overall VOC content of a coating. This type of exemption is based on an assumption that low vapor pressure VOC's volatilize more slowly, so contribute very little to ozone formation in the atmosphere. The Program EIR developed by CARB identified a number of reasons why this alternative should be rejected as infeasible. First, EPA would not approve any rule into the SIP that had a less restrictive definition of what constitutes a regulated VOC than does EPA. Second, LVP compounds do contribute to ozone formation when they are in the atmosphere, it is just that they are emitted in lesser quantity or over a much greater time period. The CARB consumer product regulations exempted LVP compounds as a way of streamlining the development of consumer product rule, minimize economic impacts on industry and provide formulation flexibility. Most importantly, the test method for determining VOC content of consumer products, which consists of a compendium of existing test methods appropriate for different types of substances, had a instrumentation limit of detection of 0.1 mm Hg, which was the vapor pressure "cutoff" between LVP compounds and regulated VOC.

The CARB Program EIR points out that consumer products and architectural coatings may be quite different in nature. Architectural coatings are (mostly) designed to have the solvent portion evaporate from a thin coating film to produce a dry film. The low vapor pressure compounds in architectural coatings, such as propylene glycol, ethylene glycol, or Texanol®, are eventually almost completely emitted into the atmosphere, so are then available for photochemical reaction.

From one perspective, the test method determines the VOC content of a coating rather than the definition. EPA Method 24 and the equivalent District methods, Laboratory Methods 21 and 22, determine volatile content by heating a coating sample at 110°C for one hour. Regardless of definition, those organic compounds that do not evaporate during this procedure, which include resin systems, organic pigments, and any other components that do not volatilize, are not measured as VOC. The assumption that exempting low vapor pressure compounds in order to reduce the VOC inventory of architectural coatings would somehow lessen the need to regulate this source category is not founded. It would simply result in an exercise in paperwork, but do

nothing to reduce the need to regulate and reduce the significant emissions from this source category. Nor would this exercise change either the cost efficiency or the technical feasibility of regulating architectural coatings relative to other source categories. Consequently, the alternative of a low vapor pressure exemption for the SCM and for Rule 3 is not considered to be feasible.

6.2.7 REACTIVITY BASED VOC LIMITS

This alternative would involve establishing coating VOC limits based on the reactivity characteristics (i.e., the tendency to react in the atmosphere to form ozone) of the compounds contained in the coating, instead of the mass-based VOC limits that are used in other District rules including the current and proposed amendments to Rule 3. Historically, control of VOC emissions has been through mass-based reductions, and the efficacy of this approach has been borne out by the significant reductions in both absolute levels of ozone and population based exposure levels.

The CARB has committed to evaluating the feasibility of reactivity-based regulations for certain VOC source categories, and has an ongoing reactivity research program that includes funding for scientific studies of reactivity and a Reactivity Research Advisory Committee consisting of interested representatives of industry, academia, air district and CARB staff. In addition, CARB has begun to incorporate reactivity characteristics of compounds into some existing regulations, such as the California state rule for aerosol coatings. However, at this time, a number of issues need to be addressed before this type of control strategy could be developed and implemented for architectural coatings.

First among these is the need to fully speciate VOC for each product. To establish viable limits and calculate the potential of new limits to reduce ozone formation, a survey much more complex than the previous CARB survey would need to be completed. This would be a complex administrative task, although CARB has embarked on a survey to obtain this data. For large companies with dedicated environmental specialists, this may prove achievable, however many small companies exist that produce architectural coatings for which the task of speciation for each product might constitute a significant burden. Complicating this task is the problem that not all solvent ingredients in a coating constitute a single VOC species. For example, mineral spirits is a blend of hydrocarbons that will vary from manufacturer to manufacturer. A coatings formulator looks at his ingredients form the standpoint of functionality, not speciation. It is doubtful that a coatings formulator could speciate mineral spirits, and more doubtful whether mineral spirits are made up of the same species and same percentage of species from manufacturer to manufacturer and batch to batch.

Second, there is not yet full consensus on the scale of reactivity that is most appropriate for regulatory purposes. Each scale that has been sufficiently developed measures an increment of ozone produced for an amount of a specific compound added to a sample of air. The air samples are intended to replicate air in urban, polluted environments. Dr. William Carter, at the University of California at Riverside, a leading researcher into reactivity, has evaluated potential scales and concluded that the Maximum Incremental Reactivity (MIR) scale, which measures grams ozone formed per gram VOC added to the base, is the most appropriate for California. This scale best replicates ozone formation in low VOC to NO_x ratios, typical of California. Development of appropriate scales is ongoing.

Also, the reactivity of different species varies with atmospheric conditions. There is variability in the reactivity estimates for species, and the reliability of estimates for some species is not good. Uncertainty estimates have been assigned for species for the purposes of establishing the MIR scale, in some cases the uncertainty may prove to be sufficient to overwhelm reactivity calculations for small volume ingredients. There is currently research ongoing to attempt to reduce uncertainties, and consensus as to the feasibility of enacting reactivity scales for

environmental regulations is growing. However, these factors are not sufficiently established at this time to consider this a feasible project alternative.

Lastly, the problem remains of a test method to speciate hydrocarbons. Although with the use of gas chromatography or gas chromatography/mass spectrophotometry, speciation is possible, it is more time consuming and expensive by a factor of ten than is the test method based on mass. Because of this, the District would have to allocate significantly more resources to testing coating samples with a reactivity based regulation than with a mass based regulation. For all of these reasons, a reactivity based project alternative. Although promising, is not considered to be feasible at this point in time.

6.3 Description of Alternatives Considered Feasible

The Program EIR developed by CARB staff included an evaluation of four project alternatives, one of which was Alternative D: Product Line Averaging. The CARB eventually incorporated a version of this alternative into the SCM, and this provision is reflected in the proposed amendments to Rule 3. Alternative D: Product Line Averaging in this draft EIR is slightly different than this provision. In addition, one other alternative is presented. These alternatives may also be considered feasible alternatives to the proposed amendments to Rule 3. They are briefly described below:

6.3.1 ALTERNATIVE A: NO PROJECT

This alternative assumes that the proposed revisions to Rule 3 will not be implemented, and that the existing VOC limits in Rule 3 would continue to apply. As a result, VOC emissions from architectural coatings in the Bay Area would remain at the same level for an equivalent volume of coating used. No emission reductions would be achieved.

6.3.2 ALTERNATIVE B: EXTENDED COMPLIANCE DEADLINES

This alternative would extend all of the effective dates for compliance with the proposed lower VOC content limits to January 1, 2004. The amendments currently proposed for Rule 3 set effective dates for compliance with lower VOC content limits of January 1, 2003, except for a January 1, 2004 compliance date for industrial maintenance coatings. As a result, VOC emissions reductions from architectural coatings would be equivalent, but delayed.

6.3.3 ALTERNATIVE C: FURTHER REDUCTION OF VOC CONTENT LIMITS

This alternative would reduce the VOC content limits for architectural coatings to lower limitations than the currently proposed amendments require. As a result, VOC emission reductions from architectural coatings would be greater than those projected from the proposed amendments to Rule 3.

6.3.4 ALTERNATIVE D: PERMANENT PRODUCT LINE AVERAGING

The SCM and proposed amendments to Rule 3 contain a provision to allow a company to average the VOC contents of architectural coatings sold from January 1, 2003, when the lower VOC limits go into effect, until January 1, 2005. This provision is intended to provide flexibility for companies that would have a considerable number of coatings to reformulate and to improve the cost effectiveness of the rule. This alternative would allow any company to average coating products sold into California on a permanent basis. As a result, VOC emission reductions expected as a result of adoption of amendments to Rule 3 might be reduced or delayed to the extent that averaging was employed.

6.3.5 ALTERNATIVE E: DIFFERENT VOC LIMITS

This alternative would provide for equivalent emission reductions as would the proposed amendments to Rule 3, but would accomplish the emission reductions by a different mix of VOC limitations than are proposed. As a result, projected VOC emission reductions would be retained.

6.4 Comparison of Alternatives

The Program EIR developed by CARB staff included an assessment of impacts for air quality, water supply, water quality, public services, transportation and circulation, solid and hazardous waste, and hazards for the proposed SCM. There were no significant impacts identified for these resource areas for the proposed SCM. There were also no significant impacts associated with any attributes of the Bay Area's environment. However, a brief discussion of the potential environmental impacts that may be generated by each project alternative is described below:

6.4.1 AIR QUALITY

Alternative A: No Project, assumes that the proposed revisions to Rule 3 would not be adopted, and that the VOC limits in the current Rule 3 would remain in effect. As a result, approximately 3.75 tons per day of VOC emission reductions from architectural coatings would not be achieved throughout the Bay Area. This scenario would jeopardize the ability of the District to meet the target emission reductions contained in the federal 2001 Ozone Attainment plan, and would, should replacement emission reductions be unable to be found, render the Plan unapproveable by the EPA.

Alternative B: Extended Compliance Deadlines, would extend the VOC content limits to January 1, 2004. This alternative would ultimately achieve the same VOC emission reductions as the SCM, however the reductions would be achieved one year later. Under the California Clean Air Act, "... priority shall be placed on expeditious progress toward the goal of healthful air", and air districts must adopt a plan "to achieve attainment of the state standards by the earliest practicable date."[46] Extended compliance deadlines may result in a violation of these requirements.

Alternative C: Further Reduction of VOC Content Limits, would implement lower VOC content limits than those included in the proposed amendments to Rule 3. This alternative, assuming the lower VOC limits were feasible, would reduce emissions to a greater extent than would the proposed amendments. If the limits proved to be infeasible, the alternative could actually hinder progress toward clean air. This is because, based on technical reasons and good faith efforts, manufacturers, distributors, sellers, and users could apply for variances, and there would be a good likelihood of those variances being granted. If granted, because a company would have put all its' efforts into meeting a VOC limitation in the Rule, no lower-VOC-yet-feasible coating may have been developed, so no emission reductions would be achieved.

Alternative D: Permanent Product Line Averaging, would make permanent a provision to allow averaging until 2006. Although the record keeping and reporting associated with a temporary or permanent averaging scheme would act as a natural disincentive to use the scheme unless a company felt it necessary until such time as product could be reformulated to meet a lower VOC limit, or unless a company felt it could improve market share for a given coating, there would be, to the extent that companies used the provision, fewer emission reductions achieved from the Rule, or emission reductions would be delayed or both. Similar to Alternative B, this might be contrary to the provisions of the California Clean Air Act.

Alternative E: Different VOC Limits, would create a different mix of VOC content limits for the amendments to Rule 3. This would achieve the same emission reductions as the proposed amendments. However, companies would have to formulate specifically for the Bay Area and

[46] California Health and Safety Code §40910 and 40913 (b)

there would be considerable confusion over products legal in other regulated areas in California but illegal in the Bay Area and vice versa. The proposed limits for Rule 3 are based on the SCM. The driving consideration behind the SCM was to reduce emissions from architectural coatings to the maximum extent feasible. Therefore, it is doubtful that an alternate mix of VOC limits could be found that would achieve the same emission reduction result and be technically feasible.

6.4.2 WATER

i) Water Demand

Alternative A would not change current water demands. It would, therefore, have fewer water demand impacts than would the proposed Rule 3 amendments.

Alternative B would produce the same water impact demands as the currently proposed amendments, but the water demands would occur at a later date.

Alternative C would probably result in an increase in water demand impacts as the proposed amendments, but, conceivably, could result in fewer impacts. This is because, although many industrial maintenance formulations are expected to be based on water-borne technology, if the VOC limits were even lower, some coatings would be replaced by two component coatings, formulated without water. Were more water used, it is anticipated that the water demand impacts would still be considered insignificant.

Alternative D would probably result in somewhat less water demand, however the water demand could be equivalent. If higher VOC coatings could be permanently averaged, they would not have to be reformulated, but other coatings might have to be reformulated to lower VOC contents for those coatings to average against. Overall, water demand would be impossible to predict but should be close to the demand created by the proposed amendments.

Alternative E would result in a different water demand for different coating categories than would the proposed amendments. Overall, it is impossible to predict whether the overall impact would be greater or less. If in some categories it was greater and in some less, the overall impact would probably still be considered insignificant.

ii) Water Quality

Alternative A would result in no change in the current quantities of coatings entering the sewer systems, storm drainage systems, or groundwater in the Bay Area. Therefore, Alternative A would not create any new or additional water quality impacts.

Alternative B would result in the same coatings that would be reformulated with water in the proposed amendments but they would be reformulated with water one year later. Therefore, to the extent that this alternative would result in water quality impacts, they would be delayed by one year.

Alternative C may require increased use of waterborne technology. Although the worst-case scenario analyzed in the CARB Program EIR, that all affected coatings would be reformulated using waterborne technology, showed that water quality impacts were insignificant for the proposed project, Alternative C would reasonably be expected to have greater impacts. Whether those impacts would be still considered insignificant cannot be projected at this time.

Alternative D would have similar water quality impacts as would the proposed amendments. If there were any water quality impacts that would arise after the sunset of the averaging provision in the proposed amendments, those impacts would not occur under Alternative D. The water quality impacts in the CARB Program EIR were analyzed, and found to be insignificant, without considering averaging.

Alternative E would probably have similar water quality impacts to the proposed amendments. A different mix of VOC limits might create water quality impacts in some categories more so than in others, in a different mix than would the proposed amendments, but it is impossible to say whether the impacts would be greater overall or lesser.

6.4.3 PUBLIC SERVICES

i) Public Facility Maintenance

Alternative A would not require any change to coatings application practices done for maintenance purposes at public facilities. Thus, Alternative A would not create any new or additional public facility maintenance impacts.

Alternative B would only delay any potential public facility maintenance impacts. The impacts were found to be insignificant, so it would be expected that the delayed compliance limits, when they became effective, would also be insignificant.

Alternative C would result in the use of coatings with a lower VOC content than those in the proposed amendments. To the extent that the lower coating VOC limits proved feasible, the impacts on public facility maintenance would be insignificant, as was determined for the proposed amendments. However, were the lower VOC limits infeasible, maintenance of public facilities could be impacted.

Alternative D would result in a product line averaging system that, to the extent that coating companies chose to average coatings used on public facilities, could result in fewer changes to coatings currently in use. This could reduce, by some small amount, the impacts, both environmental and economic, on public facility maintenance. However, any reduction in impacts would probably be offset by greater impacts on other coating users.

Alternative E could result in fewer impacts on public facility maintenance or could result in greater impacts on public facility maintenance. Without an iteration of which categories of coatings would get lower VOC limits and which would get higher VOC limits, the impacts on public facility maintenance are impossible to predict.

ii) Fire Protection

Alternative A will not change the current requirement on fire department servicing. Because the alternative would not create the need for the use of any new coatings, it would not create any new or additional fire department impacts.

Alternative B is expected to result in some coatings formulators using waterborne technology containing less flammable solvents. The exception to this would be the use of acetone in some specific coating categories. However, fire departments treat all National Fire Protection Act Class 3 flammable liquids the same. Because the same replacement and coalescing solvents used to meet the proposed project VOC content limits would be used to meet the Alternative B VOC content limits, this alternative would result in similar insignificant impacts to fire departments as do the proposed amendments, but the impacts would occur one year later.

Alternative C would probably require an increased use of waterborne technology. Manufacturers might be able to reformulate solvent-borne coatings with exempt solvents, some of which would contain more flammable solvents. The overall impact would be impossible to quantify, however, due to the anticipated increase in waterborne technology containing smaller amounts of flammable solvents to meet even lower VOC limits, Alternative C would probably result in fewer fire department impacts than would be expected from the proposed amendments to Rule 3.

Alternative D would result in an increased use of waterborne technology, and if so, it could conceivably be used to offset traditional solvent-borne coatings rather than reformulate those

coatings with acetone. Even though the traditional solvents are considered flammable, it is conceivable that Alternative D could result in fewer impacts on fire protection demands than would the proposed amendments.

Alternative E could conceivably result in fewer fire protection demands than would the proposed amendments to Rule 3. This is because it is expected that the greatest use of water-borne technology will be for the large categories of coatings already largely water-borne, that is, flats, non-flats and high gloss non-flats. Should these categories of coatings be assigned lower VOC limits than are in the proposed amendments, other solvent-borne categories might be assigned higher VOC limits. If that were the case, they might not have to be reformulated with acetone, resulting in overall fewer fire protection demand impacts.

6.4.4 TRANSPORTATION AND CIRCULATION

Alternative A would not result in changes to the volume of traffic or traffic circulation patterns associated with the manufacturing, distribution, and use of architectural coatings. Thus, Alternative A would not create any new or additional transportation or circulation impacts.

Alternative B would result in the same impacts to transportation and circulation as would the currently proposed amendments, however, the impacts would occur one year later. Based on the allegations raised by industry that transportation and circulation demands would be a result of poorer or less stable coating, those impacts one year later might conceivably be somewhat less than they would be under the proposed amendments due to anticipated coating improvements over time. In both cases, the expected impacts would be expected to be insignificant.

Alternative C could result in greater impacts to transportation and circulation than would the proposed amendments. If coatings increasingly had to rely on water-borne technology and the VOC limits were such that solvent that performed functions such as freeze-thaw stabilizers were minimized, transportation and circulation could be impacted. Any additional trips associated with the disposal of reformulated low-VOC waterborne coatings due to freeze-thaw, shelf life, or pot-life problems could potentially be greater than would be the case for the proposed amendments.

Alternative D would result an insignificant change to the transportation and circulation impacts. This alternative would make it somewhat easier to meet the VOC limits on a permanent basis by requiring fewer coatings above the proposed VOC limits to be reformulated. The proposed amendments have been determined to result in insignificant impacts, so it is reasonable to expect that this alternative would also have insignificant impacts.

Alternative E would probably also result in an insignificant change to transportation and circulation impacts for the same reasons as iterated for Alternative D, except that, with a different mix of VOC limits, the coatings shipped into the Bay Area for distribution and sale would result in more truck traffic. This is because the Bay Area shipments would have to be segregated because their legality would be different than for the rest of the regulated areas in the state.

6.4.5 SOLID AND HAZARDOUS WASTE

Alternative A would not require any changes to existing coatings manufacturing processes or coatings application practices. The volume of solid waste and hazardous waste generated from the manufacturing, distribution, and use of architectural coatings would not change under this alternative. Alternative A would not create any new or additional solid waste/hazardous waste impacts.

Alternative B would be expected to generate an equivalent amount of solid waste or hazardous waste from the manufacturing, distribution, and use of architectural coatings as would the proposed amendments, it would only be delayed by one year. Because the proposed

amendments were determined to result in insignificant impacts to solid or hazardous waste demands, the demands from Alternative B would also be insignificant.

Alternative C might result in increased demand on solid waste disposal sites. If the coatings produced to meet even lower VOC limitations suffered from reduced freeze-thaw characteristics, shelf life, or pot-life, additional need for disposal could result. The proposed amendments will not produce a significant impact, so it is likely that, in the case of even lower VOC limits, solid or hazardous waste disposal impacts could also be insignificant, however, they would likely increase.

Alternative D would not result in a change in the solid or hazardous waste disposal impacts. Because the impacts of the proposed amendments were found to be insignificant, and averaging would require the reformulation of many of the same coatings as would the proposed amendments, Alternative D would probably result in the same impacts.

Alternative E could result in an increase in impacts or could result in no change in impacts. If the coating categories selected for more stringent regulation proved to be less technically viable, there could conceivably be more waste generated. If, on the other hand, coatings under a different mix of VOC limits were to prove, individually or overall, to be as technically viable, then waste impacts would be expected to be about the same as under the proposed amendments.

6.4.6 HAZARDS

i) Increased Exposure to Hazards

Alternative A will not change the current risk of exposure to hazards associated with the manufacture, distribution, and use of architectural coatings. Therefore, Alternative A would not create any additional risk of exposure to hazards than currently exists.

Alternative B would be expected to create the same risk of exposure to hazards as would the proposed amendments to Rule 3, but would create them one year later. The potential exposure to hazards has been found to be insignificant for the proposed amendments, therefore the risk of exposure to hazards under Alternative B would also be considered insignificant.

Alternative C might require the increased use of waterborne technology. In this context, exposure to flammable or explosive hazards could reasonably be expected to be less. Conversely, if industrial maintenance coatings formulators increased the use of exempt solvent based systems, the potential for exposure to flammable or explosive situations could possibly increase for these coatings. It can be surmised that, overall, Alternative C would result in a similar risk of exposure to hazards as would the proposed amendments. The risk of exposure to hazards for the proposed amendments was found to be insignificant.

Alternative D might allow the continued use of some existing solvent-borne coatings that would otherwise be reformulated. To offset the higher VOC levels of these coatings, some other coatings might be reformulated to water-borne technology to lower VOC levels. As do the VOC levels, the net result might average to no change in the exposure to hazards from the proposed amendments.

Alternative E might produce the same resultant exposure to hazards as would Alternative D, for the same reasons. Overall, the level of exposure to hazards would be impossible to predict without an iteration of the coating categories that might be involved, but it would be expected that the exposure to hazards would be considered insignificant.

ii) Exposure to Toxic Substances

Alternative A would allow the same coatings to be used as were currently in use. This alternative would not create any change in possible health impacts derived from exposure to toxic substances.

Alternative B anticipated that the same health impacts would be present as would be present under the proposed amendments to Rule 3, but they would be present one year later. As manufacturers strive to replace toxic solvents with less toxic ones, an additional year might conceivably give manufacturers more time to find alternative solvents to use. Therefore, Alternative B could result in slightly fewer human health impacts than would the proposed amendments.

Alternative C would require more reformulation, because more existing coatings would not be able to meet the VOC limits. To the extent that coating reformulation would require the use of toxic solvents, it would be reasonable to expect the potential exposure to toxic solvent to be higher, regardless of warnings and protective equipment recommendations. Whether the risk would still be considered insignificant, as is the risk for the proposed amendments, is impossible to predict.

Alternative D would probably result in equivalent exposure to toxic solvents. This is because, if, due to averaging, the net result would probably be about the same amount of reformulation as the proposed amendments, the net exposure would also probably be about the same. However, it is also conceivable that a permanent averaging provision would allow manufacturers a little more flexibility in their product formulations and they could use that flexibility to reduce toxic solvents used. In this scenario, it could be expected that Alternative D would result in fewer health impacts due to exposure to toxic solvents.

Alternative E would probably result in equivalent exposure to toxic solvents. This is because some coatings would require more reformulation, or reformulation to a greater degree, and some coatings would require less reformulation. The net result would probably produce about equivalent exposure. However, if, in selecting categories of coatings that would be granted higher VOC limits and others that would be granted lower VOC limits, attention was paid not only to overall emission reductions, but also to potential exposure of coating applicators and the general public based on expected reformulation technology, it is conceivable that Alternative E could result in fewer health impacts due to exposure to toxic solvents.

6.5 Conclusion

Following is a brief explanation of why the District staff is recommending the proposed amendments to Rule 3 instead of Alternatives A, B, C, D, or E.

Pursuant to CEQA Guidelines Section 15126.6(e)(2), if the environmentally superior alternative is the "no project" alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives. Since Alternative A: No Project would not achieve any VOC emission reductions resulting in air quality benefits, it cannot be considered environmentally superior. Therefore, this section of the CEQA Guidelines does not apply.

Alternative A: No Project is not supported by District staff because it would not result in any emission reductions. The District needs VOC emissions reductions specifically from the source category of architectural coatings in order to comply with the proposed 2001 San Francisco Bay Area Ozone Attainment Plan, to fulfill the objectives of Stationary Source Control Measure A1 in the 2000 Bay Area Clean Air Plan and Triennial Assessment, and progress toward the California ambient air quality standards for ozone. The proposed amendments, based on the SCM approved by CARB, appear to be a technically feasible and cost effective way to achieve VOC emission reductions. For these reasons, staff does not recommend Alternative A.

Alternative B: Extended Compliance Deadlines is not supported by District staff because the VOC limits in the proposed rule appear to be feasible by January 1, 2003, with the exception of January 1, 2004 for industrial maintenance coatings, and additional time to comply is not necessary. Both the federal and California Clean Air Acts mandate that air quality standards be attained as expeditiously as practicable. It should be noted that the SCM, on which the proposed amendments to Rule 3 is based, is itself based on a coatings survey that found many coatings at the proposed VOC limits already available. The delay would give more time to industry to produce compliant coating formulations, however, the coating limits in this alternative would be the same, as would any adverse environmental impacts associated with the coating limits. As any impacts would only be delayed, but otherwise equivalent, and the delay in air quality benefits would be detrimental and would appear unwarranted, staff does not recommend Alternative B.

Alternative C: Further Reduction of VOC Content Limits is not recommended by District staff because staff has not had the opportunity to review product data and testing for lower VOC products for technical feasibility or economic impact. Therefore, staff cannot recommend lower limits within the time period for implementation of the proposed limits in Rule 3. There is the possibility that, should lower limits not prove either technically or economically feasible, significant adverse air quality impacts may occur due to manufacturers, sellors or applicators, or all three, seeking variance relief and not achieving any emission reductions. For these reasons, although it may appear that emission reductions might be greater than from implementation of the proposed amendments to Rule 3, staff does not recommend Alternative C.

Alternative D: Permanent Product Line Averaging is not recommended by District staff because, although it would provide a permanent degree of flexibility and create rule amendments that would be more cost effective, it would also impact the emission reductions achieved by the rule amendments to an unknown degree, depending on how many companies decided to take advantage of the averaging provision. It should be noted that enforcement of the averaging provision is problematic. In the proposed amendments to Rule 3, averaging is a statewide program, however, the Rule in total must be enforceable by each district. That means that enforcement of the averaging provision is dependent on staff at the California Air Resources Board to approve averaging plans and review record keeping and reporting requirements in Rule 3 and to relay that information to each district. To the extent that CARB staff were unavailable to administer the averaging provisions due to disruption or reallocation between programs, the "enforceability" of Rule 3 would suffer. The staff report that accompanied the SCM stated that the averaging provision was a way of making the rule more cost effective in the short term, but in no way was reflective of the infeasibility of the proposed VOC limits. Finally, should other districts not adopt a permanent averaging provision, this alternative would revert to averaging only within the District. Representatives have already stated that averaging, which involves tracking of high VOC and low VOC coatings within each district, is impossible. For these reasons, staff does not recommend Alternative D.

Alternative E: Different VOC Limits, is not recommended by District staff because, although the air quality benefits and environmental impacts would probably be equivalent. Adoption of different VOC limits would require coating formulators to develop different formulations for the Bay Area, some of lower VOC content, and would also allow them to import coatings with a higher VOC content than were allowed in other regulated areas. This would involve additional, potentially complex administrative procedures for the Bay Area alone and also the added cost of producing additional formulations, even assuming the VOC limits in the alternative were technically feasible to the extent that they appear to be in the proposed Rule 3 amendments. In addition, enforcement of different VOC limits would become difficult. Coating users could not purchase coatings outside of the District with any surety that they would be legal inside the District and vice versa, unless those users, including both professional and non-professional users, would have a working knowledge of both Rule 3 and the applicable architectural coating rule in the other district. For these reasons, staff does not recommend Alternative E.

Based on the information and analyses in this draft EIR and the CARB Program EIR, District staff has concluded that the proposed amendments to Rule 3 are necessary to achieve the objectives of the proposed 2001 San Francisco Bay Area Ozone Attainment Plan, to fulfill the objectives of Stationary Source Control Measure A1 in the 2000 Bay Area Clean Air Plan and Triennial Assessment and progress toward the California ambient air quality standards for ozone. Also, staff has concluded that the proposed amendments to Rule 3 is the most feasible of the alternatives presented, considering potential environmental impacts.

7. PERSONS AND AGENCIES CONSULTED

7.1 Individuals, Organizations and Agencies Consulted

William Guy, Principal Air Quality Specialist, BAAQMD
Henry Hilken, Principal Environmental Planner, BAAQMD
Jean Roggenkamp, Manager, Planning and Transportation, BAAQMD
Barb Fry, Manager, Measures Development Section, CARB
Christian Hurley, Air Resources Engineer, CARB
Mike Jaczola, Air Pollution Specialist, CARB
Robert Jenne, Senior Staff Counsel, CARB
Jim Nyarady, Manager, Strategy Evaluation Section, CARB
Cheryl Young, Air Pollution Specialist, CARB
Aleta Kennard, SMAQMD

Sacramento Metropolitan Air Quality Management District (Final Environmental Impact Report, SCH 2001012006

7.2 Persons Preparing the draft Environmental Impact Report

Daniel Belik, Air Quality Specialist, BAAQMD

8. COMMENTS AND RESPONSES

8.1 Description of Comments

No comments were received on the draft EIR at the public workshop held on October 22, 2001. One comment letter was received from Jim Sell, Senior Counsel at the National Paint and Coatings Association on the last day of the 45 day comment period, November 5, 2001. The National Paint and Coatings Association (NPCA), located in Washington D.C., is the largest national trade group for U.S. coatings manufacturers. Their comment, delivered via e-mail, consisted of a general submission to air districts considering adoption of AIM coatings SCM, dated October 18, 2001, and attachments. The attachments consist of: 1) Position paper on the July, 2001 annual SCAQMD status report concerning implementation of South Coast Rule 1113 (dated 10/18/01); 2) Comments addressed to Aleta Kennard and Greg Tholen at the Sacramento Metropolitan AQMD regarding Rule 442 (5/18/01); 3) Comments addressed Aleta Kennard and Greg Tholen at the Sacramento Metropolitan AQMD regarding Rule 442 (4/20/01); 4) Comments addressed to CARB staff regarding the SCM (6/21/00); 5) Comments submitted by Duane De Young, Rustoleum Corporation, to CARB regarding the SCM (6/19/00); 6) Comments submitted to Rob Sliwinski, New York State Department of Environmental Conservation, representing the Northeast Ozone Transport Commission (8/21/00); 7) Comments submitted to CARB staff regarding the CARB Draft EIR (8/21/00); 8) Comments submitted to Rob Sliwinski, New York State Department of Environmental Conservation, representing the Northeast Ozone Transport Commission (12/11/00).

The attachments result in 46 pages of comments. However, these comments are directed at the SCM or architectural coatings rule amendments in South Coast or Sacramento rather than at the environmental impacts of the rule amendments, in spite of the fact that attachment 7 is in response to the CARB draft EIR. Generally, these comments are about the technical feasibility of the VOC limits in the rule, and about the projected costs of compliance. In addition, there are comments on the process used to arrive at the VOC limits and concern expressed about the opportunity for public input in the SCM process. These comments are more properly responded to in the staff report that accompanies the proposed rule amendments. However, from a careful review of comments, some comments contain implications of adverse environmental impacts. These implications are responded to, below.

8.2 Staff Response to Comments

Attachment number 1 concerns the South Coast architectural coatings rule, Rule 1113, which contains more stringent VOC limits than does the SCM or the proposed amendments to Rule 3. As such, the comments are, in part, not pertinent to the Rule 3 amendments, even though they reference ongoing coating studies at both South Coast and SCM VOC limits. Comments number 2 and 3 address the Sacramento Metropolitan AQMD Rule 442 amendments. These, while pertinent to the proposed Rule 3 amendments, have been responded to by staff at SMAQMD. Comments number 4, 5 and 7 address the SCM and, while also pertinent, have been responded to by CARB staff. Comments number 6 and 8 are submitted regarding rule development in New York and the northeastern states. As such, even though those rules may be based on the model rule for architectural coatings developed by STAPPA/ALAPCO based on the SCM, the issues raised in these letters either replicate those raised in the letters to CARB and Sacramento AQMD or encourage any proposed rule to be sensitive to northeastern U.S. environmental conditions. For a summary of responses to these comments, and staff responses to the issues raised regarding the proposed amendments to Rule 3, please refer to the staff report.

In the May 18 comment letter to the Sacramento Metropolitan AQMD concerning proposed amendments to their architectural coatings rule, Rule 442, it is stated, "In some cases, the use of 'compliant' coatings will require the application of more material and diminish the durability of the coating, meaning that more VOC emissions will occur from compliant coatings than from coatings

that will be prohibited." This comment parallels the industry comments addressed above in Section 4.2.3, Air Quality, Analysis of Potential Environmental Impacts, i) Increased Thickness of Low VOC Coating Films, and vi) The Necessity for More Frequent Re-coating. It is not necessarily true that low VOC coatings produce thicker coating films, and, even if they do, the resultant thickness does not necessarily produce more VOC emissions. If a volume of coating is reformulated to decrease VOC, the volume of VOC lost could be replaced by another organic solvent, water, or solids. In the first two cases, VOC emissions would be less for an equivalent coating thickness, perhaps significantly less due to the "less water calculation" as described in Section 4.2.3, xi) VOC Definition for Low Solids Coating, above. If the coating increased solids, the VOC emissions would also be less even if the coating film increased. The comment would only be true in the case where coating technology shifts were mandated by the VOC requirements, such that the substrate coated required significantly thicker coating films for protection. As mentioned above, this has not been shown to be the case based on coating sales on a per capita basis associated with reduction in VOC limits. Also, the CARB Program EIR found that low-VOC coatings are as durable and as long lasting as conventional coatings, based on available test data to date and on manufacturers' recommendations. No revision to the EIR is necessary based on this comment.

In the June 21, 2000 submission to CARB staff regarding the SCM, Mr. Sell states that the CARB EIR is deficient because the EIR fails to address the widely differing climatic conditions in California on a region-by region basis. The District EIR has addressed Bay Area climatic conditions. For the most part, the Bay Area is characterized by conditions similar to much of California; hot, dry summers and cool, damp winters with temperatures rarely reaching freezing. However, the Bay Area also is unique in its proximity to San Francisco Bay and predominantly cool and humid conditions along the coast in the summer. This EIR addresses those topics, so no revisions based on this comment are necessary. Also, although previously noted, the Rule 3 amendments propose a limited allowance for industrial maintenance coating at a VOC limit above that of the proposed VOC limit of 250 g/l. This is specifically intended to compensate for cooler and more humid conditions.

In the August 20, 2000 submission to CARB staff regarding the CARB draft EIR, Mr. Sell, and Robert Nelson, Director of Environmental Affairs for NPCA, remark on what they consider to be proper attributes of coating to be considered in comparison tests between low VOC and high VOC coatings. In addition to performance characteristics, application and surface preparation characteristics, and cost effectiveness, waste considerations should be compared. Specifically, will the use of a particular coating generate a high amount of waste product and will the amount of solid or hazardous waste generation increase due to different surface preparation requirements. Although in the context of this statement about what should be considered as test parameters, no allegations are made regarding increases in waste from lower VOC coatings, this issue has been previously raised. It is addressed in the EIR in Section 4.6, Solid and Hazardous Waste. The analysis found that any increase in solid or hazardous waste anticipated by implementation of the rule could not be considered significant. Consequently, no revisions to the EIR are necessary.

In conclusion, none of the comments submitted by NPCA related to environmental impacts require revisions to this EIR. For a complete response to comments, please see the staff report accompanying the proposed amendments. To the extent that those comments can be further construed to raise any environmental issues other than those addressed above, the comments and responses are incorporated by reference.

UNITED ASSOCIATION
of Journeymen and Apprentices of the
Plumbing and Pipe Fitting Industry of
the United States and Canada

William P. Hite
General President

Patrick R. Perno
General Secretary-Treasurer

Stephen F. Kelly
Assistant General President

Founded 1889

Letters should be confined to one subject

UA Local Union: 78

1111 W. James M. Wood Blvd
Los Angeles, CA 90066

Subject:

April 7, 2005

Richard Drury
Adams Broadwell Joseph & Cardozo
651 Gateway Blvd., Suite 900
South San Francisco, CA 94080

RE: Issues Related to CPVC Plastic Pipe

Dear Mr. Drury:

I am the Business Manager of UA Plumbers' Local 78, located at 1111 West James M. Wood Blvd., Los Angeles, CA 90015. I have personal knowledge of the matters set forth in this letter from many years of working in the plumbing industry.

1. I am a licensed Journeyman Plumber in the County of Los Angeles. I spent five years as an apprentice plumber, nine years as a journeyman plumber in the field, and worked as a foreman and general foreman. For nine years I was an apprentice instructor at the Apprentice and Journeyman Training Trust in Dominguez Hills, California. I am a graduate of the Journeyman and Apprentice Instructor Training Program at Ann Arbor, Michigan. I have personally participated in the installation of plumbing systems in well over one thousand single and multi-family residential units.

2. In a large residential development involving partially pre-fabricated units, it is common to install CPVC plastic pipe in as many as 20 housing units per day.

3. It is common to install electrical wiring adjacent to CPVC plastic pipe since the same holes are often used for both plumbing and electrical service. Nothing in the Building Code prohibits placement of electrical wiring adjacent to CPVC plastic pipe, and it saves time and expense to place both services in the same holes.

4. It is common for contractors to use more cement, primer and solvents than suggested by manufacturers' instructions when installing CPVC pipe.

5. Propane gas is the fuel of choice in the installation of copper residential water pipe systems. Acetylene is very rarely used. I estimate that acetylene is used in less than one percent of residential copper plumbing installations.

6. A typical fourteen-ounce canister of propane gas is sufficient to plumb two to three typical residential homes with copper pipe.

7. Less than one percent of propane gas is vented to the atmosphere during the installation of copper drinking water pipe systems. Modern propane torches have electronic ignition triggers that light the propane almost immediately, resulting in almost no discharge of unburned propane to the atmosphere. Older propane torches

are ignited with a hand-held striker that is used to ignite the propane almost immediately after turning on the propane flow. Even with the older units, plumbers release very little unburned propane into the atmosphere prior to lighting since this would constitute waste of a valuable product. I estimate that less than one percent of propane is vented to the atmosphere prior to combustion even with the older hand-lit propane torches.

11. Plumbers are trained not to overheat flux, as this can ruin a joint. Plumbers are trained to use just enough heat to melt the flux and solder.

12. Construction activity varies month-by-month due largely to rainfall. Most residential construction is halted during rainfall. Since most rainfall in California occurs during the winter, this results in a decrease in construction activity during the winter months. There is generally a 25-30% decrease in construction activity during the winter months.

13. Plumbers typically work five days per week and typically do not work on federal holidays.

14. I have reviewed calculations prepared by Mr. Nick Kavanaugh, former Training Director, Joint Apprenticeship and Training Committee, Pipe Trades Training School, PMCA, Kern, Inyo and Mono Counties (Aug. 19, 1998). Mr. Kavanaugh calculated the number of joints required for a typical residential home plumbed with CPVC. I conclude that Mr. Kavanaugh's calculations are still reasonable and accurate. Also, the size of the average new home continues to expand in California, with additional bathrooms, kitchen sinks and other amenities becoming increasingly common. Therefore, Mr. Kavanaugh's calculations may underestimate the number of joints required for a typical home today.

Thank you. Feel free to contact me with any questions.

Sincerely,

John C. Hall

John Hall
Business Manager
UA Local 78

JCH/dt/opeiu#537/afl-cio

April 15, 2005

Richard Drury
Adams Broadwell Joseph & Cardozo
651 Gateway Blvd., Suite 900
South San Francisco, CA 94080

RE: Issues Related to CPVC Plastic Pipe

Dear Mr. Drury:

I am a certified plumbing instructor with UA Plumbers' and Steamfitters Local 159, located at 1308 Roman Way, Martinez, CA 94553. I have personal knowledge of the matters set forth in this letter from many years of working in the plumbing industry.

1. I am a certified plumbing inspector. I have over 31 years of experience as a plumber and 11 years of experience as a general superintendent. I have also been a plumbing instructor at the apprenticeship school for over 20 years.

2. Plumbers almost always use more cement, primer and solvents than suggested by manufacturers when installing CPVC pipe. This is because it is expedient, (there is no bonus for saving and there is a large penalty for leaks). Additionally, manufacturer-supplied daubers used to apply solvent and cement are substantially larger than the inside diameter of most in-house fittings leading to a large amount of waste. It would be common to waste as much as 50% of the cement and solvents due to these factors, which would result in use of twice as much material than specified by manufacturers.

3. Our office conducted an informal survey of professional plumbers in Contra Costa County to determine common fuels used when installing copper. Our survey indicated that most plumbers in this area use MAPP gas (10 of 14 surveyed, or 71%); the next most common fuel is acetylene (3 of 14 surveyed, or 21%); while propane is used by some plumbers (1 of 14 surveyed, or 7%). MAPP gas is C_3H_4. MAPP gas is made by combining liquefied petroleum gas with methylacetylene-propadiene. The neutral oxy-MAPP gas flame produces 2405 BTUs/cf with a 5301° F (2927° C) flame temperature. (http://www.corpbrothers.com/productcgc/mapp.htm)

4. Professional plumbers waste very little gas prior to lighting the torch, since wasting fuel results in a loss of profits. A minimum amount of gas is vented to atmosphere. The torch is turned on and immediately lit within one to two seconds. The torch is then used to join numerous joints which are set ahead of time. The result is a loss to the atmosphere of less than 1% of fuel.

5. One 7.5 lb. MAPP gas cylinder is typically adequate to plumb 4-5 houses, although this of course will vary with the size of the house and the complexity of the job.

6. The number of joints per house will be identical whether the house is plumbed with copper of CPVC. The number of joints in a typical house will range from 225-250, although this will, of course, vary with the size of the house and the complexity of the job.

7. Construction activity varies month by month due to rain. We have experienced a 20% reduction this winter.

8. Plumbers generally work 5-days a week, 8 hours a day by contract, and when work is available. Overtime work on residential construction is unusual.

9. Plumbers generally do not work on Federal holidays, except for emergencies or rush jobs.

10. It is typical to use one pound of solder and two ounces of flux to plumb a typical house with copper pipe.

11. We conducted a survey of professional plumbers in Contra Costa County to determine the flux brands that are typically used. Our survey indicated that No Korod flux is the most common (used by 8 of 16 surveyed, or 50%); No Korod Aqua is the next most common (used by 6 of 16 surveyed, or 37%), while Oatey #5 and Laco were each used less frequently (1 each of 16 surveyed, or 6% each).

Thank you. Feel free to contact me with any questions.

Sincerely,

Robert J. Calone 4/18/05

Robert Calone
Certified Inspector #016380
UA Local 159

Live safer.™

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NSF/ANSI STANDARD 14
Plastics Piping System Components and Related Materials

Click here for a list of End Use Code Designations.

DURA PLASTIC PRODUCTS, INC.

Cert-Link® (Click here to visit this Company's Website.)

533 EAST THIRD STREET
P.O. BOX 2097
BEAUMONT, CA 92223
909-845-3161

Facility : BEAUMONT, CA

Potable Water - Pipe and Fittings

Product Type	Material Type	Trade Name	Product Standard
Fittings+	*CPVC*	*DURA*	*ASTM D2846*

90° Street Ell (Spg x S) CTS
1/2"

Cap (S) CTS
1/2", 3/4"

Coupling (S x S) CTS
>= 1/2"

Ell (S x S) CTS
1/2", 3/4"

Reducer Bushing (Spg x S) CTS
3/4" x 1/2"

Tee (S x S x S) CTS
1/2", 3/4", 1"

Tee Reducing (S x S x S) CTS
1" x 1" x 1/2" 1" x 1" x 3/4" 3/4" x 1/2" x 1/2" 3/4" x 3/4" x 1/2"

+ Material complies with NSF/ANSI Standard 61 health effects requirements.

HARVEL PLASTICS, INC.

Cert-Link (Click here to visit this Company's Website)

KUEBLER ROAD
P.O. BOX 757
EASTON, PA 18042-0757
610-252-7355

Facility : BAKERSFIELD, CA

Potable Water - Pipe and Fittings

Product Type	Material Type	Trade Name	Product Standard
*Pipe** + 1/4" thru 16" Sch 40 1/4" thru 16" Sch 80	*CPVC 4120*	*HARVEL CPVC*	*ASTM F441*

* Sockets and gasketed bell ends are not tested or Listed by NSF for this production facility.
+ Material complies with NSF/ANSI Standard 61 health effects requirements.

*Pipe** + 1/4" thru 16" Sch 40 1/4" thru 16" Sch 80	*CPVC 4120*	®	*ASTM F441*

* Sockets and gasketed bell ends are not tested or Listed by NSF for this production facility.
+ Material complies with NSF/ANSI Standard 61 health effects requirements.

*Pipe** + 3/4" thru 3" SDR 13.5	*CPVC 4120*	*HARVEL BLAZEMASTER®*	*ASTM F442*

* Sockets and gasketed bell ends are not tested or Listed by NSF for this production

facility.
+ Material complies with NSF/ANSI Standard 61 health effects requirements.

Pipe +* *CPVC 4120* ® *ASTM F442*
3/4" thru 3" SDR 13.5

* Sockets and gasketed bell ends are not tested or Listed by NSF for this production facility.
+ Material complies with NSF/ANSI Standard 61 health effects requirements.

IPS CORPORATION

17109 SOUTH MAIN
P.O. BOX 379
GARDENA, CA 90247
310-898-3352

Facility : GARDENA, CA

Joining Materials

Product Type	General Material	For Use With	Trade Name	Product Standard
Solvent Cement (1,2,3)	CPVC	PW	Weld-On "All Weather" Flowguard Gold Low-VOC CPVC*	ASTM F493
Solvent Cement (1,2,3)	CPVC	PW	Weld-On 2713 Green CPVC	ASTM F493
Solvent Cement (1,2,3)	CPVC	PW	Weld-On 2714 Beige, Gray or Orange Low-VOC CPVC	ASTM F493
Solvent Cement (1,2,3)	CPVC	PW	Weld-On 2714 Red or Tan Low-VOC CPVC	ASTM F493
Solvent Cement (1,2,3)	CPVC	PW	Weld-On 713 Orange CPVC	ASTM F493
Solvent Cement (1,2,3)	CPVC	PW	Weld-On 714 Orange or Gray CPVC	ASTM F493
Solvent Cement (1,2,3)	CPVC	PW	Weld-On 724 Gray or Orange CPVC	ASTM F493
Solvent Cement (1,2,3)	CPVC	PW	Weld-On 724 Yellow CPVC	ASTM F493
Solvent Cement (1,2,3)	CPVC	PW	Weld-On Low-VOC Flowguard Gold 1-Step CPVC*	ASTM F493

* This cement is yellow color.

(1) This product was evaluated by NSF according to the requirements of NSF/ANSI Standard 61, Section 4.
(2) The compliance of this product with the health effect requirements of NSF/ANSI Standard 61 was determined based on the testing of pipe and fittings assembled using the cement and P-70 and P-72 Primers.
(3) This product is acceptable for use with pipe and fittings sized 1/2" and greater diameter.

KING BROS. INDUSTRIES

Cert-Link (Click here to visit this Company's Website)

29101 THE OLD ROAD
VALENCIA, CA 91355
661-257-3262

Facility : VALENCIA, CA

Potable Water - Pipe and Fittings

Product Type	Material Type	Trade Name	Product Standard
Fittings, Elbow PW+	*CPVC 41xBrass C3600*	*KBI*	*ASTM D2846*

Drop Ear Ell (Brass Elbow) 1" CTS x 1" FIPT
Drop Ear Ell (Brass Elbow) 1/2" CTS x 1/2" FIPT
Drop Ear Ell (Brass Elbow) 3/4" CTS x 3/4" FIPT
Drop Ear Ell (CPVC Elbow) 1/2" CTS x 1/2" FIPT

+ Material complies with NSF/ANSI Standard 61 health effects requirements.

*Transition Fittings PW+ ***	*CPVC 41xBrass C36000*	*KBI*	*ASTM D2846*

1 1/2" CTS X 1 1/2" FIPT
1 1/2" CTS X 1 1/2" MIPT
1 1/4" CTS X 1 1/4" FIPT
1 1/4" CTS X 1 1/4" MIPT
1" CTS x 1" FIPT
1" CTS x 1" MIPT
1/2" CTS x 1/2" FIPT
1/2" CTS x 1/2" MIPT
2" CTS X 2" FIPT
2" CTS X 2" MIPT
3/4" CTS x 3/4" FIPT
3/4" CTS x 3/4" MIPT
Drop Ear 1" CTS x 1" FIPT
Drop Ear 1/2" CTS x 1/2" FIPT
Drop Ear 3/4" CTS x 3/4" FIPT

+ Material complies with NSF/ANSI Standard 61 health effects requirements.
** CPVC Transition Fittings rate at 100 psi at 150°F.

Transition Fittings PW+	*CPVC 41xBrass C36000*	*KBI*	*ASTM F1807*

1/2" CTS x 1/2" PEX
3/4" CTS x 3/4" PEX

+ Material complies with NSF/ANSI Standard 61 health effects requirements.

SPEARS MANUFACTURING COMPANY

Cert-Link (click here to visit this Company's Website)

15853 OLDEN STREET
P.O. BOX 9203
SYLMAR, CA 91342
818-364-1611

Facility : GARDENA, CA

Joining Materials

Product Type	General Material	For Use With	Trade Name	Product Standard
Solvent Cement	CPVC	PW	Blazemaster FS-3	ASTM F493
Solvent Cement	CPVC	PW	Blazemaster FS-4	ASTM F493
Solvent Cement	CPVC	PW	LW5 VOC Yellow One-Step CPVC Cement	ASTM F493
Solvent Cement	CPVC	PW	Low VOC One-Step FS-5	ASTM F493

SPEARS MANUFACTURING COMPANY

Cert-Link (click here to visit this Company's Website)

15853 OLDEN STREET
P.O. BOX 9203
SYLMAR, CA 91342
818-364-1611

Facility : SYLMAR, CA

Potable Water - Pipe and Fittings

Product Type	Material Type	Trade Name	Product Standard
Fittings+	*CPVC 41*	*SPEARS*	*ASTM F437*
45° Ell 819-xxx			
90° Ell 808-xxx			

Bushing
839-xxx

Cap
848-xxx

Coupling
830-xxx

Plug
850-xxx

Tee
805-xxx

+ Material complies with NSF/ANSI Standard 61 health effects requirements.

Fittings+	*CPVC 41*	*SPEARS*	*ASTM F439*
22 1/2° Ell 4216-xxx	816-xxx		
22 1/2° Street Elbow 4242-xxx	842-xxx		
30° Ell 815-xxx			
45° Ell 4217-xxx	817-xxx		
45° Street Elbow 827-xxx			
90° Ell 4206-xxx 809-xxx	4209-xxx	806-xxx	807-xxx
Adapter 835-xxx	836-xxx		
Cap 4247-xxx	847-xxx		
Coupling 4229-xxx	829-xxx		
Cross 4220-xxx	820-xxx		

Plug 849-xxx			
Street Tee 4244-xxx	844-xxx		
Tee 4201-xxx	801-xxx	802-xxx	

+ Material complies with NSF/ANSI Standard 61 health effects requirements.

Fittings+	*CPVC 41*	*SPEARS MANUFACTURING CO.*	*ASTM F438*
22 1/2° Ell 816-xxx			
22 1/2° Street Elbow 4242-xxx	842-xxx		
45° Ell 417-xxx	4217-xxx		
90° Ell 406-xxx	409-xxx	4206-xxx	4209-xxx
Cap 4247-xxx	447-xxx		
Coupling 4229-xxx	429-xxx		
Cross 4220-xxx			
Street Tee 4244-xxx	844-xxx		
Tee 401-xxx	4201-xxx		

+ Material complies with NSF/ANSI Standard 61 health effects requirements.

Fittings+	*CPVC 41*	*SPEARS*	*ASTM D2846*
45° Ell (S x S) 1/2" thru 2" (4117-xxx)			
45° Street Ell (Spg x Soc) 1/2" thru 2" (4127-xxx)			

90° Ell (S x S)
1/2" thru 2" (4106-xxx)

90° Street Ell (S x FIPT)
1/2" thru 2" (4109-xxx)

Cap (Socket)
1/2" thru 2" (4147-xxx)

Coupling (S x S)
1/2" thru 2" (4129-xxx)

Male Adapter (Soc x MIPT)
1/2" thru 2" (4136-xxx)

Reducer Bushing (Spg x Soc)
1/2" thru 2" (4137-xxx)

Tee (S x S x S)
1/2" thru 2" (4101-xxx)

Transition Bushing (IPS x CTS)
1/2" thru 2" (4140-xxx)

Transition Coupling (IPS x CTS)
1/2" thru 2" (4141-xxx)

+ Material complies with NSF/ANSI Standard 61 health effects requirements.

Reinforced Male Thread+ *CPVC 41* *SPEARS* *ASTM D2846*

Transition Adapter
1/2" thru 2"

+ Material complies with NSF/ANSI Standard 61 health effects requirements.

Stainless Steel+ [1] *CPVC 41* *SPEARS* *ASTM D2846*

Female Adapter
1/2" thru 2"

+ Material complies with NSF/ANSI Standard 61 health effects requirements.
[1] Reinforced

Stainless Steel+ [1] *CPVC 41* *SPEARS* *ASTM D2846*

90° Ell
1/2" thru 2"

+ Material complies with NSF/ANSI Standard 61 health effects requirements.
[1] Reinforced

NOTE: xxx = different size code designation

T. CHRISTY ENTERPRISES, INC.

403 WEST BRENNA LANE
ORANGE, CA 92667
213-321-6515

Facility : GARDENA, CA

Joining Materials

Product Type	General Material	For Use With	Trade Name	Product Standard
Solvent Cement (1,2,3)	CPVC	PW	Low VOC Big Orange CPVC	ASTM F493

(1) This product was evaluated by NSF according to the requirements of NSF/ANSI Standard 61, Section 4.
(2) The compliance of this product with the health effect requirements of NSF/ANSI Standard 61 was determined based on the testing of pipe andfittings assembled using the cement and Christy Red Hot Clear primer.
(3) This product is acceptable for use with pipe and fittings sized 1/2" and greater diameter.

Number of matching Manufacturers is 7
Number of matching Products is 117
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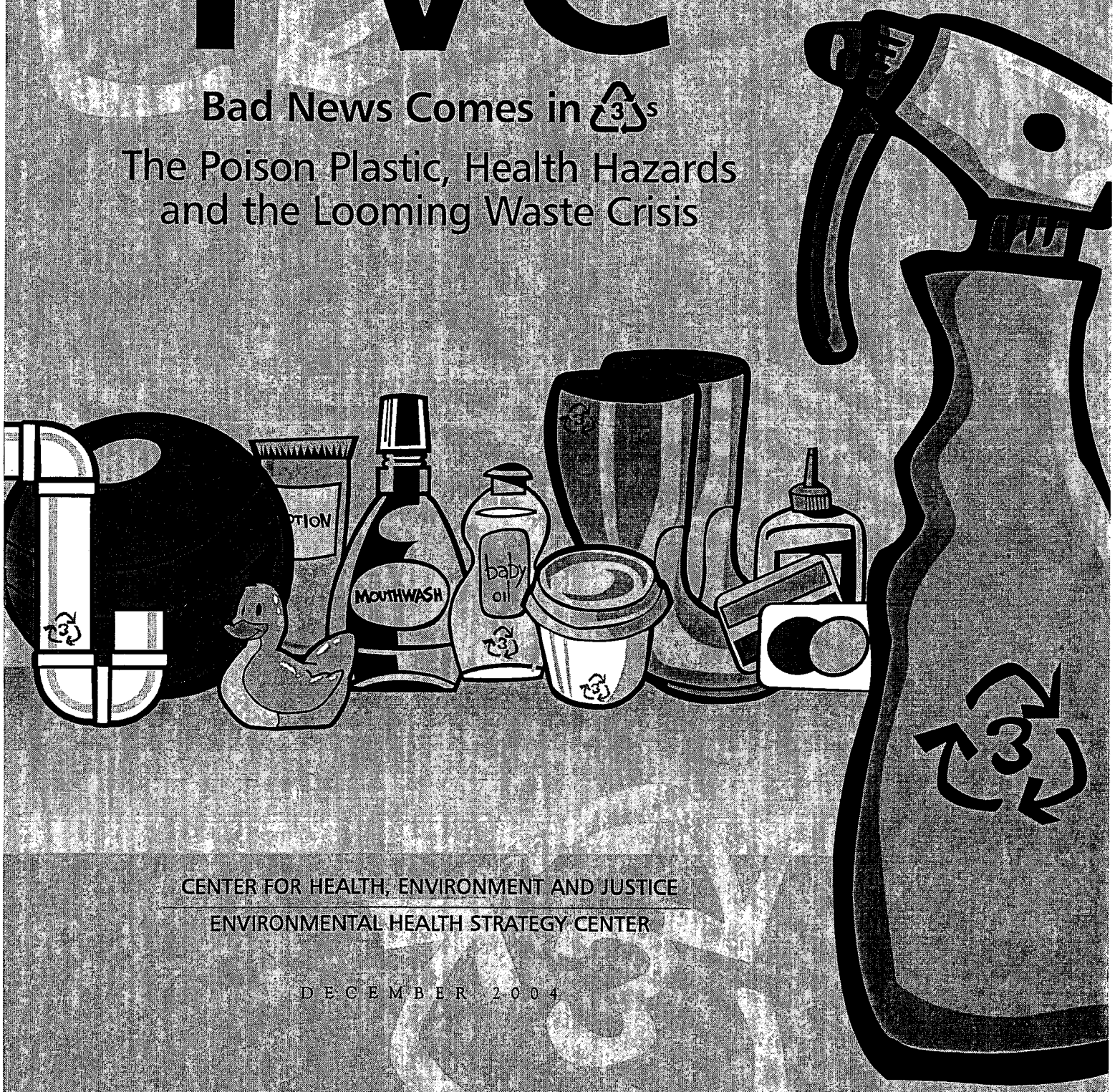
Bad News Comes in 3s

The Poison Plastic, Health Hazards and the Looming Waste Crisis



CENTER FOR HEALTH, ENVIRONMENT AND JUSTICE

ENVIRONMENTAL HEALTH STRATEGY CENTER

DECEMBER 2004

PVC

Bad News Comes in 3s

The Poison Plastic, Health Hazards and the Looming Waste Crisis

Authors: Michael Belliveau, Environmental Health Strategy Center (EHSC)
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Editing: Margaret Stemper

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The Center for Health, Environment and Justice was founded in 1981 by Lois Gibbs, the community leader at Love Canal. CHEJ empowers local groups to be active, ongoing, democratic forces working to protect people and the environment from health-threatening contaminants. We provide one-on-one organizing and technical assistance, and coordinate nationwide issue-focused campaigns that strengthen and broaden the movement.

www.besafenet.org • www.chej.org

P.O. Box 6806
Falls Church, Virginia 22040
703-237-2249

The Environmental Health Strategy Center is a public health organization that exists to protect human health from exposure to toxic chemicals. The Center promotes safe alternatives and clean industry and builds partnerships that focus on environmental solutions as a public health priority. The Center conducts strategic issue campaigns that help set the pace for national chemicals policy reform.

www.preventharm.org

One Pleasant Street, Fourth Floor
Portland, Maine 04101
207-772-2181

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ACKNOWLEDGEMENTS

The authors of this report wish to gratefully acknowledge all those who contributed by defining its scope, providing information, and reviewing the report drafts. Without them, it would not have been as comprehensive, grounded or as useful a tool. We especially appreciate the leadership of Hans Schoepflin and the Panta Rhea Foundation, which generously funded the research and publication of this report.

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*Organizations listed for identification purposes.

Keeping the American Promise:

Achieve Safer and Healthier Future By Eliminating PVC, The Poison Plastic

Dear Friends,

This report provides the facts and a plan of action for one of the most important changes society can make to protect the public's health and the environment.

PVC is a poison plastic. It has earned the title after decades of harming our health and environment. PVC's destructive toxic life begins with manufacturing, continues during product use, and then creates devastating pollution problems when it is disposed. I cannot think of another product that is so destructive throughout its entire life cycle as PVC.

In Louisiana, families gather to talk about how growing health problems in their neighborhood are connected to the local plastic chemical plant's emissions. In Massachusetts, families meet to discuss the rising cancer rates in their valley and the nearby incinerators burning large amounts of PVC and releasing dioxin into the air.

I have traveled across the nation visiting neighborhoods that confront the hazards from manufacturing or disposing of PVC plastics every day. These American families find their homes are suddenly worthless and they are trapped in a nightmare of frustration—trying to prove the pollution from the plant or incinerator has caused the damage to their health. Many of these community stories are briefly described in this report.

Our country's fire fighters and first responders are worried about exposures to PVC's toxic fumes every time they encounter a fire. Consumers are concerned about vinyl plastic tablecloths or shower curtains that release toxic fumes, often referred to as "that new smell." Parents are worried about the leaching of toxic chemicals from PVC toys that their children used in the past.

The sad truth behind the destruction and harm caused by PVC, is that in most cases it is not needed. There are plenty of alternatives that are readily available on the market today. On store shelves, consumers can choose shampoo with a PVC bottle (marked with a #3 or V in the recycle symbol triangle) or a safer PVC-free plastic bottle. A growing number of responsible corporations have decided to stop using PVC. Irresponsible corporations, on the other hand, have refused to move to safer plastics.

An important part of this report is the well-documented fact that there is no "away" for PVC. There is no way to get rid of the product once manufactured. It is with us forever—a legacy left to the next generation. You can't burn it—it just changes to dioxin, another very toxic pollutant. You can't bury it—chemicals leak out into the surrounding soil and groundwater. You can't recycle it—it contaminates the recycling process.

This report gives us hope by outlining how we as a society can phase out PVC in the future, with clear models to begin that phase out now. You'll learn in this document about the many safer, affordable alternatives to PVC that are available today.

We need to begin a nationwide conversation, community by community, on how to phase out PVC. As consumers we need to send a strong message to corporations who are resisting the effort to eliminate PVC and let them know we will not purchase their products. We need to encourage companies to use their entrepreneurial ingenuity to develop new products without PVC, the poison plastic. And, we need to enlist all levels of government to pass strong policies to phase-out PVC.

We must move quickly. Generating as much as seven billion pounds of PVC waste each year cannot continue. We can't bury it, burn it or recycle it. PVC wastes will live beyond the lifetime of everybody on this planet—a terrible legacy to leave for future generations.

A road map for how society can eliminate PVC is included in this report. If everyone takes a step down this road we can achieve a phase-out and begin to safeguard public health and the environment. I hope you will join us and help to leave our children a healthier, more sustainable world.

Lois Marie Gibbs
Executive Director
Center for Health, Environment and Justice

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EXECUTIVE SUMMARY

"Billions of pounds of PVC, the 'poison plastic,' are being thrown 'away' in the U.S.— but there is no away for the health threatening chemicals associated with PVC."

The disposal of polyvinyl chloride (PVC) plastic threatens public health and the environment. Although problematic throughout its lifecycle – from production through final use – the discarding of PVC as waste poses perpetual hazards. PVC is widely used in plastic pipes, building materials (e.g., vinyl siding, windows), consumer products, disposable packaging and many everyday products. We can prevent harm from PVC by replacing it with safer, cost-effective alternatives that are available, and by diverting PVC waste away from incineration and open burning. This report summarizes data on PVC production, use and disposal in the United States, though its conclusions about the environmental health hazards of PVC are applicable to every country.

How much PVC do we use?

Billions of Pounds of PVC are Discarded Each Year

Large and growing amounts of PVC are discarded daily in the U.S. As much as 7 billion pounds of PVC is discarded every year in municipal solid waste, medical waste, and construction and demolition debris. PVC disposal is the largest source of dioxin-forming chlorine and hazardous phthalates in solid waste, as well as a major source of lead, cadmium and organotins. Dioxins are a family of highly toxic chemicals that are known to cause cancer, reproductive, developmental and immune problems. More than 2 billion pounds per year of nondurable (short-lived) PVC products are discarded with U.S. household trash, including blister packs and other packaging, plastic bottles and containers, plastic wrap and bags, and more. In fact, nondurable products account for more than 70% of the PVC disposed of in U.S. municipal solid waste. Worldwide, an estimated 300 billion pounds of PVC, which was installed in the last 30 to 40 years in construction and other long lasting uses, will soon reach the end of its useful life and require disposal.

What's so bad about PVC plastic?

PVC: A Truly "Poison" Plastic

Unlike the many plastics made without chlorine, PVC

poses serious environmental health threats from the start. The production of PVC requires the manufacture of raw chemicals, including highly polluting chlorine, and cancer-causing vinyl chloride monomer (VCM) and ethylene dichloride (EDC). Communities surrounding U.S. vinyl chloride chemical facilities, half of which are in Louisiana, suffer from serious toxic chemical pollution of their groundwater supplies, surface waters and air. Residents of the town of Mossville, Louisiana had dioxin levels in their blood that were three times higher than normal. PVC plastic also requires large amounts of toxic additives to make it stable and usable. These additives are released during the use (and disposal) of PVC products, resulting in elevated human exposures to phthalates, lead, cadmium, tin and other toxic chemicals. Dioxin emissions from PVC combustion occur regularly due to the 1 million annual fires that burn buildings and vehicles, two sectors that use substantial amounts of PVC.

What are the options for disposing of used PVC?

PVC Products + Waste Incinerators or Open Burning = Dioxin Emissions

Dioxin formation is the Achilles heel of PVC. Burning PVC plastic, which contains 57% chlorine when pure, forms dioxins, a highly toxic group of chemicals that build up in the food chain. PVC is the major contributor of chlorine to four combustion sources—municipal solid waste incinerators, backyard burn barrels, medical waste incinerators and secondary copper smelters—that account for a significant portion of dioxin air emissions. In the most recent USEPA Inventory of Sources of Dioxin in the United States, these four sources accounted for more than 80% of dioxin emissions to air based on data collected in 1995. Since then, the closure of many incinerators and tighter regulations have reduced dioxin air emissions from waste incineration, while increasing the proportion of dioxin disposed of in landfills with incinerator ash. The PVC content in the waste steam fed to incinerators has been linked to elevated levels of dioxins in stack air emissions and incinerator ash.

Incineration and open burning of PVC-laden waste seriously impacts public health and the environment. More than 100 municipal waste incinerators in the U.S. burn 500 to 600 million pounds of PVC each year, forming highly toxic dioxins that are released to the air and disposed of on land as ash. The biggest PVC-burning states include Massachusetts, Connecticut, Maine—which all burn more than half of their waste—Florida, New York, Virginia, Pennsylvania, Maryland, Minnesota, Michigan, New Jersey, Indiana and Washington. The incineration of medical waste, which has the highest PVC content of any waste stream, is finally being replaced across the U.S. by cleaner non-burn technologies after years of community activism and leadership by environmentally-minded hospitals. Backyard burning of PVC-containing household trash is not regulated at the federal level and is poorly regulated by the states. There are no restrictions on backyard burning in Michigan and Pennsylvania. It is partially restricted in 30 states, and banned in 18 states.

PVC Products + Landfill Disposal = Groundwater Contamination

Land disposal of PVC is also problematic. Dumping PVC in landfills poses significant long-term environmental threats due to leaching of toxic additives into groundwater, dioxin-forming landfill fires, and the release of toxic emissions in landfill gases. Land disposal is the final fate of between 2 billion and 4 billion pounds of PVC that are discarded every year at some 1,800 municipal waste landfills in the U.S. Most PVC in construction and demolition debris ends up in landfills, many of which are unlined and cannot capture any contaminants that leak out. An average of 8,400 landfill fires are reported every year in the U.S., contributing further to PVC waste combustion and dioxin pollution.

PVC Products + Recycling = Contamination of the Entire Plastics Recycling Process

Unfortunately, PVC recycling is not the answer. The amount of PVC products that are recycled is negligible, with estimates ranging from only 0.1% to 3%. PVC is very difficult to recycle because of the many different formulations used to make PVC products. Its composition varies because of the many additives used to make PVC products. When these different formulations of PVC are mixed together, they cannot readily be separated which is necessary to recycle the PVC into its original formulation. It's also virtually impossible to create a formulation that can be used for a specific application. PVC can never be truly recycled into the same quality material—it usually ends up being made into lower quality products with less stringent requirements such as park benches or speed bumps.

When PVC products are mixed in with the recycling of non-chlorinated plastics, such as in the "all-bottle" recycling programs favored by the plastics industry, they contaminate the entire recycling process. Although

other types of non-chlorine plastics make up more than 95% of all plastic bottles, introducing only one PVC bottle into the recycling process can contaminate 100,000 bottles, rendering the entire stock unusable for making new bottles or products of similar quality. PVC also increases the toxic impacts of other discarded products such as computers, automobiles and corrugated cardboard during the recycling process.

Safer alternatives are available to replace PVC

Safer alternatives to PVC are widely available and effective for almost all major uses in building materials, medical products, packaging, office supplies, toys and consumer goods. PVC is the most environmentally harmful plastic. Many other plastic resins can substitute more safely for PVC when natural materials are not available.

PVC alternatives are affordable and already competitive in the market place. In many cases, the alternatives are only slightly more costly than PVC, and in some cases the costs of the alternative materials are comparable to PVC when measured over the useful life of the product. Phasing out PVC in favor of safer alternatives is economically achievable. A PVC phase-out will likely require the same total employment as PVC production. The current jobs associated with U.S. PVC production (an estimated 9,000 in VCM and PVC resin production, and 126,000 in PVC fabrication) would simply be translated into production of the same products from safer plastic resins.

How can we get rid of PVC?

To end the myriad of problems created by PVC disposal, we recommend the following policies and activities.

- Policymakers at the local, state and federal level should enact and implement laws that steadily reduce the impacts of PVC disposal and lead to a complete phase-out of PVC use and waste incineration within ten years (see box below).
- A new materials policy for PVC that embraces aggressive source reduction of PVC should be adopted to steadily reduce the use of PVC over time.
- Federal and state waste management priorities should be changed to make incineration of PVC waste the least preferable option.
- In the interim, any PVC waste generated should be diverted away from incineration to hazardous waste landfills.
- Consumers should take personal action to buy PVC-free alternatives and to remove PVC from their trash for management as household hazardous waste.
- Communities should continue to organize against PVC-related dioxin sources such as waste incinerators while working to promote safer alternatives.

A PVC-Free Policy Action Agenda

▶ Accomplish Within Three Years ◀

1. Ban all open waste burning.
2. Educate the public about PVC hazards.
3. Ban the incineration of PVC waste.
4. Collect PVC products separately from other waste.
5. In the interim, divert PVC away from incineration to hazardous waste landfills.

▶ Accomplish Within Five Years ◀

6. Establish our Right-to-Know about PVC.
7. Label all PVC products with warnings.
8. Give preference to PVC-free purchasing.
9. Ban PVC use in bottles and disposable packaging.
10. Ban sale of PVC with lead or cadmium.

▶ Accomplish Within Seven Years ◀

11. Phase out other disposable PVC uses.
12. Phase out other high hazard PVC uses.
13. If safer alternatives are not yet available, extend the PVC phase-out deadlines for specific purposes.
14. Fund efforts to reduce the amount of PVC generated through fees on the PVC content of products.

▶ Accomplish Within Ten Years ◀

15. Phase out remaining durable PVC uses.
16. Decommission municipal waste incinerators in favor of zero waste.

INTRODUCTION

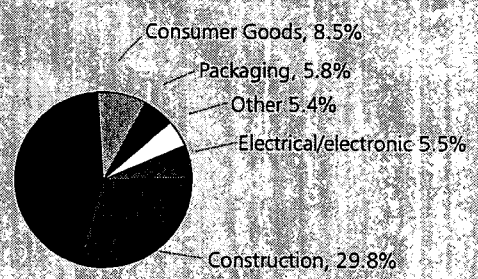
PVC—The Poison Plastic

Polyvinyl chloride, commonly referred to as "PVC" or "vinyl," is the second largest commodity plastic in production in the world today. An estimated 59 billion pounds were produced worldwide in 2002 (CEH 2003). Over 14 billion pounds are produced annually in the U.S. (VI 2004). PVC is used in a wide range of products including pipes and tubing, construction materials, packaging, electrical wiring and thousands of consumer goods (Ackerman 2003). The diverse and widespread use of PVC plastic in disposable and durable goods leads to the many immediate and long-term disposal challenges reviewed in this report.

Figure 1 provides a general breakdown of the many uses of PVC. Because of its low cost and aggressive marketing, PVC is found in hundreds of consumer products that are used everyday, including children's toys, credit cards, clothing, carpeting, furniture, flooring, automotive seats, garden hoses, cellular phones, computer parts, office supplies, siding on our homes, roofing and other building materials. A partial listing of common household products made of PVC can be found in Appendix A.

Plastic pipes and construction uses account for 75% of all PVC consumption in North America. Construction is also the fastest growing PVC sector, with a projected annual average growth rate of 3.5% between 2002 and 2007. Within the construction sector, the fastest growing PVC products are special applications, such as gutters, fencing and decking (growing at 8.1% per year), windows and doors (6.1%), vinyl siding (4.5%) and pipes and tubing (2.5%). PVC use in electrical equipment and electronics is increasing at 2.5% per year. Disposable PVC packaging and transportation-related

Figure 1. Uses of PVC in U.S. and Canada (2002)



Source: Ackerman 2003, CEH 2003

PVC uses will grow by 2.0% every year over the same five-year period (CEH 2003).

This report reviews the many hazards associated with the disposal of PVC in the United States. Although the report relies primarily on U.S. data on PVC production, use and disposal, the information on the environmental health impacts of PVC are applicable to every country. This report is not intended to be a comprehensive review of all the health and environmental risks posed during the lifecycle of PVC throughout its production, use, and disposal. The key impacts of PVC production and use are summarized in order to provide context for assessing the impacts of the disposal of PVC waste.

Throughout the text we have included a number of case studies that illustrate the impact that PVC has on people. In addition, there are a number of sidebars that highlight actions that some organizations have taken to address the public health or environmental impacts of PVC. The following is a brief summary of the report's findings listed by chapter.

Chapter 2, The PVC Generation: Large and Growing Amounts of PVC Waste,

provides an overview of the amount of PVC waste generated in the U.S. each year and estimates how much ends up in different waste streams. This chapter also addresses how PVC increases the toxicity of these waste streams.

Chapter 3, Trouble From The Start: The Production and Use of PVC,

reviews the production and processing of PVC, which involves chlorine and an array of additives that have serious consequences for public health and the environment during PVC use and disposal. The toxic hazards of PVC additives, including phthalates, heavy metals and flame retardants, are described in this chapter.

Chapter 4, The Deadly Connection: PVC, Chlorine and Dioxin,

reviews the relationship between PVC, chlorine and dioxin, which is especially troubling. Dioxin, one of the most toxic chemicals ever tested, is generated when any form of burning is used as a disposal option for PVC.

Chapter 5, Don't Burn It: The Hazards of Burning PVC Waste,

provides a detailed description of the specific hazards of PVC incineration. Open burning of PVC waste in backyard burn barrels or waste piles is especially troubling because of the large amount of dioxins generated.

Chapter 6, No Place Left: Problems with PVC in Landfills,

reviews the specific toxic hazards associated with the land disposal of PVC. Many PVC additives, including phthalates, heavy metals such as lead and cadmium and organotins, slowly leach out of PVC over time when placed in a landfill, eventually contaminating groundwater and surface water. PVC also worsens the impacts of landfill fires and landfill gases that are generated as materials in the landfill decay.

Chapter 7, Recycling Menace: PVC Undermines Recycling Efforts,

reviews efforts to recycle PVC and details its impacts on plastic recycling programs due to its incompatibility with other commonly recyclable plastics. PVC is extremely hard to recycle because of the numerous additives that are used to make a wide range of PVC products. The toxic by-products of PVC also significantly undermine the recycling of other products.

Chapter 8, Don't Buy It: Safer Alternatives to PVC are Available, Effective and Affordable,

looks at the widespread availability of safer alternatives to PVC and provides a summary of an economic analysis conducted by the Global Development and Environment Institute at Tufts University in Medford, MA. This analysis found that cost-competitive alternatives do exist for most uses of PVC. This chapter includes information on resources that can be used to identify alternatives to PVC.

Chapter 9, Take Action: Preventing Harm from PVC Use and Disposal,

describes actions that can be taken by individuals, local grassroots community-based organizations, statewide organizations, and as part of national efforts to prevent harm from the use and disposal of PVC.

In researching this report, we identified a number of important references that we used, and in some cases relied on heavily in writing this report. We appreciate the pioneering work on PVC's hazards and alternatives achieved by the researchers, analysts and authors responsible for these publications. We are especially in debt to these colleagues. We encourage you to consult these resources for more detailed documentation and useful information on the hazards and alternatives to PVC. These and other references are listed at the end of this document.

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THE PVC GENERATION
Large and Growing Amounts of PVC Waste

MAJOR FINDINGS

- As much as 7 billion pounds of PVC are discarded every year in the U.S. in municipal solid waste, medical waste and construction and demolition debris.
- PVC disposal is the largest source of dioxin-forming chlorine and phthalates in solid waste, as well as a major source of lead, cadmium and organotins.
- More than 2 billion pounds per year of non-durable (short-lived) PVC products are discarded in U.S. household trash, including blister packs and other packaging, plastic bottles and containers and plastic wrap and bags.
- Non-durable (short-lived) products account for more than 70% of PVC disposed in municipal solid waste in the U.S.
- Worldwide, an estimated 300 billion pounds of longer-lasting PVC products, such as construction materials that last 30 to 40 years, will soon reach the end of their useful life and require replacement and disposal.

Every day, PVC plastic becomes the problem waste that nobody wants to talk about. Why? Because it enters the waste stream in large amounts as the least recyclable and most environmentally harmful plastic. If there were an honest national dialogue about PVC and dioxin pollution prevention, support for waste incineration would crumble and the government would phase out PVC production and use. Landfills can't contain the toxic components of PVC. PVC contaminates the recycling of so many products that could otherwise be safely reprocessed into useful materials. PVC waste adds daily to a looming waste crisis as more and more long-lasting products made of PVC, such as building materials, are removed from use. And perhaps most of all, because powerful elements of the chemical industry are wedded to promoting PVC use and the chlorine industry involved in its production.

We should care about PVC disposal because that's when the toxic components and by-products of this seemingly benign and ubiquitous plastic are discarded and dispersed throughout the environment. Not everyone lives next to the chemical plant that emits the dangerous raw materials of PVC production. Not everyone experiences the vinyl building fire, the dioxin-spewing burn barrel, or the medical procedure that leaches dangerous chemicals from the intravenous (IV) tubing made of PVC.

Yet all of us generate PVC waste even if we try to avoid doing so. By learning about the harm posed by PVC disposal, we can spur political, business, and consumer

action to break the cycle of dependence on this incredibly toxic and problematic material. If we don't burn it, we can reduce the worst impacts of PVC. And if we don't buy it, we can avoid all of the problems associated with PVC production, use, and disposal.

The Quantity of PVC in the Waste Stream

The useful life of a PVC product may come to an end minutes after a purchase in the case of disposable packaging, or a few decades later when PVC building materials must be replaced. Given the widespread use of PVC and its highly variable lifespan across many types of products, it is no wonder that huge amounts of PVC waste are generated on a daily basis in every community.

Table 1 summarizes available information on the PVC content of solid waste in the U.S. The five major waste streams shown in Table 1 account for almost all post-industrial PVC waste: (1) municipal solid waste (MSW); (2) medical waste; (3) construction and demolition (C&D) debris; (4) discarded products collected for recycling; and (5) industrial solid waste generated during manufacturing.

Table 1

Annual PVC Waste Production in the U.S.

Waste Stream Total Quantity Generated	Description of PVC Portion of Waste Stream	PVC Content of Waste Stream: Percent	PVC Content of Waste Stream: Amount (tons)
Municipal Solid Waste (MSW) 229 million[1] - 369 million[2] tons	Packaging and other disposable vinyl products	0.62%[1]	1,420,000[1] to 2,290,000[2]*
Medical Waste (Biomedical/Infectious) 3.4 million tons[3]	Mostly medical tubing and bags with some vinyl gloves and supplies	5% to 15% [4]	170,000 to 510,000
Construction & Demolition (C&D) Debris 136 million tons[6]	Vinyl pipes only[5] and vinyl pipes and siding[6] (Does not account for other types of PVC C&D debris)	0.18%[5] to 0.63%[6]	245,000 to 856,000
Discarded Products Collected for Recycling Unknown amount	PVC-contaminated plastics from bottles, electronics, automobiles, scrap wood, cardboard, etc.	Varies	Unknown
Manufacturing Waste Unknown amount	Complete range of PVC products including manufactured homes and plastics fabrication	Varies	Unknown
TOTAL Amount of PVC Discarded Annually in MSW, Medical Waste and C&D Debris			1.8 to 3.6 million tons (3.7 to 7.2 billion pounds) Average = 2.75 million tons (Average = 5.5 billion pounds)

Sources and Notes: 1 - USEPA 2003; 2 - Kaufman 2004; 3 - USEPA 1994; 4 - Marrack 1988, Hasselriis 1993, DTI 1995, USOTA 1988; 5 - Cascadia 2003; and 6 - FA 1998. *These two estimates of total PVC content in MSW are derived using USEPA (2003) and Kaufman (2004) data to generate the low and high estimates, respectively. **Note:** There are many inherent uncertainties in any estimate of the amount of MSW generated. This is reflected in the 140 million ton difference between the USEPA estimate of 229 million tons and the Kaufman estimate of 369 million tons of MSW generated. Part of the reason for this difference is due to the methods used to derive the estimates. The USEPA relied on economic and population data to estimate MSW generated on a per capita basis. Kaufman used a survey sent to state management agencies to collect data on solid waste. The EPA estimate only included household garbage, while Kaufman collected data on a number of solid waste categories and then calculated the MSW portion, which included residential and commercial waste, organics, tires, and "other." In both cases, the MSW estimates included primarily household garbage. A third estimate, not used in this report, was made by the Environmental Research and Education Foundation (EREF 2001) which estimated that 545 million tons of MSW were generated in the U.S. in 1999. This estimate was generated from a survey distributed to both public and private waste disposal companies and included all non-hazardous waste sent off-site for final disposal including household waste, commercial and institutional waste, special waste, C&D waste, regulated medical waste, yard waste, sludge and scrap tires. This estimate clearly includes a much broader universal of waste targeted for recycling or disposal.

Waste versus Discards

This report often refers to PVC in the waste stream. In fact, what we often call 'waste' is actually discarded products that we end up wasting. When products reach the end of their useful life, they should be collected to be taken apart and recycled back into their original materials. This is the concept of 'Zero Waste', which maximizes recycling, minimizes waste, reduces consumption and ensures that products are made to be reused, repaired or recycled back into nature or the marketplace (GRRN 2004). Unfortunately, PVC is very difficult to recycle and when present in discarded products tends to contaminate the recycling process. Therefore, almost all PVC products are wasted sooner or later.

Table 1 shows that three of the five major waste streams—municipal solid waste, biomedical/infectious medical waste and construction and demolition debris—account for on average about 5.5 billion pounds of PVC discarded every year in the U.S. An estimated 7.2 billion pounds are generated annually in the European Union (EU) (AEA 2000). In the U.S., 63% to 77% of the total amount of PVC waste known to be discarded each year ends up in the municipal solid waste stream. Medical waste has the highest PVC content due to the high reliance of hospitals on vinyl medical bags and tubing. PVC also makes up as much as 18% of non-infectious hospital waste (Hasselriis 1993), which is typically disposed of as municipal solid waste. The PVC content of C&D waste is similar to that of MSW but is expected to grow significantly—mirroring the growth in PVC building materials used in the last thirty years as they are replaced because of aging (CEC 2000). Each of these five major waste streams are described in the subsections that follow.

Although PVC generally contributes only a modest amount to the total volume of a waste stream, as shown in Table 1, there are exceptions such as hospital waste (Marrack 1988, Hasselriis 1993, DTI 1995, USOTA 1988) and consumer electronics waste (MCTC 1996) that have particularly high PVC content. Furthermore, the amount of PVC waste generated which requires disposal appears to be growing due to the expiration of products placed in use 20 to 30 years ago when PVC materials were introduced (CEC 2000). This adds to concerns about the toxic impacts of PVC disposal due to dioxin formation when burned (see Chapter 5) and the leaching of lead, cadmium, tin, and other toxic additives from the plastic when landfilled (see Chapter 6).

PVC in Municipal Solid Waste

In the U.S., about 79% of PVC in the municipal solid waste (MSW), or about 2.2 billion pounds of PVC, ends up in landfills every year (USEPA 2003). About 21% or about 600 million pounds of PVC in MSW is incinerated every year, leading to the formation of dioxins in air emissions and ash. EPA estimated that a "negligible" amount of PVC is collected for municipal solid waste recycling. MSW includes solid waste generated by households as well as commercial and institutional sources. These figures are based on 2001 data (USEPA 2003).

Non-durable goods (materials with a relatively short useful life) make up 71% of the PVC found in municipal solid waste as shown in Table 2. Over one million tons (2 billion pounds) of these materials were discarded in the U.S. in 2001 (USEPA 2003). The largest portion of these materials was PVC Blister packs (hard plastic packaging often used for toys or computer supplies) and other vinyl packaging that accounted for more than 250,000 tons (500 million pounds). About 500,000 tons (one billion pounds) of these short-lived PVC products are tossed in household trash every year from disposable plastic blister packs, other packaging, film wrap, bags, bottles and other containers. Even more PVC is discarded annually as other non-durable goods, such as shower curtains, beach balls, credit cards and checkbook covers.

The third major category of PVC waste in household trash is durable goods, accounting for 411,000 tons (822 million pounds) per year. "Durable" trash containing PVC could include building materials such as piping, siding, windows and flooring, and consumer electronics and appliances.

PVC in Medical Waste

Until recently, the majority of medical waste was incinerated and much of that was burned on-site at hospitals. By 1990, about 60% to 70% of all medical waste was incinerated (USEPA 1994, USOTA 1990). This included biomedical waste produced by hospitals, labs,

Table 2

PVC Products Disposed in U.S. Municipal Solid Waste (MSW) in 2001

Type of PVC Product		Amount of PVC (tons)	(%)
Non-durable Goods (Short useful life)	Blister packs and other packaging	255,000	18%
	Plastic bottles and containers	147,000	10%
	Plastic wrap and bags	68,000	5%
	Other nondurable goods	539,000	38%
	SUBTOTAL - Nondurables	1,009,000	71%
Durable Goods	SUBTOTAL - Durables	411,000	29%
TOTAL Amount of PVC in MSW (tons)		1,420,000	100%

Source: USEPA 2003

clinics, physician offices and other sources. Since then, the amount of medical waste burned and the number of operating incinerators have dramatically declined due to overwhelming evidence of enormous dioxin emissions, leading to government regulation and powerful community opposition.

As the health care industry continues its transition to non-incineration methods for disinfecting medical waste, the problems caused by vinyl medical products in the waste stream may not be solved. For example, until recently almost all of the medical waste generated in the state of Maine was sent to an out-of-state commercial incinerator. After local community opposition, this regional incinerator was closed and Maine's medical waste was shipped to a microwave disinfection treatment facility. However, the disinfected residue after treatment is now sent to a municipal solid waste incinerator in Massachusetts. The Maine Hospital Association (MHA) is in the process of siting an autoclave facility in the state to disinfect medical waste (see Chapter 5). Due to concerns raised about dioxin emissions, the MHA has pledged to dispose of disinfected PVC-rich residue in a landfill rather than a municipal waste incinerator (Belliveau 2002, Huang 2004).

In states like Maine that are highly dependent on incineration to handle municipal waste, the closure of medical waste facilities may not prevent PVC medical waste from being burned elsewhere, releasing toxic additives and by-products to the environment. Efforts to phase out PVC by the health care industry will prevent such a dilemma.

PVC in Construction and Demolition Debris

More PVC ends up in construction and demolition (C&D) waste each year than in medical waste (See Table 1). About 850,000 tons (1.7 billion pounds) of PVC is disposed of every year in nearly 2,000 C&D landfills across the U.S. (Kaufman 2004). Very little C&D waste is incinerated, except for a portion that enters municipal solid waste when generated by households or small businesses. However, many if not most C&D landfills are unlined or poorly lined compared to municipal solid waste landfills. Thus, there are even fewer barriers to keep chemicals from leaking out than those provided by MSW landfills. This is a serious problem that will likely result in more contaminants from PVC entering the environment.

The amount of PVC in C&D waste may be seriously underestimated. The available waste characterization data included in Table 1 only accounts for PVC pipes (Cascadia 2003) or pipes and vinyl siding (FA 1998). There are many other applications of PVC in building materials and furnishings that may become C&D waste, including vinyl window frames, flooring, roofing foils and carpet backing (Thornton 2002).

Also, the growth in the installation of durable PVC building products over the last twenty to thirty years has built up a stockpile of PVC still in use. As these materials reach the end of their useful life, the amount of PVC in the construction and demolition debris will inevitably and rapidly increase in content and amount. An estimated 300 million pounds of PVC materials will require disposal worldwide in the coming years (van der Naald 1998).

PVC as a Contaminant in the Recycling of Other Products

Another poorly quantified PVC waste stream is the discarded products and materials that are collected for recycling. PVC is very difficult to recycle because of the many different formulations used to make PVC products. Its composition varies widely due to the many additives used to make PVC products. When these different formulations are mixed together, they cannot readily be separated which is necessary to recycle the PVC into its original formulation. It is also virtually impossible to create a formulation that can be used for any application. At best, only about 3% of PVC products and materials are recycled in the U.S.

Two additional problems are created by the presence of PVC in the waste stream targeted for recycling. The first is the difficulty in separating PVC from other plastics, such as PET bottles or nylon carpet facing. This makes it extremely difficult, if not impossible, to recycle these otherwise recyclable materials. Second, the presence of PVC impedes the successful recycling of other valuable commodities such as copper from wiring and cable used in electronics such as computers, steel from scrapped automobiles and corrugated cardboard containers sealed with PVC tape. PVC increases the toxic impacts of recycling these materials. Each of these problems is discussed in more detail in Chapter 7.

PVC as a Manufacturing Waste

In addition to the health care industry, other industrial, commercial and institutional facilities generate PVC waste. Two manufacturing industries are known users of large volumes of PVC—plastics fabricators where PVC consumer products are manufactured from PVC resin (see Chapter 3) and makers of pre-manufactured homes. Fabricators blend PVC resin with additives to form a variety of rigid and flexible PVC products. Manufacturers of modular and pre-made homes use a large proportion of PVC building materials and furnishings. Some amount of pre-consumer PVC waste should be recycled by these industries. Recycling rates for PVC waste from these types of industries are not readily available.

PVC Increases the Toxicity of Solid Waste

PVC contributes a disproportionate share of toxic contaminants to solid waste relative to its modest weight and volume in the waste stream. The different components of PVC add significantly to the hazardous constituents of solid waste as shown in Table 3. The Table shows that PVC contributes from 38 to 67% of the total chlorine found in solid waste, from 90 to 98% of phthalates, from 1 to 28% of the lead and about 10% of the cadmium. Phthalates, lead and cadmium are all added to the PVC resin to achieve different product features. The toxicity of these and other additives is discussed in Chapter 3.

Chlorine is the primary component of PVC making up 57% by weight of the raw material used to make the pure PVC resin (VI 2004). There have been several efforts to estimate the contribution of PVC to total chlorine found in municipal solid waste (MSW). In MSW, at least 80% of the organically bound chlorine, which is thought to be more conducive to dioxin formation than inorganic chlorine, is from PVC (Thornton 2000). In medical waste, PVC's contribution of chlorine is even higher, accounting for more than 90% of organic chlorine and more than 80% of total chlorine (Thornton 2000, Green 1993). Based on these estimates, PVC could reasonably account for as much as 50% of all chlorine found in MSW.

About 90% of all phthalates consumed in the U.S. are used in PVC products (Thornton 2000). In England, an estimated 98% of phthalates are used in PVC products (OECD 2004). Thus, the disposal of PVC in landfills can be expected to account for a substantial portion of the phthalates found in landfills. Phthalates are a group of chemicals used as plasticizers to make the otherwise brittle PVC resin soft and flexible. The proportion of phthalates leaching from PVC in medical waste could be even higher given the prevalence of pliable vinyl medical products, such as tubing and bags, that are disposed of as infectious medical waste (see Chapter 5).

PVC disposal contributes several toxic metals to the solid waste stream, including compounds of lead, cadmium and tin. These metals are added to PVC as stabilizers to help inhibit the plastic's tendency to degrade in the presence of sunlight or heat. Lead is still commonly used in the plastic vinyl sheathing of wires and cables. Older vinyl mini-blinds also contain lead. Estimates of the amount of lead in solid waste attributable to PVC ranges widely from a low of 1% to a high of 28% (CEC 2000). One study found that 10% of the lead stabilizer from one type of flexible PVC cable containing a mixture of additives was released from the PVC (Mersiowski 1999). Lead in rigid PVC is expected to

Table 3

PVC Increases the Toxicity of Municipal Solid Waste (MSW)

Toxic Substance Present in PVC	Use in PVC	PVC's Contribution of Toxic Chemicals in MSW
Chlorine	Part of polymer; pure PVC is 57% chlorine	38% - 67% of total chlorine[1,2] and at least 80% of organic chlorine[2]
Phthalates	Added as plasticizer to make PVC soft and flexible	From 90 to 98%[3]
Lead	Added as a heat stabilizer to slow degradation	1% - 28%[1]
Cadmium	Added as a heat stabilizer to slow degradation	About 10%[4]
Tin (organotins)[5]	Added as a heat stabilizer to slow degradation	Unknown
Antimony[6]	Added to enhance flame retardant effect of chlorine in PVC	Unknown
Organochlorines[6]	Added as a flame retardant to reduce risk of ignition and retard combustion	Unknown

Sources and Notes: 1 - CEC 2000; 2 - Thornton 2000 reports PVC makes up 50% to 67% of total chlorine and at least 80% of organically bound chlorine; 3 - Thornton 2002, OECD 2004; since from 90 to 98% of phthalates consumed are used in PVC products, we assume an equal amount will end up in the waste stream; 4 - Bertin 2000; 5 - Organotin compounds represent about 9.3% of European consumption of stabilizers (CEC 2000); and 6 - UBA 2001.

stay encapsulated in the PVC waste (CEC 2000). Various organotin additives have replaced some use of lead and cadmium as a stabilizer in PVC. Organotin stabilizers are added to rigid packaging film, bottles, roofing and clear rigid construction sheeting and account for 9.3% of the stabilizers on the market (CEC 2000). These estimates are based on European formulations of PVC that may differ slightly from those used in the U.S.

Certain flexible PVC products are a source of the toxic metal antimony in solid waste. Antimony trioxide (ATO) is added to PVC used in flexible electrical cables and roofing foils (an alternative to roofing felt on flat roofs) to inhibit the formation and spread of flames during a fire (UBA 2001, DEPA 1999). Antimony from PVC would show up in electronic waste (cables) and construction and demolition debris (foils).

Other toxic and persistent organochlorine flame retardants are present in solid waste as a result of their use in PVC. These include chlorinated flame retardants such as chloroparaffins and phosphate esters, which are organic phosphorus compounds that may also contain chlorine in their chemical structure (UBA 2001). Chlorinated paraffins and antimony are added as a flame retardant formulation for some PVC textile fibers that are resistant to soaking and weather (UBA 2001).

TROUBLE FROM THE START
The Production and Use of PVC

MAJOR FINDINGS

- The production of PVC poses serious environmental health threats due to the manufacture of raw chemicals, including chlorine, cancer-causing vinyl chloride monomer (VCM) and ethylene dichloride (EDC).
- U.S. communities surrounding vinyl chloride chemical facilities, half of which are in Louisiana, suffer from serious toxic chemical pollution of their groundwater supplies, surface waters and air. Residents of the town of Mossville, LA had dioxin levels in their blood that were three times higher than normal.
- PVC includes high amounts of toxic additives, which are released during the use (and disposal) of the product, resulting in elevated human exposures to phthalates, lead, cadmium, tin and other chemicals.
- The use of PVC results in dioxin emissions from PVC combustion which occurs regularly in the U.S due to 1 million annual fires that burn buildings and vehicles—two sectors that consume large amounts of PVC in construction materials.

The Life Cycle of PVC

The 'life cycle' of a product describes the stages that a material goes through from production to disposal. The general life cycle for PVC is shown in Figure 2.

PVC poses environmental and health threats throughout its life cycle, from the production of feedstock chemicals to the final disposal of PVC products. Though some PVC products can pose direct health risks to consumers, most of the hazards associated with PVC occur during production and disposal. An overview of the hazards associated with PVC production, use, and disposal is shown in Table 4.

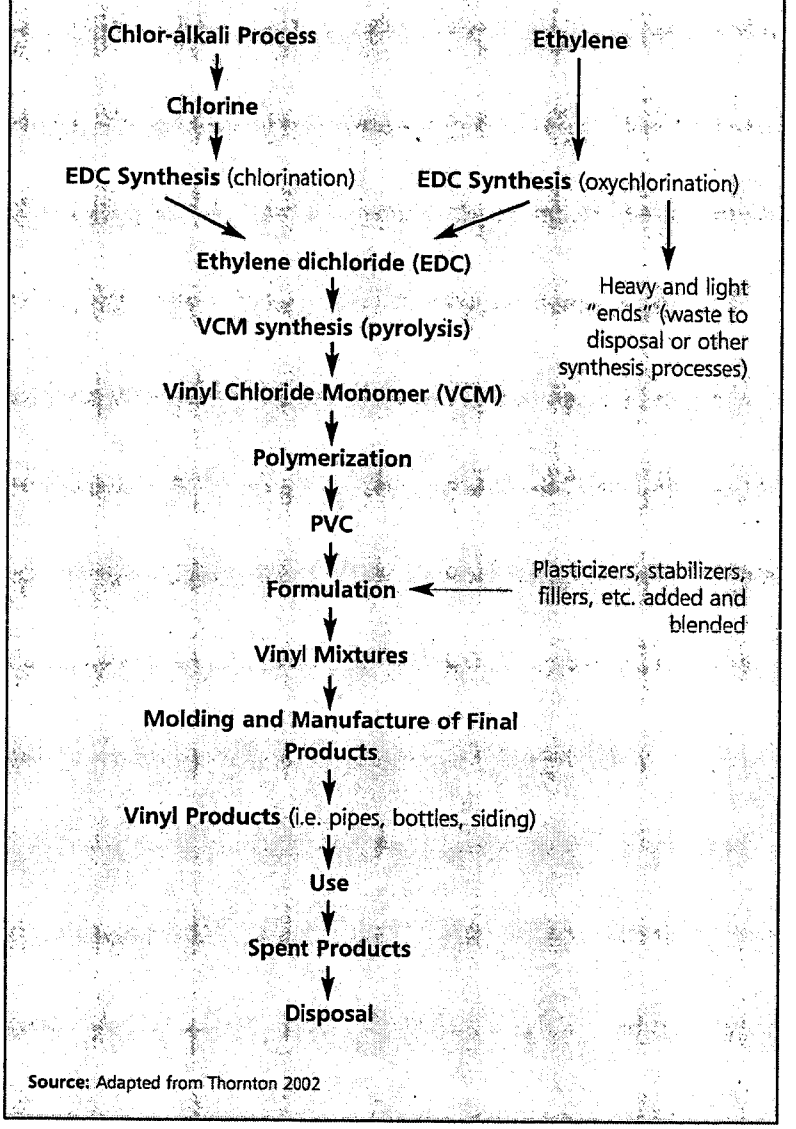
The major reason why PVC poses so many environmental and health threats throughout its life cycle is because it contains large amounts of chlorine (Thornton 2000). Chlorine is a highly reactive substance that readily combines with carbon molecules, the building block of life in people and animals. Carbon is the most important element in living things because it combines with oxygen, nitrogen and hydrogen to produce stable molecules such as DNA, proteins, hormones, sugars, starches and fats that are essential for life. Chlorine reacts readily with carbon, altering the original molecules and their functions (Thornton 2000).

The chlorine in PVC and its feedstocks (ethylene dichloride and vinyl chloride monomer) results in the generation of very large amounts of chlorine-containing

by-products during the manufacture of PVC and the burning of vinyl-containing products and waste. These chemicals include the extraordinarily hazardous chlorinated dioxins and furans, PCBs, hexachlorobenzene, hexachloroethane and hexachlorobutadiene (Papp 1996). Because of the chemical properties of chlorine, these by-products tend to be far more toxic, more persistent in the environment, and more likely to build up in the food supply and the bodies of people than otherwise similar chemicals that do not contain chlorine (Thornton 2000). PVC is the only major plastic that contains chlorine, so it is unique in the hazards it creates.

The chemicals used in the production of PVC (ethylene dichloride and vinyl chloride monomer) are also extremely hazardous. Vinyl chloride is a known human carcinogen that affects the central nervous system and damages the liver (Kielhorn 2000). Ethylene dichloride is a suspected human carcinogen that also affects the central nervous system and damages the liver (USEPA 2003a). Chlorine is a highly irritating gas that damages the upper respiratory system (USEPA 2003b). Hydrogen chloride is a corrosive gas that also affects the upper respiratory system (NAS 2004). These substances pose considerable threats to human health and the environment as a result of PVC production and processing.

Figure 2. The Life Cycle of PVC Plastic



Source: Adapted from Thornton 2002

PVC Production

PVC production begins with the conversion of salt to chlorine using huge amounts of electricity and the purification of ethylene from natural gas (See Figure 2). Chlorine and ethylene are then combined in a chemical reaction to form ethylene dichloride (EDC) in a process generally described as "feedstock production." EDC (considered a "feedstock" chemical) is converted in another chemical reaction to vinyl chloride monomer (VCM), the basic building block of PVC. Vinyl products are then produced in three additional steps. First, polymerization converts the single vinyl chloride monomer into a long chain of vinyl chloride molecules, the PVC polymer or resin. Second, through compounding (or formulation), additives are mixed in with the PVC resin to produce a vinyl formula with desired characteristics such as plasticity, color or resistance to degradation. The ability to change the properties of PVC (making it hard or making it soft or flexible) is what makes it possible to produce a wide range of PVC products. Third, during fabrication (or molding) the product is melted and then molded into its final shape such as a pipe, floor tile or window casing. A more

Table 4

Overview of Hazards Associated with PVC Production, Use and Disposal

Production

- Dioxin and mercury emissions and asbestos waste from chlorine production.
- Air emissions and wastewater releases from Ethylene Dichloride/Vinyl Chloride Monomer (VCM) production facilities.
- Dioxins and other organochlorines released as by-products of Ethylene Dichloride/Vinyl Chloride Monomer (VCM) production.
- Worker exposures to VCM.
- Incineration of production wastes.

Use

- Additives leach and otherwise migrate from PVC products (plasticizers/metal stabilizers).
- Accidental structure and vehicle fires release dioxins.

Disposal

Landfill

- Accidental landfill fires release dioxins.
- Additives, heavy metals and dioxins leach into groundwater.
- Gaseous emissions from additives.

Incineration

- Dioxins form when PVC is burned.
- Hydrochloric acid, toxic metals and dioxins are emitted to air.
- Ash, later stored in landfills, contains high levels of heavy metals and dioxins.

Recycling

- Diversity of additives prevents effective recycling of mixed PVC products and materials resulting in poor quality products (downcycling).
- Low recycling rates (currently <1%).
- Contaminates other plastics during recycling as well as other valuable commodities that are targeted for recycling.
- Does not reduce the overall demand for raw materials to make plastics (virgin resin) and has no effect on the amount of vinyl produced each year.

detailed description of the production and manufacturing process for PVC can been found in numerous references (Thornton 2002, Thornton 2000).

In 2000, there were 12 facilities in the U.S. that produced VCM (CEH 2000). Seven of these plants also produced PVC. As of 2003, there were 24 facilities operated by 12 companies that produced PVC resin in the U.S. (CEH 2003) and an estimated 2,332 PVC fabricating facilities (ARCC 2003). These PVC production facilities released 811,000 pounds of VCM and 670,000 pounds of EDC into the environment in 2002 (USEPA 2004). In addition, 6.5 million pounds of VCM and 2.5 million pounds of EDC were sent off-site to sewage treatment plants or waste treatment facilities (USEPA 2004). It should be noted that these are self-reported numbers that represent an absolute minimum. The actual releases are likely to be greater.

During production, most vinyl chloride releases are to the air since it is a volatile gas. A smaller amount of vinyl chloride monomer is released into groundwater or

into wastewater discharged to nearby rivers and streams. The wastes and emissions from production facilities are not limited to vinyl chloride. Dioxins are formed during the oxychlorination process, where chlorine is combined with ethylene gas (or ethylene, oxygen and hydrochloric acid) to form ethylene dichloride (EDC), the primary building block of the vinyl chloride monomer (Evers 1989). Dioxins are also formed when production wastes are incinerated. Incinerators, boilers and acid furnaces burn waste from the oxychlorination process (especially relevant are wastes such as "heavy ends" and distillation tars) and are responsible for the greatest proportion of dioxin releases during PVC production (Thornton 2002). Using data provided by the Vinyl Institute, the USEPA estimates that PVC-only production facilities were a documented source of dioxin air emissions (see Table 6) (USEPA 2001).

Mercury is used in the oldest and most energy intensive process for producing chlorine (Thornton 2002). There are nine chlor-alkali facilities in the U.S. that still use mercury in their process, a 50-year-old technology (Steingraber 2004). Most of this mercury is reused at the plant, but there are still significant air emissions, waste water releases and waste sludge generated (Thornton 2000). Only about 10% of chlorine production in the U.S. still uses mercury, though very little of the mercury-produced chlorine goes to the production of ethylene dichloride or vinyl chloride monomer. The chlorine industry is the largest consumer of mercury in the country (Thornton 2000).

Mercury emissions at these plants are another environmental and public health concern (Steingraber 2004, USEPA 2003c) as mercury causes reproductive and neurological damage (NAS 2000). Mercury is a potent neurotoxin that accumulates primarily as methyl mercury, in aquatic food chains. The highest levels are found in large predatory fish, such as tuna and swordfish. Air emissions of mercury are transported through the atmosphere and eventually settle on land or surface water where natural bacterial processes transform some of the mercury into methyl mercury. Ingestion of mercury-contaminated fish is the primary route of exposure to methyl mercury. Neurodevelopmental toxicity can result from the exposure of pregnant women and young children to mercury, leading to learning disabilities in children (USEPA 2003c, NAS 2000).

Plants that manufacture ethylene dichloride and vinyl chloride monomer are a risk to workers and residents of surrounding areas. In the early 1970's, plants that manufactured vinyl chloride were found to be exposing workers to levels of the chemical high enough to put them at risk of developing a rare form of liver cancer—angiosarcoma. In 1974, the industry finally admitted that workers exposed to vinyl chloride did develop this rare form of liver cancer (Creech 1974). Residents of communities near vinyl chloride production plants are also affected by plant emissions. These plants discharge pollutants into nearby communities, contaminating drinking water and releasing dioxins into the air from on-site incinerators. Besides cancer, workers and residents alike are vulnerable to a range of ailments associated with vinyl chloride exposure, including damage to the liver, lungs, blood, nervous system, immune system, cardiovascular system, skin, bones and reproductive system (Kielhorn 2000, ATSDR 1997). More detailed analyses of the human health and environmental impact of PVC production processes can be found in numerous references (Steingraber 2004, USEPA 2002, Kielhorn 2000, ATSDR 1997).

Although the levels of vinyl chloride and ethylene dichloride released from these facilities are lower today than in the past, exposure to these substances is still a concern. There appears to be no safe level of exposure for these substances, especially vinyl chloride. Both of these substances are considered to be "genotoxic" meaning that they cause irreversible damage to DNA (Kielhorn 2000). A generally accepted scientific theory is that mutation in a single cell can result in cancer (Pitot 1991). Similarly, exposure to a genotoxic substance can lead to DNA damage. This means there is no safe level of exposure to these substances and any exposure increases the risk of developing cancer, a birth defect or a genetic disorder. Thus, lower emissions from vinyl chloride and ethylene dichloride facilities reduce, but do not eliminate, health and environmental risks.

The production and disposal of PVC poses dangers relevant to everyone, but often, particular groups of people are especially at risk. Plants that manufacture the ethylene dichloride and vinyl chloride monomer are often located in low-income areas or communities of color, as are incinerators that burn PVC waste and landfills that store PVC waste (Thornton 1997). These types of sites pose a threat. Community-based groups understand the threat these facilities pose to their communities. The urgency of their opposition to these facilities speaks to the intensity of the danger that they feel these facilities pose.

CASE STUDY

Mossville, Louisiana: PVC Production in the New "Cancer Alley"

In Calcasieu Parish, Louisiana, residents of Mossville, a small unincorporated community of about 1,500 African Americans, are confronting numerous toxic industries including four vinyl production facilities that include two major vinyl chloride manufacturers. Louisiana is home to more than half of the 12 vinyl chloride plants in the U.S., and Calcasieu Parish produces more vinyl than any other county in the country making it the unofficial PVC capitol of America. At the urging of Mossville residents, air monitoring conducted by the U.S. Environmental Protection Agency (USEPA) in June 1999 showed vinyl manufacturing facilities emitted concentrations of vinyl chloride, a potent human carcinogen, that were more than 120 times higher than the ambient air standard—making the air in Mossville unhealthy to breathe. PPG Industries and Condea Vista in Mossville leaked hundreds of thousands of pounds of ethylene dichloride, a feedstock for PVC, and contaminated the groundwater. As a result of this contamination and a lawsuit settlement with two companies, a significant portion of Mossville families have relocated. This has transformed a once highly populated neighborhood into a virtual ghost town. The Condea Vista facility has changed ownership, but has not improved. The portion of the facility now owned by Sasol Ltd. continues to be ranked in the top 10% of industrial companies that create the highest cancer risk from air and water pollution according to the USEPA 2002 Toxic Release Inventory. This data shows that in 2002 vinyl production facilities in Mossville generated 238,458,615 pounds of toxic waste that were dumped on the community or transferred to disposal facilities. Over 30 million pounds of this waste wound up in landfills and incinerators located in other communities.

In 1998, Mossville Environmental Action Now, Inc. (MEAN) appealed to the U.S. Agency for Toxic Substances and Disease Registry (ATSDR) to test residents for exposure to dioxin, a highly toxic compound that is a by-product of vinyl manufacturing and other industrial processes. In 1999, ATSDR reported dioxin test results showed the average Mossville resident has three times more dioxin in their blood than the average U.S. citizen. Furthermore, testing of breast milk from local mothers found elevated levels of dioxins as high as 30% above the national average. Cancer mortality rates for Calcasieu Parish are 1.6 times the national average and many women suffer from endometriosis, a condition linked to dioxin exposure.

The citizens of Mossville are determined in their search for justice. As descendants of African Americans who proudly settled the community in the late 1800's, they have inherited not only the land, but also the fighting spirit to survive and demand what is rightfully theirs. Working through MEAN, they have lobbied successfully for government action. Through use of a Bucket Brigade program, which allows residents to test their own air, they have caused industry to be fined as much as $300,000 when testing showed benzene levels 231 times greater than the state standard. In 2001, Sasol Ltd., a South African company with chemical and fuel operations in 20 countries, acquired Condea Vista. Working in solidarity with communities in South Africa, SasolWatch.com was created to expose the company's record of violations and toxic dumping on poor communities. MEAN is working with a local health care provider to develop necessary environmental health services for Mossville residents. The organization is educating the public about the dangers of PVC production, use and disposal. MEAN is also demanding significant pollution reduction, the clean-up of industrial contamination in the local estuary, and the just and fair relocation of consenting residents to a healthier environment (Sources: MEAN 2000, Ermler 2001, LBB 2004, SasolWatch 2004, Greenpeace 2004a, Greenpeace 2004b).

PVC Use

PVC plastic used in consumer products is not a pure material. By the time a product containing PVC reaches your home, a wide range of chemicals have been added in order to change its properties to meet a wide range of product needs. These additives include stabilizers, plasticizers and fillers that are mixed in with, but are not chemically bound to the PVC. A list of common additives found in PVC products is shown in Table 5.

The most important of these chemical additives are the plasticizers known as phthalates (pronounced 'thal - eights') and the metal stabilizers. Plasticizers are added

Table 5

Common Additives Found in PVC

Stabilizers
Lead • Cadmium • Antimony • Organotins • Zinc
Plasticizers
Diethylhexylphthalate (DEHP) • Diisononylphthalate (DINP) Diisodecylphthalate (DIDP)

Source: CEC 2000, DEPA 1995

to PVC to "soften" the plastic and make it pliable for certain applications. About 90% of all phthalates consumed in the U.S. (and about 98% in England) are used in PVC products (Thornton 2002, OECD 2004). These plasticizers can make up a large portion, in some cases up to 60% by weight, of the vinyl product (DTI 1995). Because these additives are not chemically bound to the PVC, they will leach out over time (Thornton 2002).

Studies have shown plasticizers such as diethylhexylphthalate (DEHP) and diisononylphthalate (DINP) have migrated out of PVC containers used to store food (CR 1998, DTI 1995); IV bags used to hold blood (Pearson 1993, Tickner 1999); toys (NET 1999, Stringer 1997); and numerous other products, exposing people to these toxic additives (DEPA 2001, Harmon 2001, HCWH 2002).

In some cases, these additives will evaporate or "off-gas" from PVC materials like flooring, wall covering or carpeting, contaminating indoor air (CARB 1999, Rudell 2000, Uhde 2001). A study by the California Air Resources Board measured forty target compounds off-gassing from PVC flooring. Phenol was found in the air off-gassing from all the vinyl sheets evaluated. Tetrahydofuran, cyclohexanone, toluene and n-tridecane were also found (CARB 1999). Another study found the degradation of plasticizers from PVC flooring was likely responsible for an increase in adult asthma as well as eye and skin symptoms in workers. The prevalence of these symptoms decreased when the PVC flooring was removed (Tuomainen 2003). A Swedish study estimated that 42,000 tons of phthalates are released from PVC products worldwide each year (DTI 1995). The familiar "new car" smell or the odor from a newly opened shower curtain represents the release of phthalates evaporating from a PVC product (Thornton 2000).

Components of PVC have also been found to leach from PVC pipes. Vinyl chloride has been found to leach from PVC pipes made prior to 1977 (Yaw 1999). PVC pipes made prior to this time had a high residue of vinyl chloride that failed to bond when the vinyl chloride monomer was polymerized into polyvinyl chloride. In a study of unplasticized PVC pipe, vinyl chloride was detected in water after 30 days at 2.5 parts per billion (ppb), a level that exceeds the USEPA drinking water standard of 1 ppb (Al-Malack 2000). Smaller pipe size, longer line length, and warm temperatures all increase the likelihood of vinyl chloride leaching from PVC pipes. Additional studies have found organotin stabilizers also leach from PVC pipes (Sadiki 1999, Sadiki 1996, Wu 1989, Forsyth 1997).

Phthalates have been shown to cause developmental and reproductive damage (NTP 2000), altered liver (Woodward 1990) and kidney function (Seth 1982) and have been linked to the development of respiratory problems in children (Jaakkola 1999, Oie 1997). More detailed information on the health and environmental impact of phthalates used in PVC products are available from many resources (ATSDR 1997, HCWH 2002, Rossi 2001).

Metal stabilizers are used in PVC to prevent degradation from heat during processing and from exposure to ultraviolet light during the useful life of a product (Pless 2002). They include lead, cadmium, zinc, antimony and the organotins (see Table 5). These metals will leach out of PVC products. Lead and cadmium were found to leach out of children's toys made with PVC (DiGangi 1997). Lead migrated out of PVC window blinds (CT 1996) and into water carried in PVC pipes (DTI 1995). Lead is a known cause of neurodevelopmental problems (USEPA 2004a). Cadmium causes cancer and kidney damage (USEPA 2003d).

Organotin stabilizers (tributyltin, tetrabutyltin, monooctyltin, dioctyltin) were introduced to replace toxic metal stabilizers like lead and cadmium, but they have also been found to leach from PVC products (Sadiki 1999, Harmon 2001). The organotins are also toxic. They affect the central nervous system, skin, liver, immune system and reproductive system (WHO 1980, Pless 2002). The diorganotins, such as dioctyltin, are potent developmental toxins (Ema 1995, Pless

2002) and potent teratogens (Noda 1993, Pless 2002). Tributyltin affects the nervous system, and has caused reproductive and developmental problems in animal studies (Boyer 1989, ATSDR 1992).

Antimony trioxide (ATO) is added to PVC used in flexible electrical cables and roofing foils (an alternative to roofing felt on flat roofs) to inhibit the formation and spread of flames during a fire (UBA 2001, DEPA 1999). For flame retardant applications, PVC accounted for 32% of the European market for antimony trioxide in 1998 (UBA 2001). The antimony, which is a synergist rather than a flame retardant, acts to enhance the flame retarding properties of chlorine in PVC. Antimony trioxide is a suspect human carcinogen when inhaled and is toxic to the lungs, heart, eyes and skin (UBA 2001, NAS 2000a). During fires and waste incineration, antimony dust and toxic antimony halides are released. Antimony also catalyzes the formation of dioxins and furans (UBA 2001).

Other flame retardants added to PVC include chlorinated paraffins, phosphate esters (organic phosphorus compounds some of which also contain chlorine or bromine) and aluminum trihydroxide (UBA 2001). These additives are used in high volumes but are also used in many other polymer applications in addition to PVC. Chlorinated paraffins and antimony are added as a flame retardant formulation for some PVC textile fibers that are resistant to soaking and weather (UBA 2001). Chlorinated paraffins are complex mixtures of short-chain and long-chain hydrocarbons containing up to 70% chlorine. Chlorinated paraffins cause liver and kidney toxicity in animals while the short-chain mixture is an animal carcinogen and possible human carcinogen (NAS 2000a). Chlorinated paraffins and phosphate esters in PVC also function as secondary plasticizers (UBA 2001).

The phosphate ester flame retardants used in PVC include tris (2-chloroethyl) phosphate, tris (chloropropyl) phosphate [TCCP], and tris (dichloropropyl) phosphate [TDCPP]. These compounds are added to PVC floor covering and are released as off-gassing occurs from the vinyl (Marklund 2003). TDCPP was widely used as a flame retardant in children's sleepwear until May 1977, when it was withdrawn from the market after published reports that it was mutagenic in bacteria (Sanders 1978). The use of TDCPP as a flame retardant may pose significant cancer risks and reproductive harm (testicular atrophy and decreased seminal vesicle secretions), according to a committee of top U.S. scientists (NAS 2000a). The German Federal Environmental Agency has recommended a reduction in the use of TCCP in favor of safer substitutes, since it has high environmental persistence with some evidence of carcinogenicity. (UBA 2001).

Structural and Vehicle Fires

Another hazard associated with the use of PVC products arises when PVC is burned in an accidental fire. Not only are many building materials made from PVC but it was once standard practice to use PVC to insulate wiring in buildings. In 1995, there were an estimated 574,000 structural fires and another 406,000 vehicle fires in the U.S. (USEPA 2001). When the PVC in buildings and vehicles burns, a variety of toxic substances are formed that pose major public health risks. The primary combustion products are hydrogen chloride gas, carbon dioxide and carbon monoxide (OFM 1997). Hydrogen chloride gas is a corrosive and highly toxic gas that can burn the skin and cause severe damage to the eyes and lungs. When hydrogen chloride comes in contact with the mucous lining of the lungs, it is converted into hydrochloric acid that can cause severe and permanent respiratory damage (IAFF 1995).

Accidental fires that burn PVC also generate phosgene gas, benzene, toluene, xylenes, dioxins, furans and other products of incomplete combustion (IAFF 1995). The poor combustion conditions that are typical of these fires are ideal for the formation of dioxins and furans (TNO 1996). Dioxins were found in the air, water, surface soil and nearby vegetation following the burning of a plastics recycling plant in Hamilton, Ontario (OMEE 1997). In the World Trade Center fires, dioxins and furans were identified as significant components of the smoke given off by the smoldering buildings (Landrigan 2004). In Germany, dioxin levels in indoor soot remaining after a house fire were found to be as high as 45,000 parts per trillion (ppt) TEQ—more than 300 times the German government's health standard (Fiedler 1993). After a fire at a plastics warehouse in Binghamton, NY, dioxin levels in soils were found to be more than 100 times higher than other areas of the community not impacted by the fire (Schecter 1996).

Firefighters and emergency responders are especially at risk from smoke and gases generated by fires burning PVC. Exposure to combustion gases from building fires has been linked to a high incidence of leukemia and laryngeal and colon cancers in firefighters at young ages (Wallace 1990) and to other adverse health problems including pulmonary hemorrhage and edema due to chemical pneumonitis (Schreiber 2003, Dyer 1976). This is one of the reasons why the International

Association of Fire Fighters supports the use of alternative building materials that do not pose as high a risk as PVC (Duffy 1998).

The toxic gases generated when PVC is burned in accidental fires have resulted in deaths and injuries, including workers exposed to toxic gases from burning electrical wires coated with PVC (Colardyn 1978); residents exposed to airborne toxics from a Hamilton, Ontario plastics recycling plant fire (Upshur 2001); and guests who died in the MGM Grand Hotel fire in Las Vegas (Buerk 1982). A summary of the public health hazards associated with accidental fires that burn PVC has been published elsewhere (Schreiber 2003).

PVC's use to insulate wiring has raised concerns not only for its use in buildings, but also in airplanes. The use of PVC insulation around wiring was once standard practice in airplanes. A typical airplane, for example, could contain more than 100 miles of PVC coated wiring (Ackerman 2003). Insulation of the wires is critical to air safety, but defects in the insulation can lead to short circuits and sparks that could potentially start a fire or spark an explosion. If PVC wiring overheats and starts to smolder, large amounts of smoke are generated and, if moisture is present, hydrochloric acid can be produced. Although there is no proof that PVC insulation has ever caused an airplane crash, concerns have been raised about older airplanes that still contain PVC-insulated wires. Use of PVC wiring is now prohibited on new planes since PVC insulation failed Federal Aviation Administration flammability tests (Ackerman 2003).

Accidental fires are unexpected, and thus difficult to regulate, but phasing out PVC could reduce the harm they cause. If PVC was not so widely used as a building material, accidental fires would not produce the toxic combustion products that are specifically caused by the burning of PVC. Both immediate and long-term impacts would be lessened: firefighters and victims alike would avoid exposure to the toxic gases and smoke caused by the fire, and the leftover ash would be largely free of these toxins as well.

CASE STUDY

Illiopolis, Illinois: PVC Plant Explodes

On April 23, 2004, a PVC plant operated by Formosa Plastics in Illiopolis, Illinois exploded. A towering plume of smoke containing dioxins, hydrochloric acid, vinyl chloride and vinyl acetate could be seen for miles around. The explosion caused both power and water to be cut off and over 900 people were evacuated from the community. People were stationed in makeshift shelters including the local shopping mall. The U.S. Chemical Safety and Hazard Investigation Board called the explosion the most serious the agency has investigated since it was founded in 1998. Four workers were killed instantly and one died shortly after being hospitalized.

Nearly three months after the disaster, the Illinois Environmental Protection Agency (IEPA) reported elevated levels of dioxin were found in the soil at 12 of 13 sites sampled. Some samples reached levels of 50 ppt—10 times higher than normal. Some areas tested were as far as 3 miles from the explosion. Residents are concerned about the constant health risks posed by these hazardous sites. More testing is planned. (Sources: Antonacci 2004, IEPA 2004, Steingraber 2004a).

CASE STUDY

Montreal, Canada: PVC Fire and Firefighter Exposure

A 1993 fire in St. Terese, Canada at a plastics plant called Plastibec, Ltd consumed more than 15 tons of PVC. The plant manufactured vinyl blinds and vinyl window frames. After burning for 18 hours and forcing 250 people from their homes, the smoldering structure continued to emit thick black smoke. In the end, the fire produced between 40-85 grams of dioxins and furans, equal to the amount released by the pulp and paper industry in an entire year. Of the 50 firefighters called out to the blaze, 6 were treated for smoke inhalation and more than 30 required medical treatment after being exposed to the fumes (Source: Greenpeace 1994).

IV THE DEADLY CONNECTION
PVC, Chlorine and Dioxin

MAJOR FINDINGS

- When burned, PVC plastic, which contains 57% chlorine when pure, forms dioxins, a highly toxic group of chemicals that build up in the food chain.
- The PVC content in the waste stream fed to incinerators has been linked to elevated levels of dioxins in stack air emissions and incinerator ash.
- PVC is the major contributor of chlorine to four combustion sources— municipal solid waste incinerators, backyard burn barrels, medical waste incinerators and secondary copper smelters—that account for a significant portion of dioxin air emissions. In the most recent USEPA Inventory of Sources of Dioxin in the United States, these four sources accounted for more than 80% of dioxin emissions to air (based on 1995 data).

The Formation of Dioxin

A major concern about PVC is the formation of dioxin during production and during disposal through incineration. The term 'dioxin' refers to a family of chemical compounds that are not intentionally made. They are generated as by-products during production and disposal of chlorinated compounds including PVC. There are many forms ("congeners") of dioxin, each with a different toxicity. The most toxic form is 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), and is the standard against which the toxicity of all other forms of dioxin is measured. TCDD is a known human carcinogen according to the U.S. National Toxicology Program (USHHS 2002), World Health Organization (WHO 1997) and U.S. Environmental Protection Agency (USEPA) (USEPA 2000). Dioxin is fat-soluble, which means it will bioaccumulate in increasing concentrations as it moves up the food chain. Exposure to dioxins is associated with reproductive and developmental health problems, and has been shown to impair immune system response and interfere with normal hormone function (Birnbaum 2003).

The PVC-Dioxin Connection

The relationship between PVC and the formation of dioxins in incinerators is clear: PVC is a significant chlorine donor in the incineration process, spurring the formation of dioxins. The strongest evidence of this

comes from laboratory studies. The German EPA found that burning waste that includes PVC or other organochlorines produced dioxins, while burning waste without PVC did not (Theisen 1991). Two Danish studies found similar results (Vikelsoe 2000, Christmann 1989). In Japan, researchers found that adding 4% PVC to a mixture of PVC-free material increased dioxin emissions ten fold (Ishibashi 2000). When PVC was added to a mixture of newspapers or to chlorine-free paper and burned, dioxin emissions increased significantly with chlorine and PVC content (Yasuhara 2001). In a similar study, dioxin levels in fly ash were 200 to 1,200 times higher when PVC was added to a mixture of newspaper or chlorine-free plastics (Takasuga 2000). Several other studies found increased dioxin levels in fly ash or unburned residue were correlated with increased PVC levels in the waste stream burned (Kopponen 1992, Kolenda 1994, Wunderli 2000).

When elemental chlorine was added to a mixture of coal and salt, dioxin levels were 130 times higher than when the same mixture was burned without the chlorine (Mahle 1980). Adding PVC or chlorine gas to chloride-containing vegetable matter resulted in increased dioxin formation (Liberti 1983). In another study, as the level of organochlorines in a waste stream increased, so too did the amount of dioxins formed (Altwicker 1993). A study in Finland found that burning perchloroethylene in a laboratory produced more dioxins, chlorobenzenes and chlorophenols than burning sodium chloride (Halonen 1995).

There is also evidence from small-scale incinerators that support a relationship between burning organochlorine compounds like PVC and dioxin formation. The Danish EPA found that doubling the PVC content of an incinerator's waste feed increases dioxin emissions by 32% (DEPA 1995). Conversely, reducing the PVC feed results in a reduction in dioxin emissions. Researchers in Japan found that burning a mixture of PVC and polyethylene produced large amounts of dioxins (Tamade 2000, Yoneda 2000). A study conducted for the Dutch Environment Ministry found that PVC levels in the waste stream increased dioxin levels in the air emissions (Kanters 1996). Other studies in both the U.S. (Wagner 1993) and Europe (Christmann 1989, Vesterinen 1996, Halonen 1993, Hutari 1996, Manninen 1996, Hatanaka 2000) have found a positive correlation between PVC content in a waste stream and dioxin emissions.

An excellent review of the evidence linking chlorine content in the waste stream and dioxin emissions has been published (Costner 2001). This paper identified 47 studies involving laboratory and pilot scale combustion system/processes; 12 studies involving small-scale and other combustion systems/processes; and 31 studies involving full-scale combustors that are relevant to the relationship of chlorine content and dioxin emissions. The author found that reduced chlorine content was correlated with reduced dioxin formation in all three study groups and concluded that there is "a compelling body of evidence that dioxin formation in waste incinerators decreases when chlorine input is reduced."

The USEPA confirmed that PVC is a dioxin precursor in 1997 (USEPA 1997). They also acknowledged that, "several studies have identified strong correlations between chlorine content and CDD/CDF [dioxin/furan] emissions during combustion tests." As part of the Inventory of Sources of Dioxin developed by the USEPA, the agency acknowledged that a "review of experimental data clearly indicates an association between chlorine content of feed/fuels and ... synthesis of CDDs and CDFs" (USEPA 2001). However, the agency concluded that the results on whether a relationship between chlorine input and dioxin emissions exists were not "unequivocal" and left it at that.

Additional insight into the relationship between PVC and dioxin emissions can be found by examining the USEPA Inventory of Sources of Dioxin. Table 6 summarizes dioxin emissions from sources that include PVC. The table shows facilities that burn PVC are responsible for most of the dioxin sources identified. Eight quantified air sources and eight non-quantified air sources are identified that include PVC as a chlorine contributor in the waste stream. There are also quantified releases to water and land from sources that clearly contain PVC as a chlorine donor. In addition, quantified sources such as tire burning and asphalt mixing plants may contain PVC when household garbage is burned with tires, or when PVC is added as "filler" in producing asphalt. In fact, any process that burns household garbage—including gasification or pyrolysis (systems that burn waste in the absence of oxygen) — can be expected to generate dioxin emissions in large part due to the presence of PVC in the waste (BREDL 2002). The table also shows a number of other unquantified sources that may include PVC as a contributor to dioxin emissions. The data used to generate these estimates were collected in 1995 and represent the most recent data available on dioxin emissions in the U.S. (USEPA 2001).

The top four quantified sources alone—municipal solid waste incinerators, backyard barrel burning, medical

Table 6

Dioxin Emissions in the U.S. from Sources that Include PVC

Sources with Chlorine from PVC	Dioxin Releases (grams/year TEQ*)
Quantified Air Sources	
Municipal solid waste incinerators	1,250 [see note below]
Backyard barrel burning	628
Medical waste incinerators	488
Secondary copper smelters	271
Cement kilns burning hazardous waste	156
Cement kilns not burning hazardous waste	17.8
EDC/VCM production	11.2
Hazardous waste incineration	5.8
Non-Quantified Air Sources	
Landfill fires	
Landfill gas	
Accidental fires	
Scrap electrical wire recovery	
Secondary ferrous metal smelting	
Ferrous foundries	
Manufacturing chlorine and chlorine derivatives	
PVC manufacturing	
Other Possible Air Sources	
Sewage sludge	14.8
Asphalt mixing plants	7
Secondary lead smelters	1.72
Tire burning	0.11
Total Dioxin Releases to Air	**3,125**
Quantified Releases to Water	
Ethylene dichloride/vinyl chloride	0.43
Quantified Releases to Land	
Ethylene dichloride/vinyl chloride	0.73
Municipal waste water sludge	76.6

Sources and Notes: All data are from the USEPA Inventory of Sources of Dioxin (USEPA 2001) which reflects data generated in 1995, the most recent year for which data are available. Since the 2001 Inventory was published, dioxin air emissions from municipal waste incinerators have declined for two reasons related to a December 2000 compliance deadline for new federal regulations on toxic air emissions: (1) the closure of 25 waste combustion plants, nearly 20% of the total number, between 2000 and 2002 (Kaufman 2004); and (2) added air pollution controls that shifted much of the total amount of dioxin formed to incinerator ash, which requires land disposal. The USEPA now estimates that dioxin air emissions from large municipal waste incinerators are 12.0 grams of dioxin per year (TEQ) from 66 large incineration facilities in 24 states (USEPA 2002a). Dioxin air emissions from 39 small incinerators were estimated at 50 grams per year TEQ in 2000 and are projected to decline to 1.8 grams per year in response to a December 2005 compliance deadline for new federal toxic air emission regulations (ERG 2002). These more recent estimates have not yet been peer reviewed or published according to USEPA.

* TEQ = toxic equivalents; a measure of the total amount of all forms of dioxins, furans, and dioxin-like PCBs found in a sample.

waste incinerators and secondary copper smelters—account for 2,637 grams TEQ, which is equivalent to 84% of the annual total estimated dioxin emissions to air. Clearly, not all of these emissions are attributable to PVC. Dioxin can be generated when other chlorine donors are present. The fraction attributable to PVC is not known.

It is clear from this evidence that without PVC, there would be considerably less chlorine in the incinerator feed and hence less dioxins formed. This is not to say that chlorine content is the only factor determining dioxin production. It is not. Facility design, operating conditions and the presence of catalysts also matter, but numerous studies support the conclusion that without chlorine, dioxin cannot be formed and that PVC is the predominant source of chlorine in the waste stream (Costner 2001).

It is misleading to focus only on stack air emissions when assessing chlorine's contribution to dioxin formation. Fly ash, bottom ash and other residues contain dioxin as well. Two studies on municipal waste incinerators provide evidence that only from 0.0004 to 1% of total dioxins formed remain in the stack gases (Fabrellas 1999, Sakai 1997). Other research has shown that there is a positive correlation between dioxin concentrations in ash and the amount of PVC in the waste feed. In one study, when PVC was burned with wood, dioxin levels increased in the ash (Wilken 1994). In another study, higher dioxin concentrations were observed in ash residue from chlorinated plastics than in ash from chlorine-free paper, wood, cotton or wool (Theisen 1991). In general, as more PVC is added, dioxin levels rise.

Nonetheless, most studies focus on dioxin concentrations in stack gas as a means of assessing the relationship between chlorine and dioxin. The fact that many studies examining miniscule dioxin concentrations in this hard-to-measure source still find a positive correlation between chlorine and dioxin testifies to the strength of the relationship.

Despite this compelling body of evidence, the Chlorine Chemistry Council (CCC) has aggressively argued that there is no relationship between PVC content and dioxin emissions from incinerators. The industry's prime support for this claim is a study funded by the Vinyl Institute, a member of the CCC, conducted by an industry consultant and published by the American Society of Mechanical Engineers (ASME). This study examined data from 169 facilities and concluded that there was "little or no correlation between chlorine input and dioxin emissions from incinerators" (Rigo 1995). This study has been critiqued and its methodology shown to be invalid (Thornton 2002, Costner 2000, Costner 1997, Chien 2003). In addition, the conclusions of the ASME study were refuted at a workshop held by the USEPA in 1996 on Dioxin Formation Processes and Sources (Costner 2000).

Furthermore, a memo prepared prior to the release of the ASME study by the public relations firm Nichols-Desenhall Communications (under contract to the Vinyl Institute) calls into question the derivation and perhaps the integrity of the ASME study. This memo laid out a strategy to diffuse any connection between chlorine content/PVC and dioxin emissions made by the USEPA as part of their Dioxin Reassessment effort. The memo recommends the Vinyl Institute fund an "independent" scientific study to "debunk" the USEPA's claim about the positive relationship between PVC and dioxin emissions (Burnett 1994). This study turned out to be the one conducted under contract with the consulting firm of Rigo & Rigo Associates under the auspices of ASME. An internal Vinyl Institute memo described the role of the ASME, "The purpose of the ASME as the contractor is to provide unassailable objectivity to the study ..." (Goodman 1994). In this same memo, Rigo was described as "... willing to set his priorities to our needs, and he appears sympathetic to Plastics, Vinyl, PVC and Cl2 ..." Additional details on these memos have been described elsewhere (Thornton 2002).

PVC is the primary source of chlorine in the waste stream. Eliminating PVC would dramatically reduce the amount of chlorine being burned, and thereby limit dioxin formation. Given the abundant evidence implicating chlorine as an essential precursor to dioxin formation, it is important to reduce if not eliminate the levels of PVC in the waste stream. Banning PVC would be the most effective means of achieving this goal.

DON'T BURN IT
The Hazards of Burning PVC Waste

MAJOR FINDINGS

- More than 100 municipal waste incinerators in the U.S. burn 500 to 600 million pounds of PVC each year, forming highly toxic dioxins and releasing toxic additives to the air and in ash disposed of on land.
- The largest PVC-burning states include Massachusetts, Connecticut, Maine—which all burn more than half of their waste—Florida, New York, Virginia, Pennsylvania, Maryland, Minnesota, Michigan, New Jersey, Indiana and Washington.
- The incineration of medical waste, which has the highest PVC content of any waste stream, is being steadily replaced by cleaner non-burn technologies.
- Open burning of solid waste, which contains PVC, is a major source of dioxin air emissions and dioxin-laden ash, as well as other dangerous pollutants.
- Backyard burning of PVC-containing household trash is not regulated at the federal level and is poorly regulated by the states—it is completely unrestricted in Michigan and Pennsylvania, partially restricted in 30 states and banned in 18.

When PVC is burned in municipal and medical waste incinerators, dioxins and other toxic gases are formed and heavy metals present in the waste are released into the air and residual ash. Dioxins are also released when residents in rural areas dispose of their trash by burning it in small furnaces or barrels behind their homes, and when PVC products or waste are burned in building, vehicle and landfill fires.

Municipal Waste Incinerators

Incineration, or high-temperature burning, is frequently used to dispose of municipal, hazardous and medical wastes. Because PVC is a widely used plastic (especially in medical applications), the waste burned in these incinerators inevitably contains PVC. As discussed earlier, the chlorine in PVC facilitates the formation of dioxins and other chlorinated organic compounds that are subsequently released to the environment (Costner 2001). Thus, incinerators are a major source of dioxins released to the air and land, and PVC is largely responsible for this situation.

Municipal waste or household trash incinerators are considered the largest source of dioxin emissions in air (USEPA 2001). The most recent inventory of dioxin sources in the U.S. estimated municipal and medical waste incinerators together account for 55% of all dioxin releases to air (40% and 15%, respectively) (USEPA 2001). Dioxin air emissions have since declined as

Table 7

States with the Heaviest Reliance on Municipal Waste Incineration

State	Percent Incinerated (After Recycling)	Number of Incinerators	Amount of PVC Incinerated (tons)
Maine	66.2%	4	5,448
Connecticut	55.4%	6	16,257
Massachusetts	54.6%	7	28,145
Minnesota	46.1%	15	14,432
Florida	37.1%	13	45,364
Hawaii	32.7%	1	3,454
Virginia	27.9%	5	18,806
New York	24.4%	10	37,517
Maryland	22.6%	3	12,486
Pennsylvania	22.6%	6	17,746
New Hampshire	22.2%	2	1,675
Remaining States*	Varies	32	49,075
Total	10.5%	104	250,405

Sources and Notes: Estimates derived from Kaufman (2004) for 2002. The amount of PVC incinerated by each state was calculated by: (1) assuming that the percent PVC content of municipal solid waste (0.62%) estimated by the USEPA (2003) is representative of the typical percentage of PVC in the waste stream; (2) assuming that post-consumer recycling of PVC in MSW is zero; (3) multiplying the average percent PVC in the waste (0.62%) by the total waste generated in that state according to Table 4 in Kaufman (2004); and (4) multiplying this value (the total PVC disposed in the state) by the percent of waste incinerated after recycling as shown in column 2 above. The percent of PVC incinerated after recycling was determined by dividing the total amount of waste incinerated in a state (provided in Table 4 of Kaufman 2004) by the total waste disposed of (after recycling).

* 19 states did not burn any MSW according to Kaufman 2004 and AL, AK, and MT did not report any data (see Appendix B).

incinerators have closed or added pollution controls to meet new standards (USEPA 2002a, ERG 2002). Now much of the dioxins formed from incinerators are released to the land through landfilling of incinerator ash.

Table 7 lists those states that rely heavily on incineration as a disposal option for municipal solid waste. Maine, Connecticut, and Massachusetts incinerate more than 50% of their municipal solid waste destined for disposal (not counting the amount of waste recycled). Minnesota has the largest number of municipal waste incinerators (15) followed by Florida (13) and New York (10). These states have been dependent on waste incineration since the late 1980's and early 1990's. This trend may have been motivated by zealous protection of abundant groundwater and surface water supplies; limited potential for new landfill capacity; subsidies for generating electricity from waste burning; and state policies which favor incineration over land disposal. A complete listing of the amount of PVC burned in each state is shown in Appendix B.

As shown in Table 7, an estimated 250,000 tons (500 million pounds) of PVC is burned in trash incinerators in the U.S. each year (Kaufman 2004). This estimate is even higher if you use the municipal solid waste data generated by the USEPA. Using the USEPA data for the year 2001, the amount of PVC burned is estimated to be about 600 million pounds (USEPA 2003). These values are consistent with other estimates (Thornton 2002). As discussed earlier, PVC waste contributes substantially to the chlorine content of the waste and to the formation of dioxins in trash incinerator emissions. Estimates of how much PVC waste contributes to the chlorine content in waste streams vary from 35 to 66% (CEC 2000, ECC 1994). Other minor chlorine sources include food waste and paper. Another source estimates that, on average, about 50 to 67% of the chlorine input in an incinerator can be attributed to PVC (Thornton 2002). However, as much as 80% of the organically bound chlorine, which is thought to be more conducive to dioxin formation than inorganic chlorine, is from PVC (Thornton 2000).

In addition to dioxins, PVC waste contributes to the formation of hydrochloric acid (HCl) in the flue gases of incinerators. This gas must be neutralized (primarily by lime) and removed by scrubbers. HCl damages the air pollution control equipment because it is so corrosive and requires additional maintenance. In addition, the metal stabilizers in PVC (lead and cadmium) do not break down during incineration but are released either as hazardous air emissions or remain in the ash and cinders (ECC 1994). Older PVC products that used cadmium as a metal stabilizer will contribute cadmium when burned (ECC 1994). Consequently, the more PVC in the waste stream the greater the operating cost of the incinerator due to: (1) the use of more agents to neutralize the acids and flue gases; (2) additional operating and repair costs; and (3) additional waste management costs to dispose of the residual ash (CEC 2000).

Waste incineration has been linked to a number of serious health problems in plant workers, as well as in surrounding communities. Many of these troubles implicate PVC as the root source of contamination. For instance, workers in incinerator plants have increased levels of chlorinated phenols and lead in their body tissues, which may result from PVC, as well as mercury and arsenic (Allsopp 2001). The USEPA has reported that metals emissions in incinerators rise when the chlorine content of the waste rises. In one study, metals were up to seven times higher when the chlorine content of the waste was increased from 0 to 8.3% (Carroll 1989). Elevated chlorine content levels also impair the efficiency of the scrubber (an air pollution control device) to remove metals from stack gases (Carroll 1989). Incinerator operators are not the only exposed group. Populations living near incinerators are particularly vulnerable to elevated levels of dioxins and heavy metals in tissue and blood, as well as to respiratory ailments and cancers (Allsopp 2001). Elevated levels of congenital abnormalities have also been observed in newborns in areas in the immediate vicinity of incineration plants (ten Tusscher 2000).

Even distant populations are at risk, as toxic air releases settle on crops and these crops are transported to other areas and/or eaten by livestock which, in turn, are consumed by people (Cohen 1998, Cohen 1995). A study by Barry Commoner and researchers at Queens College in New York found Inuit Native peoples living in the northern reaches of Canada, miles from any sources of dioxin, had high levels of dioxin in their bodies (Commoner 2000). These researchers also found dioxins released from incinerators and other dioxin sources hundreds of miles away in the U.S. and lower Canada were transported by wind currents to the far reaches of the globe.

A common argument in favor of incinerators is that they significantly reduce the weight and volume of waste going to landfills. While waste volume is reduced by about 45 to 50%, this statement only tells part of the story. The fly ash captured by the air pollution control equipment and the residual ash left in the burner must be disposed of in landfills and is often more toxic than the original raw waste. This is the result of burning metal-containing materials (including PVC), chlorine-containing PVC waste that generates dioxins, and other difficult to burn waste. This ash is stored in landfills, and often leaches into surrounding soil and water. Incineration may indeed reduce the volume of waste going to landfills, but in doing so, this practice shifts the waste burden to air releases and increases the toxicity of the waste that will eventually be landfilled in the form of ash. Incineration is not a solution to waste disposal, especially not for PVC-containing waste.

Medical Waste Incinerators

Incineration of medical waste involves the burning of solid waste generated primarily by hospitals and research facilities. PVC accounts for 5 to 15% of medical waste (DTI 1995, Hasselriis 1993, Marrack 1988, USOTA 1988). Medical products made of, or containing, PVC include surgical gloves, dialysis tubing, blister packs, inhalation masks, IV bags/tubing, mattress covers and blood bags. Even non-medical products containing PVC (e.g., office supplies) are often burned along with medical trash.

As the overall volume of waste generated by hospitals has increased over the past 50 years, so has the proportion of that waste containing PVC. In 1996, PVC accounted for 27% of all plastic used in durable and disposable medical products (Rossi 2000). This growth in the use and disposal of vinyl medical products has led to increased chlorine input to medical waste incinerators and thus greater dioxin formation. In 2001, the USEPA cited medical waste incinerators as the 3rd largest source of dioxin releases to the environment in the U.S (USEPA 2001).

In 1990, roughly 70% of U.S. hospitals used on-site incinerators (USOTA 1990). According to the USEPA, the number of medical waste incinerators operating in the U.S. dropped roughly in half from 1987 to 1995 (USEPA 2001). Similarly, the amount of medical waste burned in these incinerators dropped from an estimated 1.43 billion kilograms (kg) in 1987 to 0.77 billion kg in 1995. Today there are substantially fewer medical waste incinerators operating (USEPA 2004b). Some of this drop is due to new regulations that have gone into effect, which increased operating costs (USEPA 2000a). But the work of activist grassroots citizen organizations and national groups like Health Care Without Harm have played a major role in shutting down medical waste incinerators and encouraging the use of non-incineration treatment technologies (HCWH 2001, Lester 2003).

Hospital waste primarily consists of general solid waste (70%), medical waste (17%), patient waste (9%) and a small amount of hazardous waste (2%). Approximately 15% of this waste is considered to be infectious waste (HCWH 2001), which requires treatment to disinfect the waste but not necessarily incineration. Viable alternatives to incineration exist for the disposal of the

remaining 98% of medical waste that is non-pathological. Much of this waste is paper, cardboard, plastic, metals and general solid waste that does not need to be burned.

The most prominent alternative for treating hospital waste is autoclaving—a process that disinfects the biological waste component. Other treatment methods include microwaving, electro-thermal deactivation, gasification, chemical disinfection and thermal treatment (HCWH 2001). Yet even these alternatives do not address the underlying problem, the initial use and generation of PVC wastes. A better solution is to replace PVC products with non-chlorinated plastics.

Given the finding in recent studies that flexible PVC products used in hospitals (like dialysis tubing) leach toxic additives into patients' bodies (USFDA 2001, NTP 2000), the imperative to employ alternatives is stronger than ever. Additives mixed in with PVC to make it flexible or rigid are not chemically bound to the plastic and are thus prone to leach from the material. One such additive, a phthalate called 2-diethylhexyl phthalate (DEHP), has been found to leach from soft plastic, and has been documented to have a significant impact on the development of the male reproductive system and the production of normal sperm in young animals (Moore 2001). Also linked with DEHP exposure is respiratory distress, changes in kidney and liver function, ovarian dysfunction and decreased hormone production in females (Rossi 2001).

Open Burning

Perhaps the most under appreciated source of dioxin emissions is the open burning of household trash.

CASE STUDY

Detroit, Michigan: Henry Ford Hospital Medical Waste Incinerator

In February 2000, residents of a predominately African-American community in Detroit, Michigan succeeded in their efforts to shut down Henry Ford Hospital's medical waste incinerator. Since it began operating in 1980, the facility had been burning approximately 6 million pounds of waste annually. As of 1998, Henry Ford was the only hospital (of 25 surveyed) still burning medical waste in an on-site incinerator. Environmental justice was a primary concern: the Henry Ford Hospital System owns two other hospitals located in predominately white suburbs that send their waste to a commercial autoclave facility in Toledo, Ohio rather than burn it. This inconsistency fueled local activists.

The Henry Ford Hospital incinerator was a major, chronic polluter. For instance, the only emission controls in place were opacity limits, which do not involve emissions testing, but use a visual estimate of how 'opaque' a cloud of smoke emitted from the stack is. And even those limits had been violated on a number of occasions. Federal pollution controls on emissions of mercury, dioxins and heavy metals had not yet been implemented in Michigan, so the facility burned medical and other waste largely without regulation. The impact on public health was consequently severe. A five year long Michigan Department of Community Health study found the rate of children hospitalized for asthma in the zip codes immediately surrounding the incinerator to be three times that of neighboring Wayne County. Moreover, a report commissioned by the New York University Research Program focusing on Ambulatory Care Sensitive Conditions in Michigan from 1983 through 1994 found that in the four zip codes surrounding the incinerator, the average hospital admissions of children aged zero to four were four times the state average.

A coalition of more than a dozen organizations including Detroiters Working for Environmental Justice, Virginia Park Citizen's District Council, a local Sierra Club chapter, and the Sugar Law Center for Economic and Social Justice worked together for four years before successfully closing the incinerator in the spring of 2000. Strategies included civil disobedience, media attention and coalition building. Yard signs helped draw attention to the fight, and a constant barrage of phone calls and postcards to hospital officials ensured residents' concerns would not be ignored. Steady, targeted pressure on executives within Henry Ford Hospital System was a major factor in the eventual shutdown of the incinerator (Sources: Lott 2004, Holden 1999, Bates-Rudd 2000).

CASE STUDY

Oakland, California: IES Medical Waste Incinerator

On December 10, 2001, after a 4-year struggle, Integrated Environmental Systems (IES) was forced to shut down its commercial medical waste incinerator in Oakland, California. Even under "perfect" operating conditions, the incinerator was known to emit dioxins, mercury and other toxic pollutants. The facility was also notorious for all kinds of permit violations including excess emissions, broken monitors, odors, uncontrolled bypasses of the pollution control devices and worker safety violations.

The Coalition for Healthy Communities and Environmental Justice, consisting of Oakland residents and community, health, and environmental justice organizations, formed to bring an end to the IES incinerator. After having ignored emissions and permit violations for years, the Bay Area Air Quality Management District finally took action by declining to renew the facility's operating permit in 2001. When IES insisted on its intentions to keep burning millions of pounds of medical and non-medical waste every year, a powerful direct action was planned and executed by the Coalition. Community protesters blocked the entrance to the IES incinerator for eight hours nonviolently putting their bodies in front of trucks carrying waste.

Owing largely to the community's powerful voices and actions, IES sold its company to competitor Stericycle in December 2001 who is reportedly planning to tear down the incinerators and close the facility (Sources: Greenaction 2001, Greenaction 2001a).

CASE STUDY

Gila River Indian Reservation, Arizona: Stericycle Medical Waste Incinerator

Members of the Gila River Indian community near Chandler, Arizona organized as the Gila River Alliance for a Clean Environment and succeeded in forcing Stericycle to shut down a medical waste incinerator operating on tribal land in 2002. The incinerator had been burning medical and non-medical waste from several states for about 10 years, and was among the largest in the U.S. Waste from hospitals, medical and dental offices, mortuaries and research institutes was among the waste being burned. When Stericycle's lease for the facility came up for renegotiation, activists seized the opportunity to push for cleaner technologies like autoclaving. The renegotiated lease will allow only an autoclave on the site. With the closure of this facility, there are now no commercial medical waste incinerators in Arizona, Nevada, or California (Source: Greenaction 2002).

Open burning, also called uncontrolled burning or backyard burning, involves the burning of household trash by residents on their property. Burning typically occurs in a burn barrel, open fireplace or furnace, homemade burn box, wood stove, outdoor boiler or open pit (USEPA 2003e). Most backyard burning occurs in rural areas where there is no curbside trash pickup. According to government surveys, an estimated 20 million people in rural areas burn trash in their backyards (MDEQ 2003).

The smoke and vapors from the open burning of household trash contain many toxic chemicals that can affect people's health and the environment, including dioxins and furans; carbon monoxide; heavy metals such as mercury, lead, arsenic, and cyanide; volatile organic compounds (VOCs) such as benzene, styrene, and formaldehyde; particulates; polycyclic aromatic hydrocarbons (PAHs); and hexachlorobenzene (USEPA 2003f, MDEQ 2003). Exposure to these chemicals have been linked to adverse health problems including, but not limited to asthma, lung cancer, and other respiratory ailments, kidney and liver damage, and nervous system, reproductive and developmental disorders (USEPA 2003g). One study found emissions were highest for VOCs such as benzene and styrene, formaldehyde, hydrogen cyanide and hydrochloric acid, followed by polychlorinated biphenyls (PCBs) and arsenic (MDEQ 2003).

Among the toxic byproducts of backyard waste burning, dioxins and furans may pose the greatest public health threat. Dioxins are highly toxic even at low levels and have been linked to serious health problems in people that include cancer and adverse developmental and reproductive effects (USEPA

2003g, Birnbaum 2003). Dioxins are formed primarily because of low combustion temperatures, poor air distribution, and the presence of chlorine (USEPA 2003h). The majority of chlorine in household trash comes from PVC plastic. Because the emissions from open burning are released close to the ground, they are particularly dangerous to people and animals located nearby. There are also no pollution control devices on these burners.

The backyard burning of household trash also produces residual ash that contains toxic metals such as lead, chromium, mercury and arsenic, as well as PCBs and dioxins (USEPA 2003f, Lemieux 1998). The ash left over from the burning is often used by homeowners in gardens or placed in areas where children may play and come in contact with these toxic substances. In gardens, vegetables can absorb and accumulate the metals (USEPA 2003f).

Open burning was not initially identified by the USEPA as a source of dioxin (USEPA 1998). Now the agency has identified open burning as a major source of dioxins. The USEPA's most recent Inventory of Sources of Dioxin estimated open burning may account for as much as 628 grams TEQ dioxin, making it the second largest source of dioxin emissions in the U.S. (USEPA 2001). The USEPA found a single household burn barrel may release more toxic chemicals into the air than a municipal waste incinerator burning 200 tons of household trash a day that is equipped with state-of-the-art air pollution control devices (Lemieux 1998).

A key study used by the USEPA to estimate the amount of dioxins generated by open burning of household trash was published in 1998 by a New York researcher (Lemieux 1998). The author burned two sets of simulated household garbage in separate metal burn barrels in a controlled laboratory setting and measured emissions from each barrel. One barrel contained simulated waste from a household that did not recycle and the other contained waste remaining after "avid recycling." This study reported high emissions of volatile organic compounds (VOCs) including benzene, polynuclear aromatic hydrocarbons (PAHs), chlorinated benzenes and dioxins and furans. Surprisingly, higher levels of dioxins and furans were found in the emissions from the avid recycling household sample compared to the non-recycler.

CASE STUDY

Maine Bans Backyard Burning; Warns Public About PVC Hazards

Reducing dioxin emissions and protecting the health of Maine residents was a high priority when the Maine legislature voted to prohibit backyard trash burning in 2001. This new law and PVC educational outreach followed a citizen advocacy campaign led by the Natural Resources Council of Maine which focused on reducing the use and disposal of PVC because of its role as a dioxin-forming consumer product. A 1997 study found 10,000 backyard burn barrels across rural Maine and documented the high levels of dioxin emissions and exposures that resulted. The law also required the Maine Department of Environmental Protection (DEP) to educate people about dioxin-forming PVC products and their alternatives.

An educational bulletin, poster and flyer prepared and distributed by the Maine DEP contain clear and compelling messages about PVC.

> "We can make a difference by RETHINKING our purchasing habits to avoid putting PVC products in the waste stream."

> "You can help to reduce dioxin pollution from municipal trash incineration by: REPLACING #3 PVC Products with 'less polluting' natural materials OR safer plastic alternatives #1 PETE, #2 HDPE, #4 LDPE, #5 PP."

> "PVC plastics waste is a major source of our dioxin pollution in Maine. It is the only plastic that forms significant amounts of dioxin when burned and has very low recycling rates. It is even preferable to avoid burning PVC in municipal incinerators to reduce air pollutant levels and toxic ash disposal. Safe alternatives exist for virtually every use of PVC plastic."

Maine's educational materials also give clear consumer guidance on safer alternatives to typical uses of PVC plastic. The Maine DEP established the link between open burning and PVC as follows: "In addition to eliminating backyard trash burning, we need to reduce the toxic nature of our waste stream that goes to incineration because of the potential for serious health effects and contamination of our food supply" (Sources: MDEP 2001, MDEP 2001a, MDEP 1997).

A likely explanation for this difference may be the higher proportion of PVC plastic which is not recycled that ends up in the trash of the avid recycling household (4.5% versus 0.2%). According to the author of the study, "the higher proportion of PVC plastic in the avid recycler's waste stream could potentially increase the formation of chlorinated organic compounds." Other factors such as time, temperature history, mixing patterns, oxygen availability, as well as the mixture of carbon with chlorine in the presence of metal catalysts are also important factors in the formation of PCDDs (dioxins) and PCDFs (furans) (Lemieux, 2000).

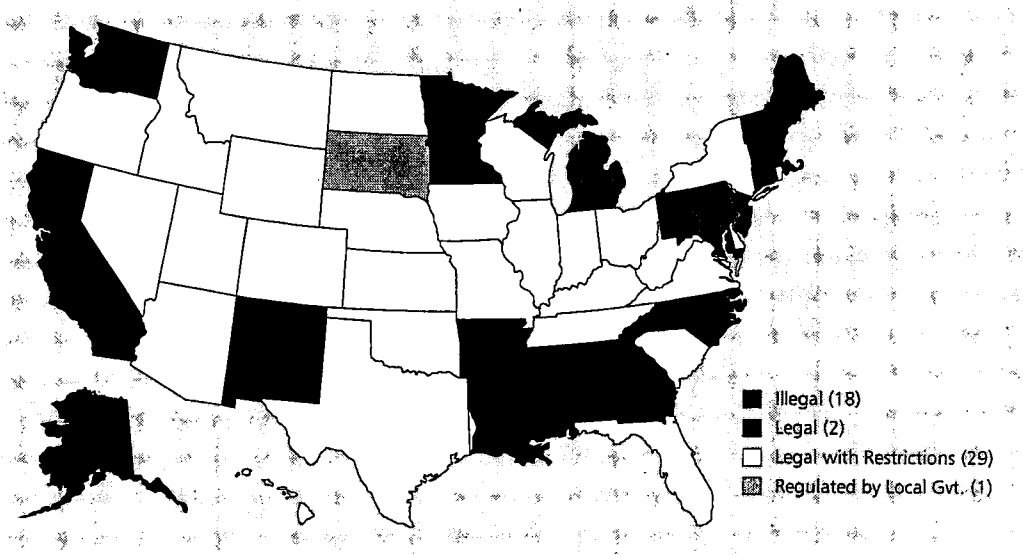
Initially, USEPA considered that PVC content in the waste might be a key determinant of dioxin emissions during open burning (Lemieix 1997, Gullett 1999). They conducted several experiments to evaluate the effect of PVC and chlorine input on dioxin emissions (Gullett 1999, Gullett 2000, Gullett 2001). The latest study concluded that the chlorine in the waste does appear to influence dioxin emissions, but only at high levels not typically found in household trash, and dioxin emissions were independent of the source of chlorine (Lemieux 2003).

A recent reanalysis of this same data found a very strong correlation between PVC and dioxin emissions in the USEPA burn barrel experiments (Neurath 2004). This study found that the percent chlorine, especially the percent PVC, were "the most important predictors of dioxin emissions"—not combustion variables such as carbon monoxide, temperature, or air input levels as claimed by the USEPA (Neurath 2004). Backyard burning is not like an incinerator where you can control these variables. By definition, uncontrolled burning is uncontrolled. What can be controlled is the type of waste, such as PVC, that is burned.

Open burning of household trash is thought to account for a considerable share of dioxin air emissions in many states including Maine (26%) (MDEP 2004) and New Hampshire (17%) (NHDES 2001). Some states including Massachusetts, Maine, Vermont, Connecticut, North Carolina, New Mexico, and Washington (USEPA 2003i), recognize the threat to public health and have adopted regulations completely banning open burning of household trash. Others, such as Alaska (AKDEC 2004) and California (CARB 2003), while allowing the burning of paper, cardboard and yard waste, have specifically banned the burning of plastic, rubber and other hazardous materials.

Figure 3 includes data originally developed by the New Hampshire Department of Environmental Services and updated in 2004. The figure shows open or backyard burning is illegal in 18 states, restricted in 29 states, completely unrestricted in two states (Michigan and Pennsylvania) and left to local government in one state

Figure 3. Current State Regulations on Backyard Burning of Household Waste in the U.S.



Source: Adapted from NHDES 2001

(South Dakota) (NHDES 2001, NHDES, 2003, NMED 2004, CARB, 2003a, MRSA 2004). Several states that have yet to enact proper legislation (e.g., Rhode Island, New York, Pennsylvania) have issued public health statements and developed pamphlets warning of the dangers associated with burning plastic, specifically the release of dioxins. The USEPA currently has no regulations that apply to open burning even though they estimate that it is one of the largest sources of dioxin in air (USEPA 2001). To assist in finding current regulations for each state, the USEPA has constructed a virtual map on their Website with links to each state's rules and regulations (USEPA 2003i).

Regulations on open burning typically vary between rural and urban/suburban areas. While generally prohibited in highly populated areas and municipalities, open burning is seldom stringently regulated in rural areas. One reason given for this has been that decisions on whether to restrict or ban open burning of household trash has been driven by citizen complaints (Lighthall 1998). Thus, those communities with enough people to generate a substantial number of complaints are the ones that enact or adopt policies to restrict or ban the open burning of household trash.

Every state has distinct laws though, and even within states, rules are far from uniform. Even in those states and areas where rules and regulations exist, enforcement is extremely difficult. This lack of coherence tends to stifle efforts to curb open burning in general and PVC burning in particular. Unless open burning can be curtailed or even adequately controlled, it is unrealistic to expect PVC will not be burned. PVC will continue to harm human and environmental health as long as open burning continues to be used to dispose of trash.

In addition to open burning of household trash, vehicle fires, structure fires, construction site burning and landfill fires all represent significant types of uncontrolled PVC combustion. Because PVC is so ubiquitous, the chance that it will be burned in intentional or accidental fires is high.

The cost of waste disposal has risen in recent years, and many rural residents are unable or unwilling to pay these increased costs. Otherwise laudable "pay-as-you-throw" (variable rate pricing) programs in communities across the nation aim to reduce waste, but in rural areas accustomed to paying a fixed rate regardless of the amount of waste they generate, such programs actually tend to trigger an increase in burning and illegal dumping. Rather than reduce the amount of waste generated, the more appealing option for some is illegal dumping and/or open burning. Moreover, proper disposal is often less convenient in rural areas. Burning trash may be a more appealing option than driving long distances to pay for and legally dispose of trash. State and local governments must address matters of affordability and convenience in these areas in order to help bring an end to open burning (MEDEP 1997). In the long term though, replacing PVC with safer alternatives is the only way to eliminate PVC from the waste stream.

VI NO PLACE LEFT
Problems with PVC in Landfills

MAJOR FINDINGS

- Dumping of PVC in landfills poses significant long-term environmental threats due to leaching of toxic additives into groundwater, dioxin-forming landfill fires and toxic emissions in landfill gases.
- Land disposal is the final fate of between 2 billion and 4 billion pounds of PVC that is discarded every year in some 1,800 municipal waste landfills.
- Many of the more than 1,900 landfills used for disposal of construction and demolition (C&D) debris are unlined and can not capture any contaminants that leak out of PVC building material waste.
- An average of 8,400 landfill fires are reported every year in the U.S., contributing further to PVC waste combustion and dioxin pollution.

Landfilling is the most common disposal option for PVC and thus is a significant part of the disposal stage of the PVC life cycle. The majority of PVC that is discarded as waste ends up in a landfill. However, landfills do not solve the PVC disposal dilemma. They eventually leak, routinely emit toxic gases and occasionally catch on fire. Landfills merely represent a temporary, polluting alternative to burning PVC and creating dioxins. As an interim strategy, land disposal of PVC is preferable to incineration, but it does not provide a long-term secure solution to PVC waste management.

Municipal Waste Landfills

In 2001, about 79% of U.S. municipal solid waste destined for disposal was landfilled (USEPA 2003). According to data made available by the USEPA, about 1.42 million tons of PVC was in U.S. municipal solid waste in 2001 (USEPA 2003). This represents less than one percent of the 163 million tons of municipal solid waste disposed of in landfills and incinerators. (This total does not include an additional 49 millions tons of municipal discards that were recycled or composted and contained negligible amounts of PVC).

The USEPA data establishes a low-end estimate of about 1.12 million tons of PVC (more than 2.2 billion pounds) that was dumped in landfills in 2001 (USEPA 2003). Using another source of data on municipal waste generation for 2002, the amount of PVC dumped

in landfills was estimated at 2.04 million tons, or more than 4 billion pounds (Kaufman 2004), nearly twice the USEPA amount. This latter estimate assumes the same percent PVC content in the municipal solid waste stream as reported by the USEPA.

The estimated number of active landfills in the U.S. that accept PVC for disposal in municipal solid waste varies. Citing 2002 data reported by 47 states, Kaufman lists a total of 1,767 municipal solid waste landfills (Kaufman 2004). USEPA concluded that 1,858 landfills received municipal solid waste in 2001 (USEPA 2004c). Yet another source estimates that there are 3,200 municipal solid waste landfills (EREF 2004).

Table 8 lists those states that rely heavily on landfilling as a disposal option for municipal solid waste in the U.S. California, Texas and Michigan landfill the most waste. Texas has the largest number of landfills (175), followed by California (161) and Florida (100). A total of 19 states including Texas, Ohio, and Illinois landfill 100% of their waste. A complete listing of the amount of PVC landfilled in each state is show in Appendix B.

Table 8

Estimated Amounts of PVC Discarded in Landfills According to States that Landfill the Most Municipal Solid Waste (MSW)

State	Number of Landfills	Amount of PVC Landfilled (tons)
California	161	328,260
Texas	175	176,896
New York	26	116,088
Ohio	44	100,509
Illinois	51	98,896
Michigan	52	96,241
Florida	100	76,817
Georgia	60	69,177
Pennsylvania	49	60,844
New Jersey	60	56,166
North Carolina	41	54,842
Indiana	35	52,986
Washington	21	49,128
Virginia	67	48,636
Maryland	20	42,722
Remaining States*	805	610,553
Total	1,767	2,038,761

Sources and Notes: Estimates derived from Kaufman (2004) for 2002. The amount of PVC landfilled by each state was calculated by (1) assuming that the percent PVC content of municipal solid waste (0.62%) estimated by the USEPA (2003) is representative of the typical percentage of PVC in the waste stream; (2) assuming that post-consumer recycling of PVC in MSW is zero; (3) multiplying the average percent PVC in the waste (0.62%) by the total waste generated in that state according to Table 4 in Kaufman (2004); and (4) multiplying this value (the total PVC disposed in the state) by the percent of waste landfilled after recycling as shown in column 2 above. The percent of PVC landfilled after recycling was determined by dividing the total amount of waste landfilled in a state (provided in Table 4 of Kaufman 2004) by the total waste disposed of (after recycling).

* AL, AK, and MT did not report any data (see Appendix B).

The amount of PVC waste going to landfills is expected to increase substantially over the next 20 years. A study in Europe found the amount of PVC waste generated in the 15 European Union countries will increase from 3.6 million tons per year in 2000 to 4.7 million tons in 2010 and to 6.4 million tons per year by 2020 (AEA 2000, ARGUS 2000). This is an increase of more than 75% over 20 years. This is because most PVC products were put into commercial use during the 1970's and their useful service life is ending. Components in cars, construction materials, and electrical, household and industrial goods typically last from 5 to 15 years (AEA 2000). Building materials such as pipes, flooring, and siding may last for decades before being replaced (AEA 2000). As production of these PVC materials has been on going for more than 30 years, the PVC waste that is entering the waste stream today is a reflection of the products put in use years ago. An estimated 300 billion pounds of this PVC will require disposal worldwide in the coming years (van der Naald 1998).

Construction and Demolition Waste Landfills

PVC is also found in construction and demolition (C&D) waste. C&D waste is generated from the construction, renovation, repair and demolition of structures such as residential and commercial buildings, roads, and bridges (ICF 1995). Franklin Associates

(under contract to the USEPA) estimated that 136 million tons of building-related C&D debris was generated in 1996 (FA 1998). This figure did not include road, bridge and land clearing debris. C&D waste consists mainly of wood products, asphalt, drywall and masonry waste with lesser quantities of metals, plastics including PVC, dirt, shingles, insulation, paper and cardboard (ICF 1995). The percentage of PVC in C&D waste is hard to estimate. One report specifically identified and estimated the percent of vinyl siding and PVC pipes in C&D waste to be 0.63% for the two materials combined (FA 1998). Other types of PVC plastic waste were not considered.

In 2002, forty-two states reported that 1,931 landfills were dedicated for disposal of C&D waste (Kaufman 2004). Many if not most of these landfills are unlined, offering groundwater supplies even less protection from contaminants that may leach from PVC and other C&D waste components.

The Hazards of Landfill Disposal of PVC

There are significant dangers associated with the dumping of PVC in landfills. Although there appears to be little degradation of the PVC polymer (ARGUS 2000, Mersiowski 1999), the additives present in PVC products are not chemically bound to the PVC and they will seep out into the environment over time (CEC 2000). These additives include plasticizers, stabilizers, pigments, fillers and other chemicals that are added to PVC depending on the final product's intended purpose (see Chapter 3). Many of these additives leach out in the disposal phase (Mersiowski 1999). This is especially true of flexible PVC products. In the case of the rigid PVC products, stabilizers are generally thought to be encapsulated in the matrix of the PVC polymer and thus migration is expected to be less than what occurs with the plasticizers (ARGUS 2000, AEA 2000, Mersiowski 1999).

In landfills, PVC (as well as all waste) is subject to different reactive conditions such as moisture, changing temperatures, the presence (or absence) of oxygen, and the activity of microorganisms (CEC 2000). These factors will interact with the waste at different stages of the aging process. Recent studies evaluating the behavior of PVC in landfills found that microorganisms and/or corrosive liquids common to landfill environments act to accelerate the release of additives in PVC products (Mersiowski 1999, Hjertberg 1995).

Cadmium, lead, organotins and phthalates (which account for over 90% of plasticizers) are commonly released from PVC waste in landfills (Mersiowski 1999, Hjertberg 1995). In studies evaluating the leaching of bisphenol A (BPA), an additive used in many plastics, PVC was found to release the highest concentrations of BPA (Yamamoto 1999). These additives will mix with water and other substances in the waste and generate "leachate" which will contaminate local groundwater in the vicinity of the landfill.

Leachate generated by waste in landfills has been detected in groundwater monitoring wells at numerous garbage landfills (Lee 1996). One study in California reported that 72% of 528 landfills had polluted the nearby groundwater (Lee 1996). The USEPA passed regulations in 1991 to control landfill leachate (USEPA 1991). These regulations have been criticized for relying on a "fundamentally flawed technological approach for MSW management that at best only postpones when significant environmental problems will occur as a result of the landfilled waste" (Lee 2003).

Estimates have been made of the amount of lead present in landfills that are attributable to lead additives in discarded PVC products. These estimates range from 1 to 28% (CEC 2000). In 1998, an estimated 51,000 tons of lead were used as stabilizers in plastic in Europe (CEC 2000) and an estimated 6 billion tons were used worldwide in 2000 (Tukker 2001). Much of this lead will end up in landfills and can be expected to be a significant source of lead being released into the environment (NCM 2003). The key question is how much of the lead will be mobilized and released into the environment and when. Although the mobility of lead is generally thought to be low, small amounts will slowly leak out. Over time, this could lead to substantial amounts of lead being released into the environment. One study in Europe reported that an estimated 8 kilotons of lead from PVC entered the waste stream and that 0.5 kilotons was released into the environment in 2000 (Tukker 2001). Given the longevity of PVC products, it can be expected that lead leaching from discarded PVC products in landfills will continue to be a health and environmental threat for many years to come.

The lack of adequate liners and/or leachate treatment in many old landfills (and even some new ones) ensures that these releases have an easy route into surrounding groundwater and soil. Many construction and demolition debris landfills are completely unlined. Most old landfills contain no liner or collection system to prevent leachate generated in the landfill from mixing with and

contaminating local groundwater. This leachate will seep down through the waste and eventually contaminate groundwater with hazardous and toxic chemicals (Lee 1994).

Even landfills equipped with the best liners and most up-to-date treatment methods cannot ensure long-term safety. In instances where liners or collection systems have been installed, leachate is still generated. When it reaches the bottom of the landfill, it is collected by a system of pipes and treated. The treated leachate is often sprayed back onto the waste and eventually collected again. If these pipes clog up, the leachate will accumulate in the landfill and create pressure on the liner. Eventually, this pressure will force the leachate out at the point of least resistance, usually the bottom of the landfill when the bottom liner fails.

These collection systems can be clogged by silt or mud, the growth of microorganisms in the pipes, or chemical reactions leading to the precipitation of minerals in the pipes. The pipes may also become weakened by chemical attack (acids, solvents, oxidizing agents or corrosion) and may be crushed by the tons of garbage piled on them (ERF 1989)

The liners used in landfills are generally made from high-density polyethylene (HDPE). These liners can be degraded by a number of household chemicals that can cause them to either lose strength, soften or become brittle and crack. Liners will also tear during installation or as a result of pressure from the weight of the waste. There may also be defects in the liners such as cracks, holes and faulty seams that allow leachate to pass through the liner (ERF 1992). One study found certain organic chemicals, such as chlorinated solvents, benzene, trichloroethylene (TCE) and vinyl chloride, can readily pass through an intact liner (i.e., a liner with no holes) in a short period of time (Haxo 1988). This finding has been confirmed in separate studies (Sakti 1991, Buss 1995, Lee 1996). Eventually, all landfills will leak whether they have a liner or not (ERF 1992, Bonaparte 1990, Lee 1992) and threaten the health of residents living nearby (ERF 1998). Landfills cannot guarantee safe, long-term disposal of PVC wastes and their by-products.

Landfill fires present another cause for concern. These fires generate a range of hazardous gases including carbon dioxide, carbon monoxide and hydrogen chloride. Dioxins and furan are also formed (USEPA 2001). Such fires are not uncommon. An average of 8,400 landfill fires are reported each year in the U.S. (FEMA 2002) and their ignition can be traced to a number of causes. Though over half of reported fires have no information available as to the initial cause, 40% of reported fires are classified as deliberate or suspicious, 20% are attributable to smoldering waste, and 5% ignite spontaneously. Highly flammable methane gas, released by landfilled waste as it decays is a primary factor in many cases.

PVC products disposed of in landfills contribute to the formation of dioxins and furans in the event of a fire. Four PVC products—pipes, rigid foils, floorings and cable wires—contribute about 40% of the chlorine content in landfills (Mersiowsky 1999). As previously discussed, the chlorine in PVC contributes to the formation of dioxins. Other factors that influence the amount of chlorinated dioxins and furans formed include fire temperature, and the availability of oxygen and catalysts (e.g., copper). Lower oxygen concentrations and lower temperatures (500-700° C) correspond with elevated dioxin formation (Moeller 1996). Both these conditions occur frequently at landfill fires.

Measured concentrations of dioxins and furans in the air of landfill fires are generally high and consistent with evidence gathered from test fires (Ruokojärvi 1995). As is the case with open burning, these air emissions are unfiltered and largely uncontrolled (see Chapter 3).

Another concern with landfills is the generation of landfill gases. All municipal waste landfills generate gases that result from the degradation of materials in the waste (USEPA 1995). The most common landfill gas is methane that results from the degradation of biological matter in the waste stream. Other common landfill gases include vinyl chloride, benzene, toluene and dichloroethane (ATSDR 2001). These volatile gases result from the breakdown of waste components present in the landfill. When PVC degrades, plasticizers and other additives leach out, and some of these evaporate and contribute to the landfill gases (ARGUS 2000).

Older landfills made no attempt to vent or control these gases. As a result, there were many explosions in homes and buildings located near solid waste landfills caused by the migration of methane gas, a highly explosive substance (USEPA 1990, Lee 1994). More modern landfills attempt to capture these gases using a gas collection system. These systems consist of a series of wells installed throughout the landfill that are used to pull out the gas. A series of pipes connect the wells and carry the gas to either a flare where it is burned or to an energy recovery system where the gases are con-

verted into electricity (USEPA 1990). The flares can be a source of dioxins if chlorinated chemicals such as vinyl chloride are present in the landfill gases (USEPA 2001, Eden 1993).

Since 1996, large landfills have been required to have gas collection systems, which, the USEPA maintains, capture 75% of the gases (USEPA 2002b). However, there is no factual basis for this number. There are no studies that define the collection efficiency of these systems. Instead, this estimate is intended to reflect the best achievable efficiency while the systems are operating. The flaws in EPA's estimate are two fold. First, more of the gases are emitted both before the systems are installed and after they are removed from service, than during the time they are functional. Second, most landfills do not achieve best practices, especially because there is no way to measure emissions that might disclose poor efficiency, other than by detecting odor problems, which is just the manifestation of the worst fugitive emissions. A study that includes these factors found that there is no factual basis to conclude that, in practice and on a lifetime basis, more than 20% of the landfill gases generated are actually captured and either flared or used to recover energy (Anderson 2004a).

Landfills are also used to discard the residual ash generated when PVC products are incinerated. This ash contains dioxins and many heavy metals that will eventually cause many of the same leaching problems and threats to groundwater discussed earlier (USEPA 1994a, ERF 1990, Denison 1988). Clearly, landfills do not solve the disposal dilemma. They merely present a temporary, polluting alternative to burning PVC and creating dioxins. As an interim strategy, land disposal of PVC in a hazardous waste landfill may be preferable to incineration, but it poses its own environmental and public health threats and does not provide a long term secure solution to PVC waste management. Avoiding the generation of PVC-containing waste is the only sure way to prevent the problems associated with either landfill disposal or incineration of PVC waste.

VI RECYCLING MENACE
PVC Undermines Recycling Efforts

MAJOR FINDINGS

- Contrary to popular belief, recycling of PVC is negligible, with estimates ranging from 0.1% to 3% of post-consumer PVC waste being recycled.
- PVC is very difficult to recycle because the many additives used in PVC products make it impossible to retain the unique properties of the original formulation from a batch of mixed PVC products collected for recycling.
- PVC severely impacts the recycling of PET plastic bottles due to difficulty in separating these plastics when they are mixed together, and because of the contamination caused by the chlorine in PVC when they are processed together for recycling.
- The vinyl industry has inflated its PVC recycling rate by failing to account for all PVC waste generated and by redefining PVC waste incineration as recycling.
- PVC increases the toxic impacts of the recycling process for other discarded products such as nylon carpet, computers, automobiles and corrugated cardboard.

The ability to recycle used PVC products into new products is not feasible as a practical matter (Plinke 2000). While the vinyl industry has argued that PVC can be recycled (VI 2004a, PP 1999), in reality, a negligible amount of PVC is actually recycled. Estimates of how much post-consumer PVC (PVC that was used by a consumer for its intended purpose) is recycled vary from a high of about 3% (Plinke 2000, PP 1999) to a low of less than 1% (Denison 1997, Beck 1996). USEPA reports that less than 0.1% of PVC in post-consumer municipal solid waste was recycled in 2001, the most recent year for which data are available (USEPA 2003). As discussed below, at most 0.3% of PVC bottles were recycled in 2001 (Anderson 2004).

The primary reason for these poor recycling rates is the lack of uniformity in the composition of PVC products. Vinyl products are made using various formulations that are designed to achieve certain properties and create specific products. To achieve these features, additives such as lead, cadmium and phthalates that enhance properties such as durability and plasticity are mixed together with PVC. For example, vinyl siding and windows are made with lead to make them more durable, whereas infant chew toys contain phthalates to make them more soft and pliable. Table 9 shows what portion of the PVC is made up of these additives.

When these different formulations of PVC are mixed together, such as when they are collected as part of a recycling effort, they cannot be readily separated which

Table 9

Typical Composition of PVC Products and Materials

Application	Share of the Components (weight - %)				
	PVC Polymer	Plasticizer	Stabilizer	Filler	Others
Rigid PVC Applications					
Pipes	98	—	1-2	—	—
Window Profiles (lead stabilized)	85	—	3	4	8
Other profiles	90	—	3	6	1
Rigid film	95	—	—	—	5
Flexible (soft) PVC Applications					
Cable installation	42	23	2	33	—
Flooring (calander)	42	15	2	41	0
Flooring (paste, upper layer)	65	32	1	—	2
Flooring (paste, inside material)	35	25	1	40	—
Synthetic leather	53	40	1	5	1
Furniture films	75	10	2	5	8
Leisure articles	60	30	2	5	3

Source: Prognos 1994, Prognos 1999, Totsch 1990 as cited in Plinke, 2000.

is necessary to reprocess the PVC back into its original formulation and to retain the unique properties of the original formulation (Plinke 2000, Thornton 2000). This problem is further complicated because PVC formulations for the same materials have changed over time.

There are other problems with mixing PVC with other plastics. One difficulty is color. Recycled products must be separated by color, which in most cases is not practical (Plinke 2000). Another difficulty is that soft PVC cannot be used in rigid PVC applications, and rigid PVC cannot be used in soft PVC applications since the material has to be reformulated (i.e., new additives need to be added). Thus, when different formulations of PVC are mixed together, it becomes virtually impossible to create a formulation that can be used for any application that requires specific properties.

As a result, a lower quality PVC plastic is produced which cannot be used for the same purpose as the original product (Plinke 2000). Thus, PVC can never be truly recycled into the same quality material. It usually ends up being made into lower quality products with less stringent requirements such as speed bumps, parking bumpers, or park benches. The loss of quality in a material during recycling is called "downcycling." The downcycling of plastics is common because of the difficulties in separating out the components with different additives (Plinke 2000). PVC that is downcycled does not reduce the overall demand for the raw materials (virgin resin) used in making plastic, and has no effect on the amount of vinyl produced each year (Denison 1997).

In Europe, where PVC recycling has received greater attention, the vinyl industry has claimed greater progress in PVC recycling than is actually the case. Instead of measuring recycling progress against the total amount of PVC waste generated, the industry instead limited its recycling goals to the much smaller fraction of PVC waste that they deem to be economically "collectable" and "available." With this distortion the European industry claimed that they achieved their goal of recycling 25% of PVC waste window frames, pipes and fittings, and roofing membranes by 2003. In fact, actual PVC recycling rates were less than 5% for pipes and fittings, 6% for roofing waste and 16% for window frames (ENDS 2004).

The PVC industry's distortion of its recycling progress can't hide the facts. Throughout Europe, the total amount of PVC recycled in 2003 was 2% to 3%, matching only one-fifth of the industry's modest goal of recycling 10% to 15% of all PVC (not just what's collectable and available) by 2010 (ENDS 2003). These modest gains are being rapidly overshadowed by the projected 50% to 80% increase in PVC waste generation over the next twenty years (ENDS 2003, ENDS 2004).

Compare the 2% to 3% PVC recycling rate in Europe (which far outpaces the 0.1% to 3% U.S. PVC recycling rate) with the recycling rates for other commonly discarded products in the United States in 2001: auto batteries (94%), yard trimmings (57%), steel cans (50%), aluminum beer and soft drink cans (49%), paper and paperboard (45%), PET #1 plastic soft drink bottles (36%), tires (31%) and glass containers (21%) (USEPA 2004c).

To further cover its poor recycling record, the vinyl industry has taken to re-labeling PVC waste incineration as recycling. For example, the European Council of Vinyl Manufacturers describes trials of several new PVC "recycling" technologies. These include PVC waste incineration at a Dow Chemical plant in Leipzig, Germany to recover hydrochloric acid, and the chemical processing of waste PVC and mixed plastics to help fuel a steel plant in the Netherlands (ENDS 2003). They also included a proposed PVC waste gasification plant to make hydrochloric acid and a fuel gas, which was later abandoned by Solvay in France due to costs and technical problems (ENDS 2003). High temperature processing of PVC waste will form chlorinated dioxins and furans and other toxic byproducts and can only be properly classified as incineration or waste treatment, not recycling.

Impacts on the Recycling of Other Materials

The difficulty in separating PVC from other plastics, such as polyethylene terephthalate (PET) bottles or nylon carpet facing, makes it extremely difficult, if not impossible, to recycle those otherwise recyclable materials. PVC also increases the toxic impacts of recycling of other valuable commodities such as copper from wiring and cable used in electronics like computers, steel from the scrapped automobiles and corrugated cardboard containers sealed with PVC tape. These examples are summarized in Table 10 and discussed below.

Plastic Bottles

PVC severely impacts the recyclability of other plastics such as polyethylene terephthalate (PET or sometimes PETE). Bottles made of PET and high density polyeth-

Table 10

PVC Contaminates the Recycling of Many Materials and Products

Material and Product	PVC Use	PVC as Contaminant
Polyester from PET plastic (#1) bottles[1]	PVC and PET bottles are commingled in all bottle recycling efforts	Due to similar densities, it is difficult and expensive to separate PVC from PET; the presence of even a little PVC ruins PET recycling during processing.
Nylon facing from carpets[1]	Backing of carpet	PVC can't be readily separated from nylon; it contaminates it and results in "down-cycling."
Copper from wires and cables of electronics[2]	Plastic sheathing of wires and cables	The PVC on wires and cables with low copper content are burned at secondary copper smelters releasing dioxins and toxic additives and by-products.
Steel from automobiles[3]	Undercoating, wiring, interior and exterior trim, other plastics in autos	After shredding, most non-metal "fluff" is landfilled, but some PVC mixed with the steel is burned in electric arc furnaces.
Cardboard from boxes[4]	Tape and other binders used to seal boxes	After separation from corrugated cardboard, PVC plastic is burned at the paper mill.
Scrap wood from C&D[5]	Siding, pipes, window frames, flooring and other building materials	PVC scraps contaminate the waste wood extracted from C&D waste which is chipped to burn as a cheap fuel in "biomass" boilers.

Sources: 1 - Anderson 2004; 2 - SVTC 2004; 3 - CCC 2004; 4 - SCC 1988; and 5 - MDEP 2004a.

ylene (HDPE) make up 95% of all plastic bottles compared to only about 2.3% for PVC bottles (Anderson 2004). PET bottles (recycling code #1) are commonly used to contain water, soda, vegetable oil and many other products (Anderson 2004) and are highly recyclable. Lower quality recycled PET (which has greater tolerance for contaminants such as PVC) is often used to make a polyester fabric known as "fiberfill" that is used in coats, sleeping bags, pillows and carpeting. However, higher quality recycled PET (containing very little PVC) is increasingly being recycled directly back into bottles. It also has an economic benefit as it is sold for fiber at seven times the price of PET contaminated with PVC (Anderson 2004).

When PVC is mixed together with PET or other highly recyclable plastic, such as in the "all-bottle" recycling programs favored by the plastics industry, the few PVC bottles likely to be collected will be virtually indistinguishable from PET containers due to their similar appearance and density. Sophisticated separation technology that uses optical systems is available to identify and remove unwanted plastic bottles, such as PVC (USEPA 1993). However, the effectiveness of these systems is greatly reduced when the bottles are damaged or dirty. This makes accurate readings difficult to achieve and as a practical matter separation of PVC almost impossible (USEPA 1993, Anderson 2004).

If the PVC cannot be separated from the PET, it will severely effect the processing of the PET bottles into reusable plastic resin. This is because PET and PVC behave very differently when they are processed for recycling. PVC burns at a lower temperature than PET. It burns at the temperature that simply melts PET (Anderson 2004, EAF 1993). When this occurs, "black spots" get into the PET resin contaminating the batch and ruining or seriously downgrading the quality of recycled PET residue (Anderson 2004). According to one plastics recycler, "introducing one PVC bottle into the recycling process can contaminate 100,000 PET bottles" (Anderson 2004, EAF 1993). In addition, when PVC is melted, it generates hydrochloric acid, which will damage the processing equipment (OSWM 1993).

Despite these difficulties, the vinyl industry partially subsidized PVC bottle recycling in the mid-1990s (Anderson 2004). This effort failed miserably. At best, barely 2% of the bottles were recovered (Anderson 2004). Instead, truckloads of PVC plastic waste were landfilled (Denison 1997) leading the Association of Post-Consumer Plastic Recyclers (APR), a recycling industry trade group, to declare that vinyl products are "unrecyclable contaminants" in the recycling of PET and HDPE bottles (PMF 2003). APR later abandoned its efforts to establish viable markets to recycle PVC (RT 2001). A report on the recycling of PVC waste prepared for the European Union similarly concluded "mechanical recycling is not qualified to contribute significantly to the management of PVC post-consumer wastes in the next decades..." (Plinke 2000).

More recently, a report released by the GrassRoots Recycling Network (a group of community activists and recycling professionals advocating for zero waste and sustainable communities) concluded that PVC bottle recycling is negligible today and that at most 0.3% of PVC bottles were recycled in 2001 (Anderson 2004). The report provides details of how PVC recycling of bottles does not exist, cannot exist, and is not wanted even by the plastics recycling industry. The only solution is a total phase-out of PVC and a rejection of programs encouraging curbside pickup of PVC that ultimately cause more harm than good.

Electronics

An estimated 26% of the plastic used in electrical and electronic equipment is made of PVC (MCTC 1996). The cabling of computers and other electronics is currently a major application of PVC in electronics, although it can be found in the housings of older computers that may still enter the waste stream (SVTC 2004).

When these consumer products reach the end of their useful life, components can be recovered and reused. Recyclers strive to recover valuable metals, such as copper from the wiring of these electronics. This is done by mechanical removal of the plastic sheathing, but it is only economical when the copper content is high. Most PVC cables from consumer electronics do not contain enough copper and so are bundled and shipped to a secondary copper smelter. Once there, the PVC plastic is burned off from the copper, a known catalyst of dioxin formation. Thus, recovery of copper wire results in toxic emissions including dioxins and furans to air and ash (SVTC 2004, USEPA 2001).

Smelting can present dangers similar to incineration. A report on the recycling of computer parts raised concerns that the Noranda Smelter in Quebec, Canada, where much of the North American "electroscrap" is sent, is "producing dioxins due to the residual presence of PVC or other plastics in the scrap" (SVTC 2004). Noranda has denied that this facility presents a "pollution hazard." Secondary copper smelters, such as the one operated by Noranda, have been identified as one of the highest sources of dioxin emissions in the U.S. (USEPA 2001).

Automobiles

Cars currently produced in North America average about twenty-four pounds of PVC per vehicle, according to plastics manufacturers (APC 2004). When the hulks of old cars are shredded, some of the PVC plastic mixes with the scrap metal which is melted down to make recycled steel. The high temperature and possible metal catalysts trigger formation of dioxins and furans. The vinyl industry advocates burning the plastics-rich automotive shredder residue (ASR or "fluff") either with municipal solid waste or in a cement kiln (VI 2004b). This will further contribute to dioxin formation from the chlorine present in automotive vinyl materials and formation of toxic PVC by-products (Singhofen 1997, CCC 2004).

The main uses of PVC in automobiles include underbody coatings and sealants, wire harnesses, dash boards, door panels, arm and head rests, upholstery, heating and cooling ducts, floor mats, spray-on sound deadener, seat belt latches, seat covers, mud flaps, and exterior trim such as body side protection strips, weather strips and window sealing profiles (APC 2004, VI 2004c, CCC 2004). PVC is the second largest volume plastic for automotive use in North America (APC 2004).

Carpets

The disposal of carpets in municipal and construction and demolition waste adds PVC from carpet backing to the solid waste stream. Two progressive companies controlling just ten percent of the market have achieved a modest 22% recycling rate for PVC carpet backing. But mechanical separation used by companies such as Interface Fabrics leaves too much PVC contaminant in with the nylon. PVC burns at the same temperature that nylon begins to soften and destroys the separated nylon fibers (Anderson 2004). Another company that uses recycling (Collins & Aikman) must downcycle the entire carpet to a lower value carpet backing, losing the nylon fibers for reuse and requiring virgin materials for new carpet facing (Anderson 2004).

Truly closed loop recycling for carpets, in which the facing and the backing fibers are recycled back into their original uses, remains elusive (Anderson 2004). And the modest success earned by recycling of PVC carpet backing can't be readily translated to other uses of PVC. The carpet makers enjoy a large volume, steady supply of discards with a relatively standard formula of PVC, unlike the variable PVC mixtures used in so many other far-flung products that are difficult to collect and recycle for a high end use (Anderson 2004).

Old Corrugated Cardboard (OCC)

Another use of PVC is to make packing tape that binds corrugated cardboard boxes. After this cardboard is used, it is broken down and returned to a paper mill for recycling. Any tape or plastic binding used to seal the cardboard is removed and separated from the cardboard, and then burned in the mill's industrial boilers. When this tape or binding is made of PVC and burned, another source of dioxin is created (SCC 1988). The Smurfit-Stone Container cardboard recycling facility in Missoula, MT processes up to 525 tons of old corrugated cardboard (OCC) per day. This mill generates about 15 to 25 tons per day of "OCC rejects" that consist of plastic packing tape, plastic twine and other non-cardboard contaminants, some of which is made of PVC (WVE 2002). Dioxins and furans have been identified in the air emissions of pulp and paper mills (USEPA 2004d).

Scrap Wood

Pressures are increasing to burn more scrap wood for fuel and power in so-called "biomass" boilers that are a proven source of dioxin emissions (MDEP 2004). Yet it is increasingly likely that PVC siding, window frames, roofing foils and other vinyl building materials will become mixed with scrap wood recovered from construction and demolition debris. When chipped and burned, this PVC-contaminated wood scrap is likely to add to the amount of dioxins formed.

VIII DON'T BUY IT
Safer Alternatives to PVC are Available, Effective and Affordable

MAJOR FINDINGS

- PVC is the most environmentally harmful plastic; many other plastic resins can substitute more safely for PVC when natural materials are not available.
- Safer alternatives to PVC are widely available and effective for almost all major uses in building materials, medical products, packaging, office supplies, toys and consumer goods.
- PVC alternatives are affordable and already competitive in the market place.
- In many cases, the alternatives are only marginally more costly than PVC, and in some cases the costs of the alternative materials are comparable to PVC when measured over the useful life of the product.
- Phasing out PVC in favor of safer alternatives is economically achievable.
- A PVC phase-out will likely require the same total employment as PVC production (an estimated 9,000 jobs in VCM/PVC resin production, and 126,000 jobs in PVC fabrication) by making the same types of products from safer plastic resins.

Safer alternatives to the use of PVC plastic are widely available, effective and affordable. These alternatives pose fewer toxic chemical hazards than those associated with the manufacturing, use and disposal of PVC. In many cases, they completely avoid the formation of chlorinated by-products of combustion, e.g., dioxins, because they are chlorine-free; they also prevent the release of other harmful chemicals because they do not contain additives such as phthalates, lead, cadmium or tin, which are commonly found in PVC formulations.

Safer alternatives to PVC come in several forms including natural materials, as well as other synthetic plastics that are cleaner than PVC. For instance, instead of a vinyl shower curtain, a cloth shower curtain, wood clapboard siding or glass door easily does the job. For some people, the perceived aesthetic value of these natural materials further outweighs the comparative appearance of the PVC products. For others, the perceived convenience of lower maintenance tips the balance in favor of synthetic materials.

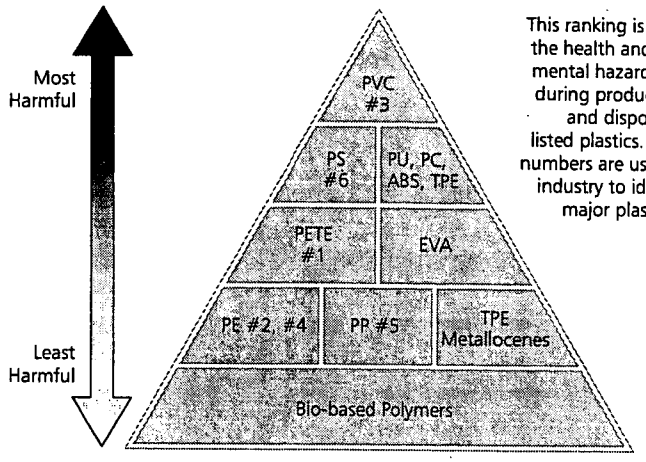
Even so, other cleaner plastics will do the same job as PVC without the high degree of toxic impacts throughout their life cycle. For example, a polyurethane-coated nylon shower curtain will repel water as well as one made of vinyl. The newly marketed polyethylene-based plastic siding avoids the toxic impacts associated with vinyl siding.

Many Other Plastic Resins are Safer Than PVC

Not all plastics or synthetic polymers are created equal. In a study of all major packaging materials conducted for the Council of State Governments in the U.S., PVC was found to be the most damaging of all plastics (Tellus 1992). A life cycle analysis conducted by the Danish EPA found that common plastics, such as polyethylene, polypropylene, polystyrene, PET and ethylene-propylene synthetic rubber, were all clearly preferable to PVC in terms of resource and energy consumption, accident risk and occupational and environmental hazards (Christiansen 1990).

This ranking of the major plastic resins from most harmful to least harmful is reflected in a revision of the Plastics Pyramid, originally developed by Greenpeace, shown in Figure 4 (DEPA 1995, van der Naald 1998, Tickner 1999a). The ranking qualitatively accounts for the toxic chemical hazards associated with the manufacture, use and disposal of plastics. Similar in concept to the federal government's Food Pyramid, the most harmful items at the narrow top of the pyramid should be avoided or used sparingly, while liberal advantage should be taken of the least harmful items listed at the broad base of the pyramid.

Figure 4. A Plastics Pyramid



This ranking is based on the health and environmental hazards created during production, use and disposal of the listed plastics. The code numbers are used by the industry to identify the major plastic resins.

A key to the plastics and some hazards associated with production, use and disposal

Level 1	PVC = Polyvinyl chloride	Chlorine, intermediates, many additives, byproducts
Level 2	PS = Polystyrene	Intermediates, fewer additives, some byproducts
	PU = Polyurethane	Some chlorine used, intermediates, waste byproducts
	ABS = AcrylonitrileButadieneStyrene	Hazardous intermediates, difficult to recycle
	PC = Polycarbonate	Some chlorine used, intermediates, toxic solvents, BPA
	TPE = Thermoplastic Elastomer	A copolymer or alloy of conventional plastic
Level 3	PETE = Polyethylene terephthalate	Some hazardous chemicals, high recycling rate
	EVA = Ethyl vinyl acetate	Chloride catalyst, some byproducts
Level 4	PE = Polyethylene	Fewer additives, some byproducts, high recycling rate
	PP = Polypropylene	Fewer additives, some byproducts
Level 5	Bio-based Polymers	Naturally based, e.g. starch, cellulose; compostable

Sources: DEPA 1993, van der Naald 1998, Tickner 1999a.

PVC clearly ranks as the most harmful plastic due to its high chlorine content, the toxic intermediate compounds used to produce PVC, the many toxic additives routinely added and its toxic by-products of combustion. PVC products, especially bottles and packaging, are sometimes labeled with the code number "3" (or the letter "V") based on a system used by the plastics industry to distinguish among the major plastic resins.

PVC V vinyl

The next level of the pyramid lists plastics that are still harmful but less so than PVC. These include polystyrene (PS), used for plastic cups and utensils and to make Styrofoam, and polycarbonate (PC), used to make compact discs and most reusable water bottles. PC releases a chemical known as bisphenol A (BPA) which is known to interfere with the functioning of the hormone system in lab animals and, as an endocrine disruptor, may pose a hazard to human health (Colborn, 1996). Acrylonitrile Butadiene Styrene (ABS) and polyurethane (PU) are also hazardous, but they are less toxic, persistent, and bioaccumulative than PVC.

The plastics in the middle of the ranking are even less hazardous than PVC and the other plastics higher on the pyramid. These include the polymer most often found in plastic beverage bottles, including bottled drinking water, known as polyethylene terephthalate (PET or PETE) (code # 1). Although hazardous chemicals are involved in the production of PET, it is recycled at a relatively high rate for plastics (19%) (USEPA 2003), especially in the eleven states that have

a returnable deposit on the sale of bottles of beer, wine, soda and other beverages.

Two high volume synthetic plastics are found near the base of the pyramid because they are far cleaner than PVC. These are polyethylene and polypropylene. Although these are both synthetic resins derived from nonrenewable fossil fuels, they are produced without toxic intermediates and far fewer additives or toxic by-products. Polyethylene, which ranks first in production among all resins, comes in two major versions: high density (HDPE or # 2), which is widely used in many applications, and low density (LDPE or # 4), which is commonly used in plastic bags. Both types are highly recyclable. Polypropylene (PP or # 5), often used for containers for products such as yogurt and prescription drugs, can readily be recycled but few recycling markets have been developed.

Even more environmentally preferable are the bio-based polymers, which are derived from natural renewable materials such as cornstarch or cellulose and which can be composted into beneficial organic matter to enrich soils rather than landfilled or incinerated. The Interface Fabrics company, among others, is pilot testing textile fibers made from bio-based polymers. An even higher standard would give preference to bio-based plastics developed from sustainable agricultural practices (e.g., without the use of pesticides and minimal fossil fuel inputs) that do not rely on genetically modified organisms or displace food products from serving the marketplace. Genetically engineered products should not be used in making bio-plastics.

Minimizing the disposal impacts of PVC favors the use of natural organic-based materials whenever practical because they biodegrade and represent a renewable resource. In many cases, however, a durable man-made plastic offers unique advantages to alternatives made of organic matter, minerals or metals.

Fortunately, as Figure 4 shows, many other synthetic plastic resins are widely available for product manufacturers to choose from to avoid the harmful impacts of PVC. And the emergence of bio-based plastics in the commercial marketplace gives an even greater boost to the success of sustainable production and environmentally preferable purchasing.

Safer Alternatives to PVC are Widely Available and Effective

PVC-free alternatives are already widely available for many applications. Several extensive reports have identified available and affordable alternatives to PVC (Ackerman 2003, Thornton 2002, Greenpeace 2001). Table 11 provides a few examples of available PVC-Free alternatives for several common PVC products. The sources reviewed below provide specific guidance on which vendors currently provide alternatives to specific products representing some of the most common uses of PVC. Several of these resources are searchable online databases of PVC-free products. The alternatives described can be currently found in the marketplace and are functionally equivalent, i.e., are as effective as a PVC product for the specified end use.

Building Materials

Effective alternatives are available now for most construction-related uses of PVC. Several databases, such as those offered by the Healthy Building Network (HBN 2004: http://www.healthybuilding.net/pvc/alternatives.html) and Greenpeace (Greenpeace 2004: http://archive.greenpeace.org/toxics/pvcdatabase), list these alternatives. A large number of construction projects, including the Sydney 2000 Olympic Stadium and the new EPA headquarters in Washington, DC have been constructed with little or no PVC (Greenpeace 2001, Greenpeace 2004b).

Medical Products

The Sustainable Hospitals Project is an excellent resource for healthy medical products, including PVC-free alternatives for gloves, bags and tubing. They operate a Website that includes extensive listings of products by category, by "hazard" or by manufacturer (SHP 2000: http://www.sustainablehospitals.org/cgi-bin/DB_Index.cgi).

Office Supplies

The Lowell Center for Sustainable Production has identified alternatives to the use of PVC in office supplies (SHP 2000: http://www.sustainablehospitals.org/cgi-bin/DB_Index.cgi). For example, instead of the common vinyl-coated three-ring binder, you can purchase an equivalent binder made of polypropylene with recycled content.

Packaging

The Grassroots Recycling Network has identified specific brand products that are currently packaged in PVC

○ ● ● ● ● Table 11 ● ● ● ● ○

PVC-Free Alternatives to Common Materials

PVC Product	Available Alternatives	Affordability
Automobile Components	Polyolefins[1]	Competitive for most uses[1,2]
Blinds	Wood[3], Aluminum[3]	Varies
Bottles	High Density Polyethylene (HDPE)[4] polypropylene (PP) Polyethylene Terephthalate (PET)[4]	Slightly more expensive. Costs expected to go down with increased market share.
Flooring (Hard)	Bamboo[5], Ceramic Tile[5] Recycled Glass Tile[5]	Bamboo is comparable to vinyl.[5] Ceramic and recycled glass are more expensive.[5]
Flooring (Resilient)	Cork[6], Stratica[6], Linoleum[6]	Alternatives cost more up front but last nearly twice as long. Savings of 30-50% over 20 years.[6]
Gloves	Nitrile[7]	Cost competitive when purchased in large quantities.[7]
Medical Bags, Tubing, Etc.	Polyurethane[7,8], Silicon[7,8] Polypropylene[7,8], Polyethylene[7,8]	Prices vary but most hospitals are able to negotiate comparable rates through high volume purchasing.[8] Prices will fall as market increases.[8]
Pipes	High Density Polyethylene[5,6,9] Copper[6,9], Cast Iron[5,9] Vitrified Clay[5], Concrete[9]	Decreased labor cost for installation reduces importance of price.[6,9] Pipe selection rarely determined by material cost differences in this industry[6,9]
Roofing (For Flat Roofs)	TPO- Thermoplastic Polyolefin[5] EPDM- Ethylene Propylene Diene Monomer[5]	Comparable to similar vinyl roofing[5]
Siding	Wood[6], Fiber Cement[6], Aluminum[5]	Varies - High quality, longer lasting materials can cost less than PVC if you shop wisely.[6] Aluminum is more expensive but very durable and maintenance free.[5]
Wallpaper	Natural Fiber[6]	More expensive[5]
Windows	Wood[6], Aluminum[6]	Varies widely[6]

Sources and Notes: 1 - Greenpeace 2001; 2 - Singhofen 1997; 3 - Dickey 2002; 4 - GRRN -2004; 5 - CEC 2004; 6 - Ackerman 2003; 7 - Ruzickova 2004; 8- SHP 2000; 9 - Harvie 2002. **Note:** This table is not meant to be exhaustive, as there are endless uses of PVC. Rather, it is provided to offer a few concrete examples of available and affordable alternatives to PVC. In choosing alternative materials for this table, an effort was made to exclude those having significant environmental and/or health concerns of their own. This does not imply an endorsement by CHEJ or EHSC of any materials listed. We do believe, however, that the materials listed offer an improvement over PVC. For any material, there are advantages and disadvantages and we would encourage you to thoroughly research all purchasing decisions.

bottles (GRRN 2004a: To view their list online, go to http://www.grrn.org/pvc). The market share of PVC for containers has steadily declined to about 2% of all bottles sold (Anderson 2004). The mostly widely used PVC-free alternatives for plastic bottles are high density polyethylene (used for milk products and almost all personal and household care products) and PET (used for most beverages and vegetables oils, for example).

Toys and Other Consumer Products

Greenpeace has established a Website that provides information on PVC alternatives for more general con-

sumer items, including toys. This site includes a toy-company report card that rates companies on a scale of 1 to 5, from being completely PVC-free to refusing to change policies or provide information (Greenpeace 2003, Greenpeace 1997: http://archive.greenpeace.org/comms/pvctoys; a more recent 2003 version can be found at http://www.greenpeaceusa.org/features/details?item_id=526899). It is worth visiting each site as they both contain unique information. Greenpeace also has issued a report on worldwide PVC restrictions that includes a list of companies, by country, that have made a decision to phase out the use of PVC in their products (Greenpeace 2001: http://archive.greenpeace.org/toxics/reports/restrictions.pdf).

Automobiles

Many automobile makers are beginning to find and implement alternatives to PVC. General Motors, the world's largest auto manufacturer, was the first to make a public statement of its intention to stop using vinyl. GM planned to end the use of PVC in car interiors by 2004, cutting total PVC use by 30% (CCC 2004: http://www.cleancarcampaign.org/pvc_elvbackground.shtml). Also, other automakers, while remaining less public, have taken similar steps. Daimler Benz has not used PVC for interiors or undercoating in Mercedes autos since 1995 and Honda said they would gradually replace PVC in interiors by 2003 (Greenpeace 2001). Pontiac has found a unique way of applying polyolefin skin for full instrument panel design, instead of PVC. Likewise, Mitsubishi has substituted polyolefins in its instrument panels and door trimmings (Greenpeace 2001). According to the Clean Car Campaign—a national campaign coordinated by state, regional and national environmental organizations promoting a clean revolution in the motor vehicle industry—Volvo, Nissan, Toyota, and BMW are all using alternative materials to PVC in various applications and to varying degrees (Singhofen 1997). And according to the Greenpeace Review of Restrictions and PVC-Free Policies Worldwide, "Ford world-wide has set itself and its suppliers the ambitious target to eliminate applications of PVC by the 2006 model year" (Greenpeace 2001).

Appendix A to this report lists some common products available on the market that may contain PVC, including which products are bottled or packaged in PVC containers. Used with the resources reviewed above, consumers can easily leverage this knowledge to identify and replaced their purchases of PVC with safer alternatives. Also available is a list of specific products packaged with PVC (GRRN 2004a: http://www.grrn.org/pvc).

PVC Alternatives are Affordable

The following section on the affordability of replacing PVC with safer alternatives was derived primarily from the report "The Economics of Phasing Out PVC," written by Frank Ackerman and Rachel Massey of the Global Development and Environmental Institute, Tufts University, December 2003 (Ackerman 2003). This section was adapted from the above report with permission of the authors. The references used by the authors are cited in the original report which can be found in its entirety at www.ase.tufts.edu/gdae/Pubs/rp/Economics_of_PVC.pdf.

The serious health and environmental impacts caused by the production, use and disposal of PVC raise two important economic policy questions.

1) Are there affordable alternatives to replace most uses of PVC?
2) What would be the economic impact on society if PVC were phased out?

The Tufts University Global Development and Environment Institute addressed both of these questions in their recent report *The Economics of Phasing Out PVC* (Ackerman 2003). This report found that alternatives to PVC do exist and that PVC does not offer enormous economic advantages over other materials.

PVC-free alternatives are already competitive in the market place. The Tufts researchers found affordable alternatives available in every commercial and institutional PVC market they evaluated, including pipes, roofing materials, flooring, medical gloves, siding and windows (Ackerman 2003). Because PVC is found in so many products, the alternatives also widely differ depending on the product. The estimated costs of phasing out specific PVC products will likewise differ from one product market to the next. Many manufacturers and suppliers have been identified who currently sell cost-comparable alternatives to PVC used in medical bags and tubing, office supplies and building and construction materials.

The Tufts report concluded that a PVC phase-out is achievable and affordable and that it would not place a large burden on the economy. The study finds that the advantages of PVC are often overstated, that PVC is not substantially cheaper than many alternatives, and that alternatives providing equal or better performance are available for almost every use of PVC. In some cases, the costs of the alternative materials are already comparable to PVC when costs are measured over the

useful life of the product. In other cases, the alternatives are slightly more costly in today's market, though they are likely to come down in cost as their market share expands. There are "good reasons to expect the costs of alternatives to decline over time." The report also found that the continued use of PVC offers small short-term gains in some areas, and none at all in others.

The Costs of Replacing PVC: Three Studies

The Tufts report identified three detailed studies, all published in the mid-1990's, which estimated the costs of phasing out PVC. All three studies found PVC to be only modestly cheaper than the alternatives. The first study, conducted by the U.S.-Canada International Joint Commission (IJC) for the Great Lakes, examined the cost of phasing out PVC as part of its 1993 "Strategy for Virtual Elimination of Persistent Toxic Substances." This report was written for the IJC by a Canadian consulting firm, the Hickling Corporation, and updated in 1994. Charles River Associates (CRA), a U.S. consulting firm under contract to the Chlorine Institute, conducted the second study. This report, which was prepared in response to the IJC report, provided an economic analysis of the benefits of chlorine and related chemicals and included an analysis of PVC. The third study, conducted by Environment Canada in 1997, evaluated the options for replacing chlorine-based products and included a detailed look at the alternatives to PVC (Ackerman 20003a).

Each of these studies evaluated many specific uses of PVC and compared the prices of PVC products to their PVC-free alternatives. Environment Canada created two sets of price comparisons: a low cost case based on the least expensive available alternative and a high cost case based on higher-priced alternatives. Table 12 provides a summary of the estimated costs of replacing PVC made in each of these three studies. The table shows the cost increase that would result from switching to PVC-free alternatives, expressed in dollars per pound of PVC produced (updated to 2002 prices) for each study. Cost estimates are shown separately for pipes and for all other products since pipes represent about half of all PVC use. The pipe and non-pipe figures in Table 12 were averaged to obtain a rough estimate of the total cost of replacing PVC.

According to the Tufts report, this table shows that there was a remarkable degree of agreement between the Hickling and CRA studies. These studies found nearly identical average costs for replacing PVC—$1.07 to $1.15 per pound. The Environment Canada low estimate had an average cost of about half this much, due to its lower estimate for pipe costs. For the non-pipe uses of PVC, there also was fairly good agreement between CRA, Hickling and the Environment Canada low estimate ($0.87 to $1.10 per pound). The data shows that PVC is only modestly cheaper than the alternatives. The Environment Canada study, which included the full cost of installation, found alternative materials would cost just 6% more than vinyl, and building a PVC-free home would increase the cost of a home by just 0.4 percent—increasing the cost of a $150,000 home to $150,600 (CIS 1997, Thornton 2000).

Factors Favoring Phase-Out of PVC

According to the Tufts report, cost estimates such as those made by Environment Canada, based on current market prices, tend to overstate the economic benefits of PVC. Four reasons were given for this conclusion.

1) Life Cycle Costs Often Favor Alternatives.

Some of the alternatives have higher initial purchase prices than PVC products, but are actually less expensive over the useful life of the product. The total cost

Table 12

The Cost of Replacing PVC

US dollars per pound of PVC (2002 prices)

	CRA (industry)	Hickling (for IJC)	Environment Canada Low	Environment Canada High
Pipes	$1.43	$1.03	$0.15	$0.33
All other uses	$0.87	$1.10	$0.94	$3.84
Average	$1.15	$1.07	$0.55	$2.08

Average is the unweighted average of pipes and "all other uses."
Hickling data excludes windows.

Source: Ackerman 2003

over a product's life cycle is the cost that ultimately matters to the user. For example, the maintenance and repair costs for some building materials, such as flooring, can be the largest cost of a product's life cycle. In such cases, the lowest maintenance product is often the cheapest on a life cycle basis, regardless if it has the lowest purchase price. In this example, PVC or vinyl flooring is the cheapest option for commercial and institutional flooring on an initial cost basis, but among the most expensive options on a life cycle basis. When full life cycle costs are taken into account, PVC flooring loses out to alternatives that may have a higher initial price but last longer and are more easily maintained (Ackerman 2003).

The Impact of a PVC Phase-Out on Jobs

The Tufts report examined the impact that phasing out PVC would have on jobs. Using data provided by the Alliance for Responsible Use of Chlorine Chemistry (ARCC), they estimated that there are approximately 126,000 workers in PVC fabrication plants and approximately 170,000 workers at chlorine-producing and chlorine-using chemical plants in the U.S. However, most of the chlorine workers are in non-PVC related chlorine sectors such as paper mills, pesticides, and solvents. The Tufts researchers estimated that only about 9,000 of the 170,000 workers were employed in the production of vinyl chloride monomer (VCM) and PVC resin.

The Tufts report identified 12 operating VCM plants in the U.S. as of 2000, with a capacity to produce 17.4 billion pounds of VCM. According to the report, seven of the facilities that account for more than half the capacity were jointly located with PVC plants owned by the same company. The report also showed that as of mid-2003, ten companies produced 15.8 billion pounds of PVC resin at twenty locations in the U.S. Three other plants were idled by the recession with an additional capacity of 1.2 billion pounds.

The Tufts report suggested that replacing PVC with safer alternatives will change some of these jobs: from fabricating PVC products to fabricating the same products from other materials, most often other plastics; or from making vinyl chloride and PVC resin to making safer substitutes. However, the alternatives are likely to require about the same total employment as production of PVC. In some cases, the same workers who currently make PVC products will be employed making products from PVC alternatives (Sources: Ackerman 2003 and Ackerman 2003c).

2) Mass Production Reduces Costs.

Most products are cheaper when they are produced in large quantities. Costs typically drop as production volume increases. Currently, the advantages to mass production favor PVC, as many PVC products are produced in huge volumes. However, the production of the alternatives could likewise grow in volume in the future, making them less expensive and more competitive than they are at present. There are also learning curves that affect costs over time. As an industry gains experience with a production line, "bugs" are worked out, process improvements develop, and maintenance procedures and schedules are improved. All of these factors help to reduce costs.

3) PVC Products Endanger Their Users.

As previously discussed, the harmful effects of PVC are sometimes felt by the users of the products. For example, plasticizers in flexible PVC products such as children's toys can leach out of the product during use posing health hazards to users (see Chapter 3).

4) Environmental Protection Costs Are Routinely Less than Anticipated.

History has shown that the actual costs of compliance with environmental standards are often lower than the originally predicted costs. One of the best examples of this occurred in the PVC industry in 1974 when the Occupational Safety and Health Administration (OSHA) established a strict standard for workplace exposure to vinyl chloride, the raw material used to produce PVC. When this standard was proposed, the vinyl industry claimed that the costs of compliance would be in the "billions" and that the industry might shut down. Instead, actual costs were only a fraction of the original estimates primarily because the industry developed new

cost effective technologies to comply with the regulation. Other studies have confirmed this pattern of overestimating compliance costs (Ackerman 2003b).

In summary, the Tufts report concluded that a "PVC phase-out is achievable and affordable. The alternatives are increasingly well known and well developed, and in many cases are already cost-competitive with PVC. It is realistic and practical to build health and environmental considerations into materials choices for municipal infrastructure, commercial and residential buildings, medical supplies and consumer products. The cost impacts of substitution will be modest and will grow smaller over time" (Ackerman 2003).

IX TAKE ACTION
Preventing Harm from PVC Use and Disposal

RECOMMENDATIONS

- Policy makers at the local, state and federal level should enact and implement laws that steadily reduce the impacts of PVC disposal and lead to a complete phase-out of PVC use and waste incineration within ten years.
- A new materials policy that embraces aggressive source reduction of PVC should be adopted to steadily reduce the use of PVC over time.
- Federal and state waste management priorities should be changed to make incineration of PVC waste the least preferable disposal option.
- In the interim, any PVC waste generated should be diverted away from incineration to hazardous waste landfills.
- Consumers should take personal action to buy PVC-free alternatives and to remove PVC from their trash for management as household hazardous waste.
- Communities should continue to organize against PVC-related dioxin sources such as waste incinerators while working to promote safer alternatives.

Personal and political actions must be taken to prevent harm to human health and the environment from the use and disposal of PVC. If we don't burn PVC, the formation of dioxins and other toxic by-products of combustion will be prevented. If we can reduce the flow of PVC to landfills, leaching of toxic additives will be avoided. If we promote and purchase safer alternatives to PVC whenever they are available, then toxic pollution will be prevented throughout the PVC life cycle.

Making Choices: A New Materials Policy for PVC

When solid waste experts in the U.S. first established meaningful management goals about fifteen years ago, there was universal support for source reduction as the top priority (USEPA 1989). Table 13 shows the priorities established by the USEPA for the most environmentally sound strategies for managing solid waste. Source reduction is the top choice. It means taking action to avoid or prevent waste from being generated in the first place. In keeping with this philosophy, the first priority in managing PVC waste should be to avoid making it or using it in the first place.

We should adopt a universal policy and practice across the country to avoid the purchase or use of PVC whenever possible in order to prevent waste management problems before they start. We need to dramatically

Table 13

National Priorities for Solid Waste Management

Highest Priority	SOURCE REDUCTION	Includes Reuse
Middle Priority	RECYCLING	Includes Composting
Lowest Priority	DISPOSAL	Includes both Combustion and Land Disposal

Source: USEPA 2004d, USEPA 1989

and steadily reduce the amount of PVC waste produced through a source reduction strategy that targets PVC-containing products.

The second best option, if generating waste can't be avoided in the first place, is to reuse, recycle and compost the wastes. With PVC waste, this is not an option. Most PVC products cannot be reused or recycled, and definitely will not compost. What is the best option for PVC waste after source reduction and recycling? The answer lies in defining what ultimate disposal strategy is preferred once PVC waste has unavoidably been generated.

Federal solid waste policy fails to express a preference between waste disposal in incinerators or in landfills, treating each as equally usable options (See Table 13). Consistent with this lack of judgment, the USEPA has failed for over 12 years to finalize its reassessment of the health risks from exposure to dioxins. In addition, the USEPA has failed to take aggressive action to prevent dioxins and other toxic pollutant releases at their source, such as working to reduce PVC use and disposal.

Some states have chosen incineration as their top waste management option, favoring even dirty mass burn facilities over landfill disposal. For example, as shown in Table 14, under Maine state law, waste incineration is preferred over landfill disposal (MRSA 2004a). The State of Maine, in turn, burns the highest proportion of its waste (after recycling) of any state in the country (see Table 7 in Chapter 5).

By favoring waste incineration, such policies encourage the continuous formation of dioxins and other toxic air emissions, and the generation of toxic ash requiring land disposal. The burning of PVC in municipal solid waste releases dioxins and toxic additives. Land disposal, on the other hand, minimizes dioxin formation by avoiding intentional combustion, although some highly polluting landfill fires are unavoidable. Land disposal additives in PVC will leach and eventually contaminate groundwater. However, this is also true for incineration, since a large amount of dioxin and metal-laden incinerator ash also requires land disposal.

We believe that a new health-based materials policy is needed to reorder current federal and state priorities for waste management. Such a health-based policy should be designed so that the greatest effort is invested in the highest priority options as shown in Table 15. We propose a new set of priorities for PVC waste management that are based first and foremost on targeted source reduction steps that will prevent the creation of PVC waste in the first place. This strategy aims to aggressively and continuously replace the most hazardous uses of PVC with safer alternatives whenever available.

These source reduction steps include immediate action

Table 14

The State of Maine's Waste Management Policy Favors Incineration Over Landfill Disposal

Highest Priority	SOURCE REDUCTION	Includes reducing both the amount and toxicity of the waste
2nd Priority	REUSE	
3rd Priority	RECYCLING	
4th Priority	COMPOSTING	Of biodegradable waste
5th Priority	INCINERATION	And other waste processing which reduces waste volume
Lowest Priority	LAND DISPOSAL	

Source: MRSA 2004a

Table 15

Proposed Priorities for PVC Waste Management

Highest Priorities	Step # 1 - SOURCE REDUCTION	Ban disposable PVC bottles, containers and packaging.
	Step # 2 - SOURCE REDUCTION	End the use of lead and cadmium in all PVC products.
	Step # 3 - SOURCE REDUCTION	Phase out all disposable, non-durable uses of PVC.
	Step # 4 - SOURCE REDUCTION	End the use of PVC products containing phthalates.
	Step # 5 - SOURCE REDUCTION	Phase out PVC uses that are vulnerable to fire hazards, e.g., in building materials and cars.
2nd Highest Priority	EXTENDED PRODUCER RESPONSIBILITY	Require manufacturers to finance the "take-back" and safe management of PVC products at the end of their useful life.
3rd Priority	REUSE AND RECYCLING	Achieve the low potential to recycle bulk PVC waste into the same type products.
4th Priority	LAND DISPOSAL	In the interim, divert any unavoidable PVC waste away from incineration for disposal in hazardous waste landfills.
Last Option	INCINERATION	Ban open burning and incineration of any waste containing PVC

to end the use of PVC bottles and packaging. Other source reduction targets would include short-lived disposable PVC products and those that contain lead, cadmium and phthalates. Fire-vulnerable uses of PVC in buildings and vehicles should be replaced with safer alternatives. To avoid toxic by-products generated during structural fires, vinyl siding, roofing and window frames among other uses, should be replaced with safer alternatives.

This health-based materials policy would favor land disposal over incineration only temporarily and only for legacy waste from the stock of current PVC in use and any other unavoidable PVC waste. This waste would be managed by land disposal in a hazardous waste landfill.

A new materials policy for PVC defines incineration as the least favorable waste disposal option. We need to create effective systems to collect and divert PVC in the waste stream away from incineration. PVC should be actively managed as a serious problem waste akin to handling household hazardous waste (or other non-hazardous problem wastes like propane tanks or latex paint). This would mean educating consumers to identify PVC waste and separate it from the waste stream. As an interim practice, PVC should be diverted away from incineration for collection and transfer to a triple-lined "secure" hazardous waste landfill. With time, after PVC has been replaced with safer materials, the need to divert PVC to landfills would diminish.

Our vision for managing PVC waste is positive. We promote safer alternatives to PVC that are effective, affordable and available now. Alternatives that exist for most uses of PVC are able to do the job well at a cost that is comparable to PVC. Substituting safer materials for PVC is consistent with principles of clean, sustainable production (see Chapter 8).

To realize steady progress on the path to a PVC–Free Future, many personal and political actions by many people will be necessary.

Personal Steps

Taking personal responsibility for preventing harm from PVC is an important place to begin. Here are some key actions you can take as a consumer and contributor to generating household PVC waste.

1. Identify PVC Products.

Look for the "# 3" or the letter "V" inside the plastic recycling symbol (or sometimes beneath the recycling symbol) on the bottom of bottles and on clear plastic packaging such as blister packs. The # 3 and the letter V indicate that the plastic is made from PVC. Also, look for the words "PVC" or "vinyl" on the product (e.g., plastic pipe) or on its packaging. You will need to use other strategies to identify PVC products that are not labeled. Does the unlabeled soft plastic, such as the skin on a 3-ring office binder or a shower curtain, have that "new car smell" of chemicals? If so, it's probably vinyl and you're breathing phthalates, a PVC additive. Check the PVC product listing in Appendix A for likely suspects. You can also call the company and ask them whether they use PVC. If they do, ask them to switch. If they don't, thank them for being environmentally conscientious.

PVC V vinyl

2. Buy and Promote Safer Alternatives.

Search for and purchase non-PVC alternatives (see Chapter 8). Always avoid PVC bottles and plastic wrap (e.g., Saran Wrap). Consult Internet resources on PVC-free alternatives for office supplies, medical supplies, toys and building materials (see Chapter 8). Educate others about PVC hazards. Promote safer alternatives in your homes and business, with your friends and neighbors. If the best alternative is a plastic, look for the cleaner plastics, such as polyethylene (# 4 or # 2) or polypropylene (# 5) (See Figure 4).

3. Start Collecting PVC.

Don't toss PVC in the household trash, especially if your garbage is incinerated (see Table 7 to see if your state relies heavily on burning its waste). Put the PVC aside in an enclosed cardboard box and/or garbage bag away from the sun and possible ignition sources. See how much PVC you can salvage and segregate from the waste stream. Every bit of PVC diverted away from incineration will prevent some dioxin formation.

4. Ask the Manufacturer to Take it Back.

If you can identify who made the product containing PVC, bundle it up in a secure cardboard box and mail it back to the Chief Executive Officer of the product manufacturer (search the Internet for the address of the corporate headquarters and the CEO's name). Enclose a polite note asking that they take personal and corporate responsibility for safely managing this problem material at the end of its life. Tell them you won't buy any more of their products until they make the switch to PVC-free manufacturing. Warn them not to burn it. Ask them to dispose of it at a hazardous waste landfill or to securely store the PVC unless they can recycle it for high value uses. Ask for a written response.

5. Dispose of Your Collected PVC as You Would Household Hazardous Waste.

If you have too much PVC waste to mail back, ask that your community household hazardous waste collection program accept PVC plastic for secure hazardous waste land disposal, not for incineration. Explain the reasons why PVC is a serious problem waste. Encourage others to separate and divert PVC away from incineration.

Community Action: People, Voices and Communities

Being a PVC-free consumer is not enough. The real power needed to adopt a new health-based materials policy for PVC lies in the number of people involved. When friends and neighbors work together to organize their community to take action, major changes can occur. Grassroots action by community groups around the country has already stemmed the damage from PVC use and disposal. Medical waste incinerators are rapidly being replaced due to community-based campaigns that promote non-incineration alternatives (see case studies in Chapter 5). Few new municipal waste incinerators have been sited in the last ten years due to environmental health concerns and community opposition.

CASE STUDY

Intimate Brands Responds to 6,000 Consumers and Stops Using PVC

Greenpeace and the Center for Health, Environment and Justice (CHEJ) teamed up in 2001 to launch a consumer campaign against a major beauty supply company who distributed products packaged in PVC containers. The Victoria's Dirty Little Secret campaign successfully targeted Intimate Brands, the parent company of Victoria's Secret and Bath & Body Works, who agreed to phase-out PVC containers from their product line by the end of 2003 after receiving 6,000 faxes, phone calls, and postcards in one month.

Organizers launched the campaign at an Eco-Conference held annually on college campuses, distributed flyers and postcards, and posted an action alert allowing Website visitors to fax a letter or send a postcard directly to Intimate Brands. The company initially responded by sending defensive letters to the individuals that wrote to them. However, as more letters continued to come in, they took the demand more seriously. In February 2002, they met with representatives from CHEJ and Greenpeace and presented a plan to phase out the use of PVC bottles in both their Victoria's Secret and Bath & Body Work's line. PVC bottle production would stop by 2003 and by 2005 all PVC bottles would be out of circulation. The effectiveness of this campaign is a testimony to the positive changes that can be made when people come together and pressure companies to put safety first (Source: Lester 2003).

Community action has also repeatedly changed national waste policy from the grassroots up. Join with your friends and neighbors to make a difference. Join a local group or start a new one to take action against dioxin sources such as incinerators, backyard burning, landfills, biomass plants or building fires where PVC use and disposal release toxic chemicals into the environment. For referrals and how-to tips, contact the Center for Health, Environment and Justice (www.chej.org).

Organizing To Win Around Issues on PVC

Every day, people facing threats to their health and environment speak out about PVC problems. They look for proof that a landfill leaks, or seek to undertake a health study to link emissions from an incinerator to cancer, or find evidence that a polluting company has a bad environmental record. However, simply speaking the truth about landfills, incinerators, toxic products or previous violations won't stop the poisoning of our bodies and the environment.

The truth is only a start. In order for things to change, the truth has to be understood by a large group of people who then use this knowledge to fuel their efforts to win justice. The truth won't stop the poisoning, but mobilizing and organizing will.

According to Webster's dictionary, organizing is "uniting in a body or becoming systematically arranged." Organizing to protect our communities from environmental harm means pulling together a large enough, diverse enough, active enough group of people to convince corporations and the government that they have to stop making people sick with toxic chemicals.

Organizing is how we restore the balance between the rights of people to safe products and healthy communities, and the rights of corporations to profit. We will never have as much money as the corporate polluters. We will never be able to afford their Madison Avenue media campaigns or their twenty-four hour access to elected officials. But we can build our own power to overcome their influence. We can do this by organizing to demonstrate the strength of our numbers and the righteousness of our demands.

Successful organizing happens when a group of people find visible ways to use the truth to wake up the conscience of a larger group. In an era when politics is defined by scandals and sound bytes, organizing can remind the American people that political life is supposed to be about self-government, justice and the common good.

After years of doing it, we've come to the conclusion that organizing is more of an art than a science. At the same time, there are some basic rules for organizing that usually hold true. These rules aren't always applicable, but they are right often enough that you should consider them if you start to get organized around an environmental issue in your community.

Basic Organizing Rules

Power determines the outcome.

If two or more groups care about an issue, and one of them has a lot more power, that group will get what it wants, no matter what the facts are or who will be hurt.

Our power comes from people, while corporations and government's power comes from money.

Communities need to use strategies that depend on people's creativity, courage and caring. The corporations and government will use strategies that depend on things that can be paid for, like experts and lawyers.

Polluters and government agencies write the rules so they can win using experts and lawyers, which are their strength.

You can assume going in that if you play exactly according to the rules of their game, you will lose most of the time, whether you are at the slot machines in Atlantic City or the hearing process of your state environmental agency. Create your own rules instead.

To win, communities will have to work harder than polluters and government agencies do.

Polluters and agencies are doing what they do because they are paid to. They've done it before, and they know most of the facts before the fight even starts. You are opposing them because you believe your health and your community are at risk. This gives you an unmatched motivation for working harder than they do.

These rules may seem harsh and they are. And sometimes things turn out to be easier than these rules would lead you to expect. But when your community is at stake, it's important to start out vigilant, alert and ready to face the challenges ahead.

Experience has taught us that organizing isn't easy. Recognizing this should help you to be forgiving of each other and ourselves. We are trying to build a democratic society without adequate blueprints and models, so our trial-and-error method has to leave room for experimentation and mistakes. And recognizing how necessary organizing is should help you to be inclusive and persistent. There are no magic facts. There are no perfect heroes to give perfect speeches that will convince the polluters to stop polluting. There is only the dogged determination of people working together to protect their own health, their families' health and the health of their communities. This is why we organize. (See below for "Ten Simple Steps To Organizing.")

Mobilizing vs. Organizing

What is the difference between mobilizing and organizing? Take the 2004 protests in New York City around the Republican Convention. There was a large mobilization—demonstrations that brought out over 800,000 people—and various targeted actions. The main goal was to influence the results on Election Day and get people to understand the issues.

Mobilization is a thing that good organizers do. Mobilization is getting people together, moving people out. It's bringing people in to do an action. It's using everything including phone calls, personal visits and handing out fliers to bring a certain level of consciousness to the community. When trying to change policy and public opinion and purchasing choices, you need to use both organizing and mobilizing.

As a result of a mobilizing initiative, you will likely find people who will join your organization and build your organization's base. However, most people who are mobilized are not likely to join but their voice/presence in an activity increases your power for that moment. You are not likely to know how folks got to the mobilizing activity. Maybe they saw it listed on the internet at MoveOn.org or received an e-mail flyer, or a friend agreed to have dinner with them afterwards if they met at an event.

In organizing, leaders understand how people got there. For an organizer it would be important to have 100 people at a demonstration and to know exactly how those people got there. You know which leaders talked to people and can talk to them again, not just for this one event, but maybe for another campaign. Think about how to use mobilization opportunities to move your issues and to identify new members for your organization.

Ten Simple Steps To Organizing

1. Talk and Listen

If you are one, two or three individuals without an organization, you'll need to talk with other people in your community to build a group. If you are already part of an organization, then your next step is to talk to the people in your organization about initiating a campaign around a PVC issue in your community. Brainstorm a list of groups and individuals whose interests are most directly affected by PVC, then determine who you need to talk with first. Who are the people that are most directly affected? Who are the leaders in that neighborhood? What other organizations are involved in protecting the community's health? You can work out the answers to these questions in a brainstorming exercise at an early meeting of your group. Brainstorm a list of the groups of people whose self-interests are most directly affected, then figure out who has contacts with these groups or individuals.

2. Create and Distribute Fact Sheets

Create an attractive, easy-to-read and accurate fact sheet to educate the community about the problems and how these problems relate directly to their lives. A simple one-page fact sheet will serve the purpose.

3. Recruit Hundreds, One At A Time

Recruiting will help you build the relationships, resources and critical mass to act effectively for change. Reach out to a wide range of local groups to build the broadest possible coalition. It will be much more difficult for decision-makers to ignore your concerns if your campaign represents a wide cross-section of your community. All recruiting is a form of door knocking. If you are trying to organize a neighborhood, the doors line the streets. If you are trying to build a different kind of group or coalition, the doors may spread all over town and you may need appointments to open them. There are several ways to make knocking on doors easier. First come up with a 'rap'— "I am..." "We are..." "This is..." "We want..." "You can..." Also, consider circulating a petition. Not only will the petition help you get the names and addresses of community supporters and show community support to those in power, it also begins the process of getting the people you're talking with involved in the issue. Make sure to listen closely to the concerns of the people you are talking with and link the PVC problem to their interests and concerns.

4. Hold Meetings That Make People Want to Come Back and Bring Their Friends

People will come to a meeting if:

- They have made a commitment to come
- They have a role or responsibility in the meeting
- They have an immediate and specific self-interest in the work of the organization
- They have past, positive experiences with similar meetings

To have a successful meeting, your recruitment efforts must satisfy the first and third of these conditions. The second and fourth conditions will depend on how you run the meeting. There are several different kinds of meetings to suit different purposes.

House Meetings - This is the kind of meeting many groups hold when they are first forming. The meeting is held at a member's house and the style is informal. One of the biggest benefits of this kind of meeting is the greater comfort level among members.

Planning Meetings - Leaders or other key decision makers within the group get together to set their agenda, review the work that's been done and plan activities. Planning meetings should not be decision-making meetings, but rather they should establish the agenda and process by which decisions will be made at a general membership meeting or define a plan to carry out an activity that has already been decided upon by the membership.

General Membership Meetings - These meetings are important to ensure that all members of the organization share the responsibility for decision making and carrying out the activities of the organization. The time and location should always be chosen to accommodate the maximum number of people. The meeting should always start with an agenda and when possible, get the agenda out to people prior to the meeting in the form of a flier (this will also serve as a reminder for the meeting). Make sure you pass around a sign up sheet to collect names and addresses to contact people who attended in the future.

People will come to the next meeting if they enjoyed the first one, if it started and ended on time and wasn't a bore, if it produced concrete results, if it was lively and exciting, and if it delivered what was promised.

5. Set Goals

It is critically important to have long-term, intermediate and short-term goals to help members understand where they are going and the steps they have mastered along the way. Ask yourselves: What do we want? What is your bottom line? Do you want to pass a local or state law that bans PVC products where alternatives are available? This could be your long-term goal.

Next identify different strategies and tactics that will lead you to your goal such as getting your city or county council to pass a resolution to phase out all PVC products where alternatives are readily available. This could be your intermediate or short-term goal.

6. Identify Your Targets

Once you've identified what it is that you want, the next step is to identify who can give it to you. Pinpoint the actions and the people that have the power to help you reach your goal. The people who impede the achievement of your goal are often referred to as the targets of the campaign. This does not mean that they are evil or bad. It simply means that because they have the power to give you what you want, it makes sense to focus your attention and actions on them. The target of your campaign must always be a person or persons. You can't fight City Hall because City Hall is a building, but you can target the person with the power at City Hall to get them to act.

To help your group identify your targets, answer these three questions.

- Who is responsible for the situation you want to change?
- Who can make the changes you want to happen?
- How can you convince them to act on your issue?

7. Research Is An Essential Tool

Research is a tool, not an end product. You need to do research to gather enough information to achieve your goals, not to know absolutely everything there is to know. Research should tell you who has the power to give you what you want and should help you figure out what arguments your targets will probably use against you. Once you know this, you can create counter arguments. This report will give you some of the information you need, but you need to undertake the local research related to the problem that you want to address.

8. Take Direct Action

An action is any step you take to advance your group's goals. Petitions, letter-writing campaigns and educational meetings are all actions that advance your group's goals. A direct action is the most dramatic type of action, involving confrontation and demands. Direct action begins after your efforts at education, information sharing and persuasion are ignored. Use direct action when your group is ready to confront a decision-maker with its frustrations and to make specific demands. Direct actions move your organization outside the established rules for meetings and discussion. It takes your group into a forum in which you make the rules and where elected representatives and corporate executives are less sure of themselves and how to handle the situation. A direct action often provides the necessary pressure to force your target to act on your group's issue.

9. Target The Media

Who are the media decision-makers who need to be convinced that your story should be covered? What will it take to convince them? In most media outlets, the decision-makers are the editors, and the way you get to them is to spoon-feed them a story they can use without much work. It is important to develop a media strategy for your campaign that you can constantly refine and develop. But don't be fooled into believing that the media is the only way to get your story out. Keep creating your own media through fact sheets, cable access television programs, newsletters, call-ins to radio talk shows, letters to the editor, statements at public hearings, barbecues, rallies, auctions, concerts and videotapes.

10. Celebrate The Victories And Keep Applying Pressure

Savor the victories no matter how large or small. A meeting with the City Council is a small victory and a resolution to stop purchasing PVC is a larger victory. Celebrate all victories because it helps members to see that you are moving forward and are winning. No one wants to join a loser organization.

Policy Action

While personal steps are critically important, community action is a must. But neither are enough. The personal should also be political. Unless the system that unduly relies on hazardous materials like PVC is changed, then green consumerism and green behavior will remain a minor movement of the privileged few. Unless many community-based organizations join forces, large-scale systemic change will be slow in coming.

strictly prohibited everywhere as the country's major uncontrolled source of dioxin pollution. However, a statutory ban will not be effective without educating people about the hazards of PVC and simultaneously working aggressively to reduce the toxicity of the waste stream. People burn their waste to avoid real costs and inconvenience, and out of cultural habit and practice. People need to know the truth about PVC and waste burning in order to overcome their resistance to change.

2. Educate the Public About PVC Hazards. Conduct a well-funded public education campaign that targets PVC as a serious problem waste that especially threatens public health when burned, but also creates health and environmental risks when disposed of in a landfill. Use a hard-hitting approach that holds the chemical industry responsible for the impacts of open burning and for selling a material that releases toxic additives and by-products. Model the campaign along the same lines as the anti-tobacco industry ads that work to reduce teenage and adult smoking. The educational campaign should sell PVC-free solutions as it persuades people to halt the backyard burning of trash.

Table 16

A PVC-Free Policy Action Agenda

Accomplish Within Three Years

1. Ban all open waste burning.
2. Educate the public about PVC hazards.
3. Ban the incineration of PVC waste.
4. Collect PVC products separately from other waste.
5. In the interim, divert PVC away from incineration to hazardous waste landfills.

Accomplish Within Five Years

6. Establish our Right-to-Know about PVC.
7. Label all PVC products with warnings.
8. Give preference to PVC-free purchasing.
9. Ban use of PVC in bottles and disposable packaging.
10. Ban sale of PVC with lead or cadmium.

Accomplish Within Seven Years

11. Phase out other disposable PVC uses.
12. Phase out other high hazard PVC uses.
13. If safer alternatives are not yet available, extend the PVC phase-out deadlines for specific uses.
14. Fund Efforts to reduce the amount of PVC generated through fees on the PVC content of products.

Accomplish Within Ten Years

15. Phase out remaining durable PVC uses.
16. Decommission municipal waste incinerators in favor of zero waste plans.

Here are a number of action steps that government at the state, local and national levels must take to phase-out PVC in a timely and orderly manner. Actions that may be successful early on and that establish a foundation for future PVC reductions are listed first in order on the timeline below. These policy actions also give guidance to other decision makers in industry, commerce and institutions about policies that they should embrace to help prevent harm from PVC use. This PVC-free action agenda is summarized in Table 16.

Accomplish Within Three Years

1. Ban All Open Waste Burning. Backyard burning of household trash and other open burning should be

3. Ban the Incineration of PVC Waste. All forms of incineration of PVC waste should be phased out by a certain date. Designate PVC waste as hazardous waste. Develop educational programs and incentives to remove PVC from waste streams destined for incineration. Replace all medical waste incinerators with non-burn technologies for waste that needs to be disinfected and send the disinfected residue to a "secure" landfill. Develop a workable timeline to ban the incineration of PVC in municipal solid waste.

4. Collect PVC Products Separately from Other Wastes. Award grants and publicize new programs to support PVC waste separation and collection. Identify

CASE STUDY

PVC Identified as Household Hazardous Waste

In its Plan for the Statewide Collection of Household Hazardous Waste, the State of Maine identified PVC as a problem waste that should be separately collected and, if not recycled, then diverted away from incineration to landfill disposal. Although household hazardous waste remains exempt from regulation, collection programs are being expanded in Maine and elsewhere to encourage residents to turn in old hazardous products for safe management rather than tossing them in the trash. In addition to spent paint thinner, old pesticides, mercury products and other toxic household waste, the Plan targets PVC, latex paint and old propane tanks as problem wastes requiring special collection and management. Efforts are underway to establish a reliable means of funding the operational costs of household hazardous waste collection so that this plan can be fully implemented in Maine (Source: MDEP 2001b).

CASE STUDY

San Francisco Bay Area Adopts Dioxin-Free Purchasing Policies

The San Francisco Bay Area is leading the nation in preventing dioxin pollution by passing Dioxin Resolutions in Oakland and San Francisco and establishing dioxin-free purchasing requirements for local governments. The resolutions grew out of a grassroots campaign to shut down the last commercial medical waste incinerator in Oakland, one of the largest sources of dioxin in the Bay Area. A diverse coalition of environmental, environmental justice, health-impacted groups, labor representatives, and local government officials worked together to shut down the incinerator in 2001. In the process, they convinced local governments to pass dioxin resolutions and establish a Bay Area Government Task Force to implement resolutions that will:

- Promote dioxin pollution prevention practices;
- Use less toxic, non-chlorinated products and processes, such as chlorine-free paper and PVC-free plastics;
- Urge health care institutions to phase out PVC products;
- Work with other local governments to convene a Regional Task Force to identify sources of regional dioxin pollution and develop prevention strategies; and
- Pursue dioxin reduction practices that do not cause workers to become unemployed (Sources: Greenaction 2001a, CO 1999, CSF 1999).

PVC as a hazardous waste and add PVC waste products to existing programs that collect household hazardous waste, mercury products and other problem wastes for safer management.

5. In the Interim, Divert PVC Away from Incineration to Hazardous Waste Landfills. Clarify waste management priorities for PVC to establish preference for land disposal over incineration due to the formation of dioxin and other toxic by-products. Make the institutional arrangements needed to ensure that PVC waste is disposed of in "secure" triple-lined hazardous waste landfills and diverted away from incineration. Identify opportunities for operators of waste incinerators to remove more PVC waste from the floor of the incinerator prior to waste combustion.

Accomplish Within Five Years

6. Establish Our Right-To-Know About PVC. Require product manufacturers that sell products containing PVC to notify the state of the amount of PVC and the specific chemical name of additives used in individual products, identified by brand name, model and type of PVC use. This information should be made available on-line in a searchable database on PVC products that allows consumers and business people to identify PVC and its ingredients in consumer products and materials. This provides people with the knowledge they need to ask questions and make decisions about safer PVC-free alternatives.

7. Label All PVC Products with Warnings. A meaningful education and PVC diversion program will run head long into the current limits on identifying PVC in the

waste stream. By requiring all PVC products to be labeled, PVC can be more readily separated from other waste and diverted away from incineration. Warnings should encourage consumers to avoid burning PVC products. Labeling will also encourage product manufacturers to switch to safer non-PVC materials to avoid labeling requirements.

8. Give Preference to PVC-free Purchasing. A government procurement policy that establishes as a priority the purchasing of safer alternatives to PVC will harness institutional buying power. Changing the buying habits of various levels of government will help drive the market for PVC alternatives and begin to affect the practices of other institutions in the supply chain that supports government operations.

U.S. Companies Stop Using PVC in Products

Dozens of U.S. companies have stopped using PVC in their products. Some examples are as follows.

- General Motors announced it would phase out the use of PVC for auto interior panels by 2004, informing its suppliers to use alternatives for all new products (CCC 2004).
- Nine toy manufacturers, including International Playthings, Gerber and Brio are phasing out all the PVC in their products (Greenpeace 2003).
- Mattel, Inc., the world's largest toy manufacturer, is planning to phase in plant-based plastics to replace PVC in company products (Greenpeace 2001).
- NIKE, the shoe and sports equipment manufacturer, is phasing out PVC in its products (Greenpeace 2001).
- Helene Curtis eliminated PVC bottles for packaging Suave, and Intimate Brands, a major beauty supply company, is phasing out PVC containers by 2005 (Lester 2003).

9. Ban the Use of PVC in Bottles and Disposable Packaging. These two uses of PVC are the easiest and most compelling to ban outright in the near term. Both represent short-lived uses that become PVC waste soon after purchase. The PVC in bottles contaminates the recycling of the more plentiful and safer PET bottles (# 1 plastic) (see Chapter 7). The market in PVC bottles has already been declining steadily. The growing use of PVC for packaging, such as in clear plastic blister packs, adds disproportionately to the problem of PVC in municipal solid waste. Safer alternatives for both uses are readily available and already in the market place.

10. Ban the Sale of Any PVC Containing Lead and Cadmium. The continued use of these two highly toxic PVC additives presents a serious hazard that has long been recognized by progressive governments. Even the PVC industry has moved to replace some uses of lead and cadmium as stabilizers in their products. For example, the European vinyl industry has set a voluntary goal to phase out the sale of lead stabilizers by 2015 with a 15% reduction by 2005 and 50% by 2010 (ENDS 2004). However, by 2003 only a 5.3 % reduction in lead had been achieved (ENDS 2004). We think the global PVC industry needs to move away from lead much faster. By banning the sale of any new PVC product containing lead or cadmium, policy makers will be acting on strong public health science. Such a ban will further clean up PVC and raise questions about the other additives used in PVC and the hazards of the material itself.

Accomplish Within Seven Years

Priorities for Replacing Specific PVC Uses

1. PVC bottles and disposable packaging
2. PVC containing lead or cadmium
3. Other non-durable disposable PVC uses
4. Other higher hazard PVC uses
5. Other PVC used in durable goods

11. Phase Out Other Disposable Uses of PVC. Non-durable products made with PVC become waste in short order, steadily adding PVC to the municipal waste stream. Separating PVC from the waste stream after it is generated will never be 100% effective. Nor can these collected non-durable PVC products be readily recycled. Therefore, the next phase in directing reductions in PVC usage should focus on replacing the remaining non-durable disposable uses of PVC with safer alternatives whenever they are available, effective and affordable.

12. Phase Out Other High Hazard Uses of PVC. A further priority should target replacement of PVC uses that expose sensitive groups of people to toxic additives and other uses that are vulnerable to dioxin-forming fires. The continued use of vinyl in medical products

Health Care Institutions Move to Phase Out PVC

- Health Care Purchasing: Four top group purchasing organizations that buy supplies for more than 70% of U.S. health care facilities, such as Premier, Inc., established initiatives to reduce the purchasing of medical products containing PVC, mercury and the chemical plasticizer diethylhexyl phthalate (DEHP) (HCWH 2002a).
- Baxter International, Inc., one of the world's largest medical supply manufacturers, is phasing out PVC in its intravenous (IV) solutions containers (Baxter 1999).
- Abbott Laboratories has committed to move toward PVC- and DEHP-free alternatives (Abbott 2003).
- The thirty-seven members of the Maine Hospital Association agreed to continuously reduce the use and disposal of PVC plastic in hospitals as part of a statewide pollution prevention agreement (MHA 2001)

CASE STUDY

Model Policy Action Taken to Phase Out PBTs and PVC

In 2000, the Washington State Department of Ecology (Ecology) developed a groundbreaking strategy to phase out some of the deadliest toxic chemicals in Washington—persistent, bioaccumulative and toxic chemicals (PBTs). Ecology's program has a goal of reducing PBTs such as mercury, dioxin, PBDEs (toxic flame retardants) and PCBs by the year 2020.

Under Washington's PBT strategy, chemical action plans are developed for high priority chemicals. In 2003, Ecology developed a plan to reduce and phase out mercury and the legislature passed a bill to ban certain mercury consumer products. Right now, Ecology is working on a chemical action plan to reduce and eliminate toxic flame retardants (PBDEs), chemical cousins of PCBs that are rapidly rising in the environment, breast milk, orcas and other wildlife.

The Toxic Free Legacy Coalition, led by Washington Toxics Coalition, Washington Physicians for Social Responsibility, Healthy Building Network, WashPIRG, Breast Cancer Fund and People for Puget Sound, is working to ensure the meaningful implementation of legislation and Ecology's PBT strategy.

On a local level, the Toxic Free Legacy Coalition was successful in getting the City of Seattle to adopt a first in the nation purchasing policy to reduce and eliminate the purchasing of products that contain or generate PBTs, including PVC. The hazards of PVC continue to be central to the debate surrounding successful implementation of the Resolution (Source: WTC 2004).

represents a prime example of unnecessary exposure to the additives in PVC products. DEHP, a type of phthalate additive, leaches out of vinyl medical bags and tubing. An infant boy in neonatal intensive care may be exposed to enough phthalates from PVC to pose harm to his developing reproductive organs (Rossi 2001). Examples of PVC uses particularly vulnerable to dioxin-forming fires include automotive applications and building materials such as vinyl siding. High fire hazard uses of PVC should be replaced with safer alternatives.

13. If Safer Alternatives are Not Yet Available, Extend the Phase-Out Deadlines for Specific PVC Uses. A reasonable PVC phase-out policy would make allowance for those few cases where acceptable alternatives are not readily available. In such a case, a temporary exemption could be granted for a scheduled PVC phase-out deadline upon a satisfactory demonstration by a product manufacturer. Further criteria for granting interim relief should consider whether the specific use of PVC is essential to public health and safety or if the available alternative does not work effectively or is much more expensive.

14. Fund Efforts to Reduce the Amount of PVC Waste Generated Through Fees on the PVC Content of Products. Funding will be needed for public education, developing diversion and labeling programs, and to administer an orderly phase-out of PVC products. PVC products should be assessed fees to pay for these PVC reduction programs. That's the fairest approach. Fees should be collected at the product distribution level to avoid the administrative burden of retail fee collection.

Accomplish Within Ten Years

15. Phase Out Remaining Uses of Durable PVC Products. The remaining uses of PVC should be relatively lower hazard uses in longer-lived products that have less chance of accidental combustion or public exposure to toxic additives. These uses should be replaced with safer alternatives as the final priority for the orderly phase-out of PVC. By ending all uses of PVC, the toxic impacts across the life cycle from production to disposal will be prevented.

16. Decommission Municipal Waste Incinerators in Favor of 'Zero Waste' Plans. Within ten years, we should replace the inherently dirty and obsolete strategy of needlessly burning valuable resources disguised as discarded materials and products. Zero waste strategies involving much more aggressive source reduction (including product redesign), reuse, recycling and composting can reduce waste volumes even more than incineration, and without generating toxic by-products. As the contracts expire on the current inventory of more than 100 municipal solid waste incinerators, these plants should be safely decommissioned. Waste incineration should be relegated to the dustbin of history.

Conclusion

Within ten years, we can bring a virtual halt to the toxic life cycle of PVC. Through persistent organized action at all levels, discarding harm from PVC disposal will become a practice of the past. Safer alternatives will serve the same purposes filled by PVC now through the use of clean materials and the sustainable production of clean products. The health and environmental problems created by PVC can be solved through two profoundly simple actions—don't buy it, don't burn it!

APPENDIX A
Common Household Products and Packaging That May Contain PVC

Thousands of consumer products and packaging are made from PVC. The following is a general list of some common products that are typically made of PVC This list is meant to be a starting point for identifying what common products are packaged in or made from PVC. In creating this list, we recognize that companies are always changing their products, including the materials they use to package them. In some cases, you may find that a product listed is no longer made from PVC. If this happens, you may want to contact the company and congratulate them for being environmentally conscientious.

While this list may help get you started, not all containers and products are labeled. If you suspect that a product or its packaging is made of PVC, we suggest you contact the product manufacturer and ask them directly about the materials used in the product or its packaging. One way to be sure if the packaging of a product is made from PVC is to look for the number "3" or for the letter "V" inside the universal recycling symbol. This means that the product is made of PVC. Soft flexible plastic products that are made with PVC often have a distinct odor. What you smell is the plasticizer that was added to the PVC material to make it soft and flexible.

PVC V vinyl

In addition, a list of specific products identified by brand name that are packaged in PVC bottles, was generated by the Grassroots Recycling Network (GRRN 2004a). This list can be accessed on the GRRN web site at http://www.grrn.org/pvc.

Apparel:
Boots
Aprons
T-shirts with PVC prints (shiny)
Raincoats
Rain pants
Skirts
Lingerie
Shoes
Bags
Luggage
Bibs
Backpacks (PVC coating for waterproofing)
Watchbands
Diaper covers

Personal Care Items (packaging):
Shampoo
Hair gel
Lotion
Suntan lotion
Baby oil
Mouthwash
Face Wash
Aloe Vera Gel
Massage oil
Liquid soap

Household Items:
Cleaning product containers
Waterbeds
Shelving
Checkbook covers
Photo album sheets
Self-adhesive labels and stickers
Shower curtains
Imitation leather furniture
Mattress covers
Textiles
Toys
Clothes racks (covers metal to prevent rusting)
Pet care product containers
Strollers

Kitchen Items:
Drinking straws
Tablecloths
Beverage containers
Plastic utensils
Dishwasher, refrigerator and freezer racks
Dish drying racks (covers metal to prevent rusting)
Appliance casings
Food wrap
Food containers

Outdoor Items:
Pond liners
Tarps
Greenhouses
Children's swimming pools
Inflatable furniture
Outdoor furniture
Garden hoses
Balls

Automotive:
Upholstery
Dashboards
Door panels
Underbody coating
Car seats for children
Traffic cones
Wire coating
Auto-related product containers

Building Materials:
Pipes
Siding
Tiles
Wall coverings
Window frames
Door frames
Door gaskets
Gutters
Fencing
Plastic lumber
Shutters
Flooring
Wire/cable insulation
Molding
Cavity closure insulation

Medical Supplies:
Colostomy bags
Catheters
Blood bags
Bed liners
Tubing
Gloves
Mattress covers

Office Supplies:
Computer keyboards
Computer monitor housing
Cellular phones
Floppy disks
Binders
Clipboards
Paper clips
Tape
Mouse pads

Miscellaneous:
Credit cards
Slide holders
Landfill liners and leachate pipes

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APPENDIX B
Amount of PVC Generated, Incinerated and Landfilled in Each State

State	Total MSW Generated (tons)	Total Amount of PVC Disposed (tons)[1]	Amount of PVC Incinerated (tons)[2]	Amount of PVC Landfilled (tons)[2]
Alabama	*	*	*	*
Alaska	*	*	*	*
Arizona	6,012,359	37,277	0	37,277
Arkansas	3,838,217	23,797	545	23,252
California	54,429,851	337,465	9,205	328,260
Colorado	5,051,132	31,317	0	31,317
Connecticut	4,734,132	29,352	16,257	13,095
Delaware	1,069,042	6,628	0	6,628
Florida	19,706,584	122,181	45,364	76,817
Georgia	11,214,006	69,527	350	69,177
Hawaii	1,706,018	10,577	3,454	7,123
Idaho	1,090,000	6,758	0	6,758
Illinois	15,951,037	98,896	0	98,896
Indiana	9,542,378	59,163	6,177	52,986
Iowa	3,416,268	21,181	366	20,815
Kansas	4,698,338	29,130	0	29,130
Kentucky	5,465,608	33,887	16	33,871
Louisiana	4,952,900	30,708	0	30,708
Maine	1,327,164	8,228	5,448	2,780
Maryland	8,904,464	55,208	12,486	42,722
Massachusetts	8,307,387	51,506	28,145	23,361
Michigan	16,916,076	104,880	8,639	96,241
Minnesota	5,043,752	31,271	14,432	16,839
Mississippi	2,918,407	18,094	0	18,094
Missouri	7,256,744	44,992	207	44,785
Montana	*	*	*	*
Nebraska	2,395,100	14,849	0	14,849

State	Total MSW Generated (tons)	Total Amount of PVC Disposed (tons)[1]	Amount of PVC Incinerated (tons)[2]	Amount of PVC Landfilled (tons)[2]
Nevada	3,365,570	20,867	0	20,867
New Hampshire	1,214,777	7,532	1,675	5,857
New Jersey	10,606,326	65,759	9,593	56,166
New Mexico	2,095,052	12,989	0	12,989
New York	24,775,000	153,605	37,517	116,088
North Carolina	8,981,349	55,684	842	54,842
North Dakota	638,804	3,961	0	3,961
Ohio	16,211,198	100,509	0	100,509
Oklahoma	4,489,028	27,823	0	27,832
Oregon	4,074,945	25,265	2,434	22,831
Pennsylvania	12,675,854	78,590	17,746	60,844
Rhode Island	1,248,745	7,742	0	7,742
South Carolina	5,973,059	37,033	2,004	35,029
South Dakota	518,493	3,215	0	3,215
Tennessee	7,365,920	45,669	1,266	44,403
Texas	28,531,660	176,896	0	176,896
Utah	2,471,404	15,323	782	14,541
Vermont	611,617	3,792	498	3,294
Virginia	10,877,723	67,442	18,806	48,636
Washington	8,666,755	53,734	4,606	49,128
West Virginia	1,754,523	10,878	0	10,878
Wisconsin	5,592,862	34,676	1,545	33,131
Wyoming	693,783	3,301	0	3,301
Totals	**369,381,411**	**2,289,166**	**250,405**	**2,038,761**

Sources and Notes: Estimates derived from Kaufman (2004) for 2002. (1) The amount of PVC generated in each state is derived by multiplying the total Municipal Solid Waste (MSW) generated in that state by the percent of PVC (0.62%) estimated from USEPA (2003). We assumed the percent of PVC estimated from the USEPA data was representative of the PVC content in a typical municipal solid waste stream and that none of the PVC was recycled. (2) The amount of PVC incinerated (or landfilled) in each state was calculated by multiplying the total PVC disposed of in the state by the percent of waste incinerated (or landfilled) after recycling. The percent of PVC incinerated (or landfilled) after recycling was determined by dividing the total amount of waste incinerated (or landfilled) in a state (provided in Table 4 of Kaufman 2004) by the total waste disposed of (after recycling).

* These states did not participate in the survey conducted by Biocycle magazine (Kaufman 2004).

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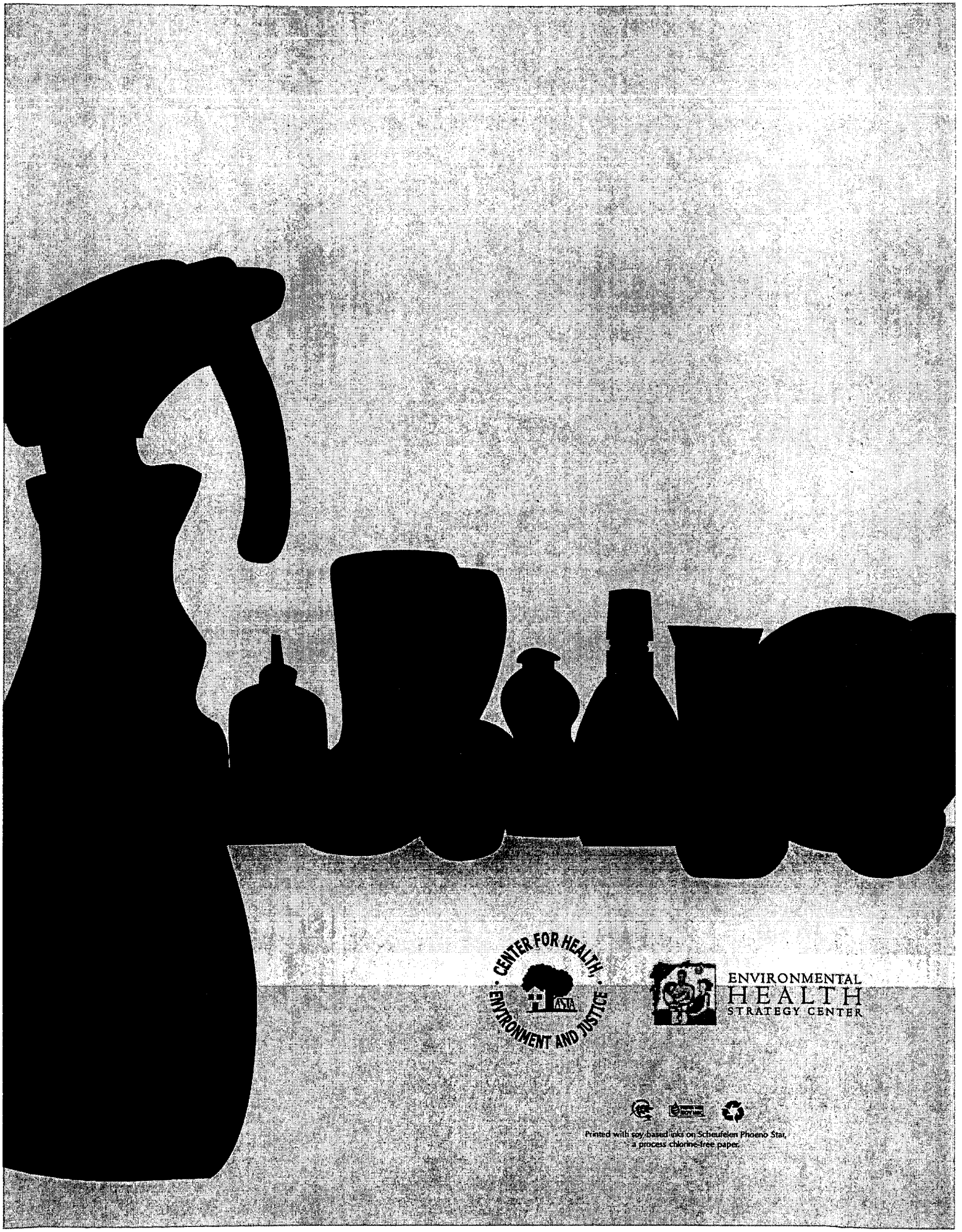

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BUSINESS STANDARDS COMMISSION

July 27, 2006

SIDE A - TAPE 1

CHAIR: [LAUGHING] You're doing great. Dave, I've heard really wonderful comments about your delivery so far, and it's very heartening, and I know all of my colleagues want you to be very successful because your success assures the success of this Commission. I know you hit the ground running, and we're very, very excited to have you. I don't know if you want to say a couple of words?

D. WALLS: Just thank you very much. And I'm excited and we're moving along.

CHAIR: Okay. Why don't we do the approval of the minutes of both April and May meeting? Is there a motion for that?

WINKEL: I so move.

CHAIR: Moved by Mr. Winkel.

PERNELL: Second.

CHAIR: Second by Mr. Pernell. Call the roll please.

SECRETARY: Commissioner Sawhill.

SAWHILL: Yes.

SECRETARY: Commissioner Hasenin.

HASENIN: Yes.

SECRETARY: Commissioner Pernell.

PERNELL: Aye.

SECRETARY: Commissioner Jamison.

Jamison: Aye.

SECRETARY: Commissioner Jensen.

Jensen: Aye.

SECRETARY: Commissioner Blackseth

BLACKSETH: I'm going to abstain; I wasn't at one of the meetings.

SECRETARY: Commissioner Winkel.

WINKEL: Yes.

SECRETARY: Commissioner Dowty.

DOWTY: Yes.

SECRETARY: Madam Chair Marin

CHAIR: Yes, Aye. Thank you. And thank you for abstaining because that brings me to a point that I would like to make regarding abstentions and recusals. I know that there have been a couple of committee meetings that—commission committee meetings—and just so that people know going forward, because it appears to me that in the past the commission has acted a little bit different than what my preferences will be from here on in.

People that serve either on any committee or in the commission—if they must recuse themselves from an item before us or before the committee, they must leave the room. There are usually conflict of interest reasons why a person must recuse themselves from taking a position in even therefore a discussion of an item. So we will ask people that must recuse themselves on an item that they need to leave the room so there is not even the appearance of a potential conflict of interest.

People who abstain on items whenever there is no conflict of interest; for example, Mr. Blackseth, that was a perfect abstention because he--he's not opposed to the item--he cannot support the item because he wasn't here. So that is a perfect position for him to abstain. But an abstention usually means that there is no conflict, no conflict of interest for that person. So, I know there was some questions about that, and this is the way it is now going to be from here on it how this commission and its committees will deal with those items. And if there is any question or problem with that, please see me regarding that. Okay?

Okay, having said that, let's go to the item that—report from the—oh, before I do that—I know Mr. Sawhill was, has brought up an item over and over again, and it's really embarrassing that we had not been able to word it

KRUGER: It was not appealed at the time to appeal. I think we discussed that back at the end of 2004, the time to appeal, the petition for review to the Supreme Court has run. It's not appealable now. There was the Commission wrote a letter to the California Supreme Court asking that it be depublished, and therefore would not have been precedent. But after sitting on it for about 6-7 months, they issued a one-line, "No, we're not going to depublish."

So, it is binding precedent that can be cited, and inevitably will be cited.

WINKEL: Okay. Thanks.

CHAIR: Okay. Thank you Mr. Kruger. We really appreciate you taking the time to do this for—to enlighten all of us who—actually it's probably the majority of the commission who were not there when all of this was happening. Thank you so very kindly. Dave, we have requested that the—let me think, uh. Do you want to say anything about the Building Standard Commission where?

WALLS: I think basically you covered it. Yeah, basically you covered it. Following that decision, which I believe was in November of 04, and they re-looked at it when there was a request, and I think they published it in December of 04. And the agencies got together with Fred Aguirre and Evelyn Matuchi confirmed that the other day that the HCD agreed that HCD would take the lead on dealing with the CEQA.

CHAIR: So, who do we have here from Gloria's department of Housing and Community Development?

BEDDARD: Good morning Madam Chair, Members of the Commission, my name is Dennis Beddard. I am the acting Chief Counsel for the Department of Housing. And it is true we are taking the lead in dealing with the PPFA case fallout. As you may appreciate, we are not set up to do environmental impact reports or assessments. We did have the good fortune of hiring an attorney just about a year ago. We hired her for other purposes, _____ [sounds like lawn or loan] closings, but she came to us with an environmental background. And since about January, she's been working

full time on the CPVC [or CPBC] EIR, which has been our highest priority in this area.

We are happy to report it is our anticipation to have that draft EIR published on our website by the close of business on Monday, July 31. Once that occurs we will be able to use her time to commence an initial study on the PEX product. And that's what we will be doing. And, of course, we can't presuppose what the outcome of that study will be until we've looked at it, but it will be in consideration of the information that's already in the record by Mr. Reid and also the firefighters, and other information that is available to us regarding the product.

CHAIR: Good. Well, thank you. We expect to hear from your soon, if not from you, from the person that is taking the lead on this. Thank you for your status. We're asking the--

BEDDARD: You're welcome.

PERNELL: Question.

CHAIR: Mr. Pernell?

PERNELL: Just one question.

CHAIR: Yes, sir?

PERNELL: Oh, yeah, _____ over here. Uh, from July 31st moving forward, how long would it take your agency to complete the EIR?

BEDDARD: CPCBC EIR?

PERNELL: Yes.

BEDDARD: Okay. There will be a 45-day public comment period. We have no control over the volume or the technicality of the comments that may be received. Based on the 25-year history, we expect to get a considerable number of comments. We know the deadline for the adoption of the codes has been set, and it's our intent to use our resources to address all the comments. And our plan is to have the certifiable EIR in time for that Commission meeting in January.

Recd. 5/15/06.

Subject: **Re: Threshold of Significance for VOC impacts**
Date: Mon, 01 May 2006 09:41:51 -0700
From: Judy Yee <jyee@arb.ca.gov>
Organization: California Air Resources Board
To: Robin Gilb <rgilb@hcd.ca.gov>

Robin,

How about looking at it both ways. I think folks want to see that you used methods that give reasonable but conservative estimates of impacts. Hopefully, the impacts are minimal or insignificant! Judy

Robin Gilb wrote:

In your opinion, what is the appropriate Threshold of Significance (TOS) for the VOC impacts?<?xml:namespace prefix = o ns = "urn:schemas-microsoft-com:office:office" />

I was going to use the local air districts' construction TOS.However, HCD received comments on previous CEQA documents that indicated the appropriate TOS was operational, not construction.

The argument for an operational TOS is that CPVC installation may occur every day of the year, and thus, should be considered to be operational.

However, the same folks who argue that it will occur every day also insist that plumbers only work about 190 days per year (once you subtract the rainy season, weekends and federal holidays).

It seems pretty obvious to me that this is construction and the construction TOS would apply.CPVC will be a portion of the total construction impact, and any developer who needs to determine VOC impacts will have to include it along with the transportation, architectural, and other VOC impacts to determine what mitigation measures they may need to take for their project.

If operational is appropriate then is it more accurate to take the daily operational limit, multiply it by 365 to get a yearly limit and then divide it by 190 (or whatever number is used) to get a daily impact threshold? I thought operational was for stationary sources that anticipate emissions on a daily basis.

Do you have any advice for me on this issue?

Thanks,

Robin
Robin Gilb, Staff Counsel

Department of Housing and Community Development

1800 3rd Street, Room 440

Sacramento, CA 95814
rgilb@hcd.ca.gov
Phone: (916) 324-5817
Fax: (916) 323-2815

FINAL STATEMENT OF REASONS FOR PROPOSED BUILDING STANDARDS OF THE DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT, REGARDING THE CALIFORNIA PLUMBING CODE, CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 5

The Administrative Procedure Act requires that a Final Statement of Reasons be available to the public upon request when rulemaking action is being undertaken. The following are the reasons for proposing this particular rulemaking action:

ADOPTIONS, AMENDMENTS, OR REPEALS:

Permanent adoption by reference of Uniform Plumbing Code (UPC) Section 604.1, without amendment, allowing the use of chlorinated polyvinyl chloride (CPVC) plastic pipe in buildings in California.

1) The public problem, administrative requirement, or other condition or circumstance that the (adoption, amendment, or repeal) is intended to address.

The Department of Housing and Community Development (DHCD) proposed, and the California Building Standards Commission (CBSC) approved, an emergency action to adopt by reference Section 604.1 of the UPC, without amendment, allowing the use of CPVC plastic pipe in buildings in California. The effective date of this action was November 30, 1995.

However, Government Code Section 11346.1 states that no regulation adopted on an emergency basis can remain in effect more than 120 days, unless the adopting agency has complied with the all of the requirements of the Administrative Procedure Act. Therefore, the DHCD is proceeding through the rulemaking process and is now proposing permanent adoption of the emergency regulations.

2) Specific purpose and rationale for necessity of the (adoption, amendment, or repeal).

Prior to the emergency adoption, California was the only state prohibiting the use of CPVC plastic pipe within buildings. Various cities in California, such as the City of Colton, were experiencing serious difficulties with the use of metallic piping materials. Metallic piping materials react negatively to soil conditions within certain areas of California, causing excessive premature corrosion of the pipe and resulting in property damage, financial ruin, and severe hardship to homeowners, construction contractors, and insurance companies alike.

The use of CPVC plastic pipe reduces health and safety hazards, and reduces the number of bankruptcies within the construction industry due to lawsuits over property damage caused by broken metallic water pipes. Plastic piping materials, such as CPVC plastic piping, have been proven to maintain longer than metallic piping materials, and do not corrode as easily.

The rationale for restricting the use of CPVC plastic pipe was the delayed completion of an Environmental Impact Report (EIR) examining the possible dangers associated with the use of CPVC plastic pipe for potable water piping within buildings. The DHCD has been conducting a study for 18 years to determine if the transportation of potable water in CPVC plastic pipe poses a health hazard. Although the contractor completing the initial EIR submitted his findings to the DHCD, it was determined by the DHCD's Legal Affairs Office that additional information is required to comply with the California Environmental Quality Act (CEQA).

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Fourth, Mr. Cardozo contradicts the DHCD's claim that the adoption of the UPC is mandated by Health and Safety Code Section 17922, because the DHCD can modify the UPC.

In conclusion, Mr. Cardozo claims that the CBSC has not conducted any CEQA review of the proposed regulatory action, and instead has relied upon the initial findings of the draft 1989 EIR. He continues by stating that CBSC's failure to certify and consider a final EIR prior to action on this project violates CEQA.

In addition, Mr. Cardozo asserts that the CBSC has deprived the Coalition and other members of the public of an opportunity to meaningfully comment or participate in the regulatory proposal by failing to proceed in accordance with APA requirements. Furthermore, Mr. Cardozo claims that the CBSC has failed to present an adequate justification for the proposed building standards as is required by the State Building Standards Law.

Lastly, Mr. Cardozo states that the Coalition requests the Commission not take action on the proposed adoption until it has complied with CEQA, the APA, and the State Building Standards Law.

Department Response

Mr. Cardozo commented that the adoption of the proposed regulations is in violation of the CEQA, and that no adoption may occur until after the preparation and certification of an EIR.

Although adoption of the proposed regulation may be a "project" subject to CEQA, no EIR is required. This is because projects which do not have a potential for a significant environmental impact are exempt from CEQA [CEQA Guidelines promulgated by the Governor's Office of Planning and Research, Section 15061(b)(3)]. It is the DHCD's position that adoption of the proposed regulation would not have a significant effect on the environment for the following reasons:

(a) Through its enactment of Health and Safety Code Section 17921.9 (Stats. 1995, c.785, AB 151 (Baca), effective October 12, 1995), the Legislature has in effect determined that CPVC pipe is safe when installed in compliance with specified installation standards.

1. The Legislature specifically has found that CPVC pipe has been successfully used for many years in other states and in nations around the globe, and has also been widely used, in accordance with federal regulations, in manufactured housing. [Health and Safety Code Section 17921.9, Subdivision (a)(2).]

2. The Legislature has established extensive safe work practices to be adhered to when installing CPVC. Health and Safety Code Subsections 17921.9(d) and (e) apply to <u>any</u> installation of CPVC in the state.

3. Installation of CPVC pipe following the legislatively-required installation standards would mitigate any potential environmental impact to installers to a level of insignificance.

4. In permitting the use of CPVC anywhere in the State by jurisdictions who had approved CPVC locally prior to January 1, 1996, subject to statutorily specified worker safety measures, the Legislature has implicitly determined that use and installation of CPVC does not represent a significant danger to installers or end users.

MINUTES

CALIFORNIA BUILDING STANDARDS COMMISSION
March 19, 1996

Consumer Affairs
400 R Street - First Floor Hearing Room
Sacramento, CA 95814

10:00 a.m.

Commission members present: Joanne Kozberg, Chair; Commissioner Canestro, Vice Chair; Commissioner Baldacci, Commissioner Geneck, Commissioner Holms, Commissioner Mattar, Commissioner Smith, Commissioner Storchheim, Commissioner Ward. Absent: Commissioner Youssef.

Staff members present: Richard Conrad, Maggie Cummins, and Stan Nishimura (CBSC staff); Bill Cady, Legal Counsel; Anita Ahuja, State and Consumer Services Agency.

The meeting was called to order at 10:10 a.m. by Chair Kozberg. The Chair was pleased to announce the reappointment by Governor Wilson of Commissioners Canestro and Storchheim, and that interviews were underway to fill the labor position that was vacated by Commissioner Levitt. Roll was called and a quorum established.

Approval of Minutes

Storchheim / Canestro — **Motion to approve the minutes of the November 29, 1996 meeting as submitted**
Motion carried; unanimous vote.

Commissioner Geneck pointed out that in item 8 on page 2 of the minutes, Mr. Burns had agreed to furnish a copy of the pool safety video to Richard Conrad for distribution to Commission members. Mr. Burns also agreed to provide copies of the pool package for each Commissioner and one for the CBSC staff. After several inquiries to Mr. Burns, he still has not provided the information. This was noted for the record.

Item 4 -- CONSENT CALENDAR

A. Certification of rulemaking file for adoption and approval of amendments to the California Building Standards Code adopted in the 1995 annual code adoption cycle and adoption of the 1994 editions of the UBC, UPC, UFC, UCBC, and 1993 NEC.

respect to AB 151, the limited authority in that bill simply is irrelevant to statewide permanent repeal of the CPVC ban. And in fact, we would argue that the legislative history of that bill shows exactly the opposite of what the department is attempting to maintain. When the bill did include statewide repeal, it directed HCD to complete the EIR process before the material would be approved. It was only after the statewide approval was taken out that the EIR requirement was dropped. So we think that's evidence that the Legislature recognized that statewide permanent repeal would require completion of the EIR process."

CHAIRWOMAN KOZBERG: "Yes, Mr. Pitts, do you wish to respond to that issue?"

MR. PITTS: "Only, Ms. Kozberg, that we respectfully disagree. We take a different reading of the Legislature's process. We are aware of all the worker safety concerns that have been brought up throughout the entire 14 years of deliberation, and we feel that the Legislature addressed those very specifically in AB 151. Although it may be an argument that that was intended for a very narrow application, it specifically states in AB 151 that all installations of CPVC pipe in the state of California shall follow these worker safety requirements."

CHAIRWOMAN KOZBERG: "Thank you. For the record, AB 151 was passed by the Senate on a vote of 32-1, and in the Assembly 70-4."

COMMISSIONER MATTAR: "Just...along the lines of what Rebecca brought up, the question is how many codes in the United States (common codes) disallow the use of CPVC...or does not include CPVC as a material that is allowed *(unintelligible...)*? It's a general question; I'm not sure of the answer. Mr. Pitts, do you know?"

MR. PITTS: "All of the major codes permit the use of CPVC as an alternate material, which is not a key issue here. We are not mandating the use of CPVC as the only material in the state; we're only trying to allow this as an alternative. This would bring the California Plumbing Code into compliance with all the major recognized national codes."

COMMISSIONER STORCHHEIM: "Yes, my question is directed to our attorney. There have been statements by Mr. Cardozo concerning the law, what we can do and can't do, and what we're obligated to do... Could you at this time please respond to that?"

BILL CADY: "I'd be happy to, Mr. Storchheim. The analysis of HCD's staff and its legal unit delved into these issues in quite some detail and that obviated the need for us to do it within the staff of the Building Standards Commission. So as to the specific issues of whether CEQA is required or not, pursuant to AB 151 in this process, that was an issue with HCD and we had no reason to question their analysis or conclusion in that regard. I can speak more forcefully as to the issue of whether an EIR is required under the Building Standards Law or Housing Laws required for regulatory rulemaking process. Clearly, it is not."

COMMISSIONER SMITH: "I just have one question. I'm trying to sort through all this information and come up with a clear understanding of what is being proposed for us not to adopt

Bill:
Did Maureen answer in writing? (I know she did verbally)

State of California

MEMORANDUM

To: MAUREEN GORSON, Chief Counsel
Resources Agency

Date: May 21, 1997

From: WILLIAM G. BRENNAN, Deputy Secretary/Special Counsel
Business, Transportation and Housing Agency
980 - 9th Street, Suite 2450
Sacramento, CA 95814-2719

Subject: CEQA Question

Thank you for meeting with Alice Detwiler, Rich Friedman, Bill Cady and myself last Friday to discuss the long-standing CPVC issue. Your patience and expertise in CEQA matters was, and will continue to be, invaluable.

I continue to have a nagging question, and was hoping to be able to get a more detailed response from you.

During the meeting, you indicated that it was not desirable to have a project proponent, or its consultant, perform the environmental analysis. I certainly can understand that it may appear to be somewhat of a conflict of interest and would, therefore, raise some political questions. These considerations can, and will be, an important factor in our decisions. They must, however, be weighed against whether proceeding in that manner presents a <u>real</u> litigation risk.

I note for example, that section 15084 of your Agency's CEQA guidelines expressly provide:

(b) The Lead Agency may require the project applicant to supply data and information both to determine whether the project may have a significant effect on the environment and to assist the Lead Agency in preparing the draft EIR.

and

(d) The Lead Agency may choose one of the following arrangements or a combination of them for preparing a draft EIR.

(3) Accepting a draft <u>prepared by the applicant, a consultant retained by the applicant,</u> or any other person. (Emphasis added.)

It is also my understanding that such arrangements have been noted and approved by the courts. (See *Friends of La Vina v County of Los Angeles*) (1991) 232 Cal.App.3d 1446; 284 Cal.Rptr. 171.)

This is an issue of some relevance, since neither HCD nor CBSC really has staff on board to manage the preparation of a complicated EIR. While I fully endorse your idea to retain a specialist consultant to oversee the project and to ensue the state's independent review of the draft environmental documents, each additional consultant will require a certain level of expense and personnel time. Minimally, there will be costs and delays involved, if nothing else, in the preparation of bid documents and contracts, the establishment of accounting systems to accept funds from the applicant, the payment of contract expenses, and the preparation of final audits. As a practical matter, it will also be much more difficult to ask the project applicant for reimbursement of state costs than to simply ask them to find the appropriate consultants and ensure that quality materials are provided and merely cover the state's billings for the consultant retained to assist in independent review of the prepared materials as you have recommended.

It seems to me that unless there is a legal risk to proceeding in the manner authorized by the CEQA guidelines, that this is an area in which a public/private partnership would produce a better document quicker than to manage the project with the usual bureaucratic impediments. Since the goal is to accomplish this CEQA review quickly and efficiently, I am reluctant to reject this alternative out-of-hand unless it presents an unwarranted litigation risk.

Thank you again for your assistance. Your candor and your advice is most appreciated.

cc: Alice Detwiler, Deputy, Legal Affairs Secretary, Governor's Office
JoAnne Kozberg, Secretary, State and Consumer Services Agency
Marybel Batjer, Undersecretary, Business, Transp. & Housing Agency
Richard Mallory, Director, HCD
Bill Cady, Executive Director, CBSC
Richard Friedman, Acting Chief Counsel, HCD

BRIEFING FOR THE GOVERNOR'S SCHEDULE

MEETING WITH: B.F. GOODRICH
MEETING DATE: FRIDAY, DECEMBER 12, 1997
TIME: (Unknown)
LOCATION: (Unknown)
FROM: Richard Mallory, Director
Department of Housing and Community Development

I. PURPOSE: For the Governor's meeting with representatives of B.F. Goodrich regarding the residential use of Chlorinated Poly Vinyl Chloride (CPVC).

II. BACKGROUND:

Background: The federal government permits the use of CPVC pipe in manufactured homes, and the State of California has permitted CPVC piping to be used in mobilehomes and recreational vehicles since the early 1970s. However, the use of CPVC plastic pipe for potable water systems in residential dwellings has been a long-standing issue in California and is prohibited.

For the first time, the 1982 edition of the Uniform Plumbing Code (UPC) adopted by the International Association of Plumbing and Mechanical Officials (IAPMO), permitted the use of CPVC pipe (in addition to copper, galvanized, and cast iron pipe) in both drinking water systems and drain, waste, and vent systems in residential structures.

In 1983, HCD went before the Commission of Housing and Community Development (hereafter Commission), responsible for the adoption of building standards during that time period, and proposed adoption of the 1982 edition of the UPC which allowed the use of CPVC pipe. However, at the hearing, the Commission determined that an Environmental Impact Report (EIR) was necessary to allay concerns of various entities including the Department of Health Services (DHS) and the California Pipe Trades Council (hereafter Pipe Council) and instructed HCD that the use of plastic pipe could not be expanded beyond what was permitted in the 1979 edition of the UPC until an EIR was prepared. (Since that time, with each adoption of the California Plumbing Code, the use of CPVC for potable water systems in residential dwellings has been prohibited.)

Under the direction of HCD, a task force of interested parties was formed which included DHS, the Pipe Council and the Society of the Plastics Industry, Inc. (hereafter Plastics Industry) to determine the scope of the EIR. In recognition of HCD's limited resources, both the Pipe Council and the

Plastics Industry provided funds for preparation of the EIR. After the parties had agreed on the scope of the EIR, they also agreed that Stanford Research Institute International (SRI) should be retained to prepare the EIR.

In August, 1989, SRI issued a Draft Environmental Impact Report (DEIR). The scope of the DEIR encompassed the following areas: (1) Water Quality: public health aspects of leaching of chemicals from soil into water and leaching of chemicals from plastic pipe into water; (2) Smoke Toxicity: danger of toxic fumes from burning pipe in house fires; and (3) Worker Health: worker exposure to toxic substances (cleaning solvents, glue, dermal absorption, dust from cutting), and effective mitigation measures for confined work areas, poor ventilation, and high temperatures in work areas.

The DEIR did not conclude that the use of CPVC pipe would result in any significant environmental impacts but it did recommend a variety of mitigation measures to reduce the potential hazards associated with the use of CPVC pipe. The DEIR generated a tremendous volume of public comments many of which attacked the overall adequacy of the document as the basis for public decision making.

Upon conclusion of the public hearings, SRI endeavored to address all public comments and prepare a final EIR. In February of 1990, SRI delivered to HCD an "administrative final" EIR. HCD, in conjunction with the Office of the Attorney General, determined that the product delivered by SRI did not constitute a legally-adequate EIR. In addition, a major criticism from the Pipe Council was that the EIR did not address the issue of "mechanical failure"; that is the cracking or breaking of CPVC pipe. Although the Pipe Council has not alluded to the fact that the use of plastic pipe, which is durable and easy to work with, may impact the amount of work required to be performed by plumbers, it is common knowledge that they have this concern.

Due to the efforts by SRI to respond to the voluminous comments, insufficient funds remained in the SRI contract to complete the EIR. In response, the Plastics Industry offered to provide additional funds and circulated a Request for Proposal for completion of the document. However, the bids received were two to three times the Plastics Industry's original cost estimates. In August of 1994, the Plastics Industry informed HCD that it was suspending work on the EIR and asked that HCD also suspend its work pending further notice from the Plastics Industry.

Because the DEIR was never finalized or certified by HCD, it does not provide a basis for public decision making as to the hazards or safety associated with the use of CPVC in residential plumbing. Please note that the UPC adopted by IAPMO has allowed the use of CPVC pipe since the

publication of the 1982 edition.

AB 151/Baca (Chapter 785/1995) specifies that the prohibition against the use of CPVC piping in California shall not apply to any local government that permitted its use within its jurisdiction prior to January 1, 1996, provided specified conditions are met. This legislation contained a sunset date of January 1, 1998. We are aware of 14 counties and 40 cities that have approved the use of CPVC pipe within their jurisdictions prior to January 1, 1996.

The stated intent of the Legislature in enacting AB 151 was "... to allow the use of CPVC water supply piping in building construction in California ..." To implement the stated intent of the Legislature, and at the direction of the Governor in the signing message, the Department developed, and the California Building Standards Commission (CBSC) approved on an emergency basis, the use of CPVC pipe in potable water systems in residential occupancies statewide. However, opponents of these building standards brought suit against the Department and the CBSC. As a result, the San Francisco Superior Court ruled that the adoption of building standards approving CPVC pipe for interior water distribution systems be deleted from the California Plumbing Code and that neither the Department nor the CBSC may take further action to permit the use of CPVC for interior water distribution systems unless requirements of the California Environmental Quality Act (CEQA) have been met.

AB 941 (Miller, 1997) This bill would allow those cities to continue to permit the use of CPVC pipe without violating the law and having to conduct a study to establish a finding of need, hold a public hearing, adopt an ordinance, and forward copies of the findings and ordinance to the Department of Housing and Community Development (HCD). AB 941 failed passage of the Assembly Appropriations Committee.

III. WHAT'S HAPPENING NOW:

In order to achieve the court ordered compliance with the California Environmental Quality Act (CEQA) the Department has begun preparation of an EIR. Given the nature of the project, a Negative Declaration was carefully considered as an alternative to an EIR. However, given that a legal challenge is very likely no matter what the facts are, plus the fact that the standards for successful challenge of a Negative Declaration in the courts are very low, the EIR was considered to be the preferred course of action.

The EIR process normally requires about one year to complete. The Department believes that this can be shortened somewhat for the EIR for

CPVC pipe for residential buildings in California. This is because of the existing information available from the long history of this issue, and the willingness of advocates to CPVC pipe to provide technical support to the effort.

The work on the EIR began in September, 1997. A Draft EIR is expected to be finished in about March of 1998. It may be possible to certify a Final EIR by about August 1, 1998, although there will probably be a concerted effort to delay this with voluminous input. After the final EIR is certified, time the Building Standards Commission may take action to approve CPVC use. It is anticipated that any approval of CPVC use under the EIR will be challenged in court, and this should be expected to include a request for an injunction against implementation. The attorneys for the pipe trades union have been very active in the process, and in addition, a recent flurry of negative letters from various legislators indicates a degree of interest from that branch.

IV. POTENTIAL ISSUES:

- Legislation for 1998: B.F. Goodrich may propose that the use of CPVC should be allowed statewide through legislation. As stated earlier, an attempt was made by Assemblyman Miller to extend to the time that CPVC can be used in localities that allowed the use prior to January 1996 (AB 942). AB 942 was defeated by the California Pipe Trades Council in the Assembly Appropriations Committee. As such, it would be unlikely that the Legislature would pass a bill allowing the use of CPVC statewide.

  You have already demonstrated your support for the statewide use of CPVC through your signing message to AB 151, directing the Department to propose the adoption of emergency building standards allowing the use of CPVC for residential dwellings statewide.

- The Department is receiving letters from Legislators that are prompted by constituent letters from union members that are questioning the Department's objectivity with the completion of the EIR.

- As you may recall, the Senate Rules Committee rejected two of your appointments to the CBSC because of their support for the use of CPVC. Given the controversy surrounding this issue, any action prior to January 12, 1998 may jeopardize my confirmation.

Finally, I have attached a newspaper article from October of 1995 where B.F. Goodrich praised your signing of legislation allowing the use of CPVC as well as the Department's action in the adoption of emergency building standards.

file / plastic pipe

(2) Allen Hendrix - Caltrans

5/23/97 DO NOT have in house expertise to deal w/ Health.

DO have expertise to manage in-house environmental process

→ However Supreme Ct Decision → creates problem.

→ Caltrans does most EIR's - has expertise to manage.

For the meeting on Friday, July 18, 1997

Issues:

1. Worker health and Safety; consider the concept of an MOU with CALOSHA in order to have a defense in depth on this issue. If desirable, who should be the lead on this, maybe Dennis?

2. Proposed tactics for responses to comments (see handout.)

3. CPVC use would eliminate the potential of lead contamination from domestic water pipe. This could be developed as a public health and safety basis for CPVC. Is there any history on this issue?

4. Can we define a process and route for the review of documents prior to publication? For example, the Initial Study and Notice of Preparation.

5. I have begun to contact agencies and others for their input and areas of interest.

6. Write the EIR in house. I recommend this approach given the short time line, the limited scope of the document, the willingness and ability of the industry to support the effort with timely responses to our needs. This will avoid the process of contracting and managing a consultant. This will also help with the issue of decisions being based on the independent judgment of the Department.

7. I recommend not having scoping meetings, see attached.

FLOWCHART FOR THE EIR ON ADOPTION OF CPVC PIPE

START

I. Issue Notice of Preparation (NoP), with Initial Study.
   A. An initial Study is needed due to the wording of the Writ.
   B. Drafts of NoP and Initial Study in handouts.
   C. Considerations:
      Mailing list (plaintiffs plus)
      Identify Responsible and Trustee Agencies, if any, early consultation if there are. (Note conversation with Terry Rivasplata, there are none.)
      Careful review of Project Description, and major issues (Potential Environmental Effects)
   D. Resources:
      Printing
      Mass mailing, some certified.
      Internal review + Ann Jennings + OPR.

Discuss:
Hold Scoping meetings? I recommend we reconsider: The issues are already relatively well defined. OPR agrees.
   Resources needed if we have them:
      Meeting rooms
      Court recorder or tapes?

II. Write the Draft EIR.
   Discussion:
      [Due to the circumscribed scope of the EIR (especially compared to the last EIR attempt) and the willingness and ability of industry to provide support, I recommend not hiring an environmental consultant for this effort. Managing the consultant and navigating the process would be tougher than just doing the Draft and Final EIR's in-house.]

   A. In-house Resources:
      Robin
      Will need word processing support
      Will draw on resources of industry
      Need a defined internal review and editing path
      Periodic progress and issues reports.

   B. Support Documents to come from industry:
      Risk Assessment for worker and end user health and safety.
      References (add all to Administrative Record)
      Federal or other state environmental documents, foreign use?
      MORE?

III. Review of Draft EIR.

A. Issue Notice of Completion.
B. Circulate and receive comments.
C. Hold hearings if needed (opponents may request so)

IV. Write the Final EIR.

A. Revision of the Draft, based on input.
B. Responses to comments
The best approach will be to respond to issues, follow the pattern of the Aerial Malathion and Bait EIR. See handout.

V. Certification of Final EIR and Program Approval

A. Documented informed decision of the decision maker on whether or not to approve use of cpvc.
B. Approval Documents (use CDFA approval documents as a pattern)
Findings, Statements of Overriding Considerations if necessary, Mitigation Monitoring or Reporting program if needed, NoD.
C. Adopt the Regulations.

END

Things to have:

Consecutively paginated record, documents with accession numbers. Dennis and I are responsible for content, we need a person to be responsible for the rest; i.e., numbering, indexing, copying, file, and maintain.

More???

ROBIN REYNOLDS

EXPERIENCE: Over twenty years in environmental compliance and planning in the State of California. Extremely familiar with the complex environmental laws, regulations, and resources of the State. Have worked for the following agencies :

The Department of Food and Agriculture (1991 to Present)
Toxic Substances Control (1986 to 1991)
The Department of Water Resources (1980 to 1986)
State Water Resources Control Board (1974 to 1980)

EDUCATION: University of Chicago, Master of Science in Biology.
California State University, Sacramento Bachelors in Biology

SELECTED ACCOMPLISHMENTS:

At the Department of Food and Agriculture:

- Developed, advocated, and led the team which carried out the environmental policies and compliance strategy for the California Department of Food and Agriculture's exotic pest eradication and control programs. This included the sensitive and highly controversial Medfly program, which was threatened by a series of legal actions under California environmental law. Success required a decisive and innovative solution to complex environmental issues and compliance problems. Failure would have been disastrous to the agriculture industry, economy, and environment of California.

  Regularly briefed and advised management, including the Secretariat on the risks, environmental impacts, human health implications, and potential mitigation measures for this and other discretionary actions considered by the Department. In order to succeed in this program, it was necessary to gain the confidence of management in a new approach to the program, and to lead and inspire a tem of diverse individuals to accomplish the tasks needed for success.

  Primary author for the series of EIRs which formed the cornerstone of the Departments' environmental policies and compliance strategies. Worked directly with the California Attorney Generals' office to successfully defend these EIRs against a series of lawsuits brought under the California Environmental Quality Act. After successful defense of the programs, administered and continuously evaluated the environmental compliance processes and procedures established.

- Represented the Department and California agriculture in the ongoing CALFED program. This program will have profound long-term implications for the future of agriculture in California. Working with management, the Secretariat, and industry, developed and carried out a strategy to use the States complex environmental laws, regulations and legal

precedents to further the fundamental mission of the Agency; to protect and promote California agriculture. Prepared and presented position papers on these sensitive environmental and public policy issues. Inspired and led industry leaders and industry organizations to effectively utilize this approach.

With the Department of Toxic Substance Control

- Proposed, advocated, formed, and then managed the Statewide Planning, and CEQA compliance units in what is now the Department of Toxic Substances Control in CALEPA. Managed preparation of the State hazardous waste management plan. Developed an innovative approach to secure environmental program funding from the regulated community.

With the Department of Water Resources

- At the request of the Deputy Director, served on the staff of the Governor's Taskforce on Toxics, Waste, and the Environment. This taskforce effort resulted in the formation of the new Department of Toxic Substances Control.

- Responsible for conceptual design, State and Federal environmental compliance, and licensing for the enlargement of Devil Canyon Power Plant on the East Branch of the California Aqueduct. Represented the State and successfully advocated this major project with the Metropolitan Water District of Southern California.

- Team leader for planning, design, construction, and operations of alternative energy demonstration projects at the Department of Water Resources. Received Directors award for this work: Specifically commended for negotiations with Department Of Fish and Game.

- Represented the State in complex, long-term power contract negotiations.

REFERENCES:

Charles Getz, Assistant Attorney General, Director of the Natural Resources Law Section, California Department of Justice. (415 356-6348)

Robert Hoffman, Chief Legal Counsel, Department of Toxic Substances Control. (916 324-1084)

Ron Robie, former Director of the California Department of Water Resources (1974-1982), now Superior Court Judge, State of California.

[illegible]
STATE CAPITOL
ROOM [illegible]
SACRAMENTO, CA [illegible]
[illegible]

[illegible] SANTA ANITA AVENUE
SECOND FLOOR
EL MONTE, CA [illegible]
[illegible]

[illegible] CESAR CHAVEZ AVENUE
BUILDING "A"
FAST LOS ANGELES, CA [illegible]
[illegible]

California State Senate

SENATOR
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TWENTY-FOURTH SENATORIAL DISTRICT

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INDUSTRIAL RELATIONS
SUBCOMMITTEE ON AIRS TRADE AND COMMERCE
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SELECT COMMITTEE ON HIGH EDUCATION
SELECT COMMITTEE ON WORKFORCE PREPARATION
SUBCOMMITTEE NO. [illegible] ON HEALTH, HUMAN SERVICES AND LABOR

November 18, 1997

Lita Flores
Chief Deputy Director
Dept. of Housing/Community Development
1800 Third Street, Suite 450
P.O. Box 952051
Sacramento, CA 94252-2051

Dear Mrs. Flores:

I am writing about the Department's intent to prepare an EIR on CPCV plastic pipes for drinking water.

It is my understanding that normally the cost of an EIR is borne by the private groups seeking an approval from a public agency. It is also my understanding that consultants possessing the appropriate scientific, engineering, and technical expertise are normally retained to review technical issues and prepare a draft EIR. In the previous effort to prepare a draft EIR on plastic pipes, technical consultants were retained and the cost was borne by the Plastics Industry.

However, it is also my understanding that HCD is proceeding to pay for the costs of preparing the EIR using taxpayer money instead of funds from the plastic industry which produces CPCV. It is also my understanding that scientific, engineering or other technical consultants with specific expertise will not be retained.

I do not understand why the normal EIR process is not being followed in this instance. I am not concerned whether it is appropriate to use taxpayer funds for this purpose. I am also concerned that the failure to hire a team of consultants with the appropriate technical expertise will result in a deficient, legally inadequate EIR.

Consequently, I would appreciate the following information. What is the cost of the staff time that will be used to prepare the CPVC EIR? How does HCD intend to provide adequate technical expertise? Why are outside technical experts not being retained?

What is the justification for using taxpayer dollars for this project? What is the justification for not requiring CPVC manufacturers to pay the full cost, including reimbursement of staff time, for this EIR? Why is this EIR being paid for by public funds when the last effort was paid by the Plastics Industry?

Thank you for your attention to this letter.

Sincerely,

Hilda L. Solis

HILDA L. SOLIS
Senator, 24th District

HLS/jt

NSF International

Ann Arbor, MI • Sacramento, CA • Washington, D.C. • Brussels, Belgium

December 5, 1997
Comment Clerk
Docket Number W-97-11
Water Docket (MC4101)
USEPA, 401 M. St., SW
Washington, D.C., 20460

Dear Dr. Evelyn Washington,

I would like to comment on behalf of NSF International in reference to the Environmental Protection Agency announcement of the draft Drinking Water Contaminant Candidate List; Notice in reference to the occurance of organotins in drinking water resulting from its use as a heat stabilizer in Poly Vinyl Chloride or Chlorinated Poly Vinyl Chloride (PVC / CPVC) pipe used for the transmission of potable water.

As an introduction, NSF International is a third party, independent, not for profit organization, that is dedicated to public health safety and protection of the environment. Since 1944, NSF International has developed product standards and provided third party conformity assessment services to government, users, and manufacturers/providers of products and systems. NSF Certifications and Standards are accredited American National Standards Institute (ANSI) in Canada by the Standards Council of Canada (SCC) and Europe by the Rad vor Accredidate (RvA).

NSF has been involved with developing standards, testing and certification of plastics plumbing components since 1965. There are two NSF Standards that cover PVC/CPVC pipe.

- ANSI/NSF Standard 14: Plastics Piping System Components and Related Materials
- ANSI/NSF Standard 61: Drinking Water System Components - Health Effects

ANSI/NSF Standard 61 establishes requirements for the testing and evaluation of contaminants that are extracted from water which has been exposed to the material or products that convey potable water.

ANSI/NSF Standard 14 requires that all plastic plumbing products intended for use with potable water applications comply with physical performance requirements as well as the health effects requirement of ANSI/NSF Standard 61.

The US EPA has recognized NSF Standard 61 as the criteria for determining health effects acceptability of materials or products that convey potable water, as referenced in Federal Register Notices: Vol. 53, No.130. July 7, 1988, and Vol. 62, No.163 August 22, 1997.

According to a survey by the American Waterworks Association, twenty nine U.S. states have current regulations or legislation requiring compliance of water contact materials to ANSI/NSF Standard 61. There are more than 595 PVC/ CPVC products produced by 88 companies at 148 manufacturing sites currently certified by NSF International to the health effects requirements of ANSI/NSF Standard 14 (NSF Listings book for Standard 14 and Standard 61 are enclosed).

P.O. Box 130140 Ann Arbor, Michigan 48113-0140 USA
313-769-8010 1-800-NSF-MARK Fax 313-769-0109
E-Mail: info@nsf.org Web:http://www.nsf.org

The formulations for all products certified by NSF International are thoroughly reviewed; this includes obtaining information from ingredient suppliers. Organotin stabilizers are added to PVC/CPVC formulations to protect the resin from thermal degradation during processing and usage. These compounds protect the PVC / CPVC by inhibiting the dehydrochlorination reaction by exchanging their anionic group, X, with the allylic chlorine atoms in the polymer. In addition they can react with the HCl produced, producing compounds which may inhibit other side reactions.

When PVC/ CPVC materials or products are tested at NSF International, multiple analytical tests are performed on the water which was exposed to the material; Residual Vinyl Chloride Monomer (measured in the wall of the material), phenolics assay, VOC analysis, regulated metal analysis, tin analysis and any other formulation specific analytes (i.e. acrylates; which are used as impact modifiers).

PVC / CPVC intended for use in pipes or fittings are tested based upon the protocol described in ANSI / NSF Standard 61, Appendix B. (p B9-B10). The lab results are then normalized based upon the intended end use of the product to determine the "at the tap" exposure following the procedure outlined in ANSI / NSF Standard 61, Appendix B (p B38-B51). The normalized concentrations are subsequently compared to pass/fail criteria for contaminants using the Toxicology Review and Evaluation procedure described in ANSI / NSF Standard 61, Appendix A (p A1- A13).

Indirect measurement of organotin is done by measuring the inorganic form of tin and then correcting for the molecular weight differences between the inorganic tin and the organotin species. The compounds which extract are monomethyl tin trichloride, dimethyl tin dichloride, monobutyl tin trichloride and dibutyl tin dichloride.

NSF has set the following action levels for organotins based upon the current guidelines in ANSI / NSF Standard 61, Appendix A.

	Mono and dimethyl tin	Mono and dibutyl tin
Acute: Short Term Exposure Level (STEL)	100 ug/L	100 ug/L
Chronic: Maximum Drinking Water Level (MDWL)	30ug/L	20ug/L

Testing of PVC/CPVC materials at NSF International includes the initial qualification of the material followed by annual sampling. The annual sample is collected on unannounced audits. Approximately 350-500 samples are tested annually at NSF. There are occasions when the extraction of organotin exceed the MDWL. In those cases, a follow up multiple time point analysis is performed. Regression analysis of the data is performed to determine if the extraction of tin decays over time for that material. The day 1 normalized concentration (acute exposure) is then compared to the STEL and the extrapolated Day 90 concentration (chronic exposure) is compared to the MDWL. Based on our current database, all products which have been tested with a multiple time point analysis have met the pass/fail criteria for acute and chronic exposure as defined under ANSI/ NSF Standard 61, Appendix A. This evaluation of PVC/CPVC is done on newly manufactured pipe when organotin extraction is at its highest level when compared to the lifetime of the product.

Triorganotins are more toxic than diorganotins which in turn are more toxic than monoorganotins (WHO 1980). Triorganotins are used as biocides in industry and agriculture (Sadiki 1996) and not as heat stabilizers in PVC/CPVC pipe. It has been our experience at NSF that monomethyl tin, dimethyl tin, monobutyl tin and dibutyl tin are the heat stabilizers of choice used by manufacturers for PVC/CPVC pipe which is used to convey potable water. NSF has tested and certified the majority of PVC/CPVC pipe material which is used to convey potable water in the United States. Currently, there is no record at NSF of a manufacturer using a triorganic tin as an intentional additive for heat stabilization of PVC or CPVC pipe.

It is our opinion that the evaluation of PVC/CPVC pipe based upon the requirements of ANSI/NSF 61 is protective of human health and the presence of the monoorganotin and diorganotin in potable water due to their use as heat stabilizers does not present a human health risk. Any regulation of organotins should be based around triorganotins and not the monoorganotin or diorganotin species.

Please contact me at your convenience if you have any questions.

Sincerely,

Lori Bestervelt

Lori Bestervelt
Manager, Toxicology Services
NSF International

Phone: 313-769-5345
Fax: 313-769-0418

Enclosure: ANSI/NSF Standard 61
NSF Listings- Drinking Water Additives
NSF Listings - Plastic and Plumbing System Components

WHO (World Health Organization), 1980. Environmental Health Criteria 15, Tin and Organotin Compounds. A preliminary Review.

A.I. Sadiki, D.T. Williams, R. Carrier and B. Thomas, 1996. Pilot Study on the Contamination of Drinking Water by Organotin Compounds from PVC Material. *Chemosphere*, Vol. 32, No. 12, p 2389-2398.

VOLUNTARY STANDARDS AND ACCREDITATION ACT OF 1977, S. 825

HEARINGS

BEFORE THE

SUBCOMMITTEE ON ANTITRUST AND MONOPOLY

OF THE

COMMITTEE ON THE JUDICIARY

UNITED STATES SENATE

NINETY-FIFTH CONGRESS

FIRST SESSION

ON

S. 825

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First of all, the Sherman Act case occurs after the fact. It is a long process to prosecute successfully or unsuccessfully an antitrust case. Thus, the resolution of the problem all too frequently comes well after the fact, well after the injury to the potential entrant. And perhaps more importantly, the traditional standard imposed under the Sherman Act has been a rule of reason. While I tend to favor a rule of reason test, I think the judicially developed standard here has not been altogether reasonable or responsive to the problem. The decisions, and I guess the plywood decision is probably as dramatic an example as I can give, tended to indicate that because the standard was ultimately amended and changed consituted a sufficent response.

I think the courts have been handicapped by the fact that there has been no national policy. There has been no statement of national objectives. The Sherman Act itself does not contain such a statement. Accordingly, it seems to me that one of the important functions of S. 825 is to begin the articulation of a statement of national policy and national objectives with regard to standards-making.

Senator ABOUREZK. I have no more questions.

Senator Metzenbaum?

Senator METZENBAUM. No questions.

Senator ABOUREZK. Thank you very much. We appreciate your testimony and your appearance here today.

Mr. Ralph Nader is our next witness. Mr. Nader.

STATEMENT OF RALPH NADER, WASHINGTON, D.C., ACCOMPANIED BY PETER L. MAIER, ATTORNEY

Mr. NADER. Thank you, Senator Abourezk, members of the subcommittee. Thank you for the invitation to testify on S. 825, which is called "The Voluntary Standards and Accreditation Act of 1977." With me today is Peter Maier, who has been working on this subject and who will comment specifically on the particular provisions of the legislation.

What I would like to do is to establish some evidence and some observations about the need for legislative correction in a major area of marketing activity in the United States. Of course, one of the greatest shields of the private trade standards groups in the United States, one of the greatest shields from accountability, is in the fact, that what they do appears to the public to be very dull, and anything that is very dull is usually something that does not provoke public curiosity. But also it is also a good rule of thumb that anything that is very dull is likely to be also very important.

Yesterday on "60 Minutes," Henry Ford was interviewed, and in his admirable candid manner he said to the interviewer, "Sure, we build a lot of lousy cars."

Well, a lot of people in the United States would agree with him, but there is no particular standard to point to that would provide a framework of reference as to how lousy these cars are.

Senator ABOUREZK. If I might just interrupt there. There are a lot of Members of Congress who learned that trick, remaining anonymous and boring and therefore no one calls public notice to them.

Mr. NADER. Yes. Many of them are from the South. If you took a name recognition test of Senators over the years in the United States, they would not be from the South, although over the years many of the most important Senators have been from the South. So, anonymity is a technique of power. Dullness is a technique of power. Garnished with a droning voice, many of these standards association representatives manage to, if they don't lull you to sleep, they manage to inject a kind of verbal novocaine into your intellect so that you really lose any interest. The best definition of a standard that I know of is that a standard informs consumers of what they are buying from sellers. As a result, standards are a critical factor in the element of informed choice, which is the bedrock of the competitive enterprise system. This does not mean that sellers want to generate these kinds of informed standards clearly communicated to consumers. Because in the tussle between sellers and buyers, the sellers have very often liked to camouflage the true properties of their products, their lack of durability, safety, and other qualities, so that consumers are not informed of what they are buying so they cannot reward the better seller and penalize the worst.

There is a magnetic pull to a lowest common denominator performance among many industries where a few companies dominate the industry. For example, the difference between an Impala, a Galaxie, and a Fury is about the difference between tweedledum and tweedledee. There is a lowest common denominator pull among concentrated industries. Rather than a race to the top, there often is a race to the bottom. If the public is unable to differentiate between competing or allegedly competing products, these products are going to become more similar, less innovative, and overall less competitive.

Privately developed trade standards, and I use the word "trade" standards, Mr. Chairman, because I don't want the word "private" to connote something excessively charitable to such operations as the American Society of Mechanical Engineers or the ANSI, or other testing and standards groups. These are trade standards. They are controlled by the industries that they relate to, and to give them a professional coloring, I think would be unjustified by the record.

Privately developed trade standards have an enormous, but largely unrecognized impact on consumers. An estimated 400 trade standards groups publish over 20,000 product standards covering such diverse products as household appliances, portland cement, 16-millimeter movie reels, and microwave tubes. I understand there is a revision of a standard by the American Society for Testing and Materials concerning the traction capability of shoes. A lot of people are slipping all over the country partly owing to their shoes being too slippery, and they are doing a standard on the traction capability which shoes should meet.

At the urging of trade standards groups, many of these standards have been adopted in Government statutes and regulations. For example, State and local governments routinely incorporate by reference trade standards in their construction code requirements.

So, private industry employees develop a standard under the cover of a standards association. The standards association issues the standard. Shortly thereafter, a local State or Federal regulation or ordinance or code adopts the standard almost without changing it.

When the Auto Safety bill was passed in Congress, and the Auto Safety agency was set up in 1966, one of the first things the Auto Safety people did was go to the Society of Automotive Engineers, and there was a strong temptation just to take the Society of Automotive Engineers' braking standards, which were written by the auto company employees, and transform them into Department of Transportation regulations.

The whole thrust to the auto safety law was to lift up the existing auto safety standards and make them much stronger. But still there was that strong pull of the SAE. With their far-reaching impact, product standards have the potential to be used, of course, for productive purposes. For example, they could facilitate competition by giving consumers more and better purchase information; they could lower production costs by increasing industrial efficiency, and protect consumers from unsafe products.

Unfortunately, present trade standards frequently fail to realize their potential for a positive contribution to the Nation's economy. If this subcommittee can do anything toward ameliorating the present sad state of affairs, it will be a major step in a hopefully escalating series of steps to deal with this broad problem. I think also, if the subcommittee could prepare a simple pamphlet that could be widely distributed to consumers, to students, all over the United States, who may be interested in studying standards—particularly, for example, engineering students or law students—the focus on understanding these standards will be much sharper and the process will be much improved.

You have, I am sure, been informed of a book by David Hemenway on standards, and that was one of the few books on standards associations that has been written from a scholarly and consumer perspective. Well, he became interested in this subject as a student of economics at Harvard, and he came down to Washington and worked for a number of public interest groups, including ours, and he went back and he wrote a Ph. D. thesis on standards which now is a major study that is helping policymakers here on Capitol Hill as well as members of the press and others who want to delve into this subject.

So, there is an educational long-range impact to the subcommittee's work, and I would hope that some summary material could be made, apart from the voluminous and very informative hearings that have been and will continue to be compiled on this subject.

Trade product standards often harm consumers. The history of standards is strewn with abuses: standards essentially written by large corporations to exclude competitors from the marketplace, standards that misrepresent hazardous products as safe, standards that boost sales while benefitting only the producer, and standards that are designed to head off tough Government safety requirements rather than protect the public. That is quite a menu, and it has been produced very vigorously all too often by many of the industry indentured standards groups in this country.

This subcommittee has already heard testimony on the use of trade standards by large firms for anticompetitive purposes. In the case of automatic vent dampers, the American Gas Association has used its grip on standards setting for gas appliances to prevent the marketing of a device that would reduce energy consumption for gas home

heating by an estimated 23 percent. The AGA's efforts have thus blocked consumer access to an energy conservation device that would compete with natural gas sales.

In the case of low water boiler cutoff devices, a dominant manufacturer of boiler controls used its close ties to an American Society of Mechanical Engineers standards committee to spread the word—deliberately and incorrectly—that a small competitor's products did not comply with the standard. By this maneuver, McDonnell & Miller, Inc.—which has more than 85 percent of the annual $10 million boiler control market and is owned by ITT—retained its dominant market share and sent the small manufacturer's sales into an immediate tailspin.

The use of standards to exclude competitors from the marketplace is particularly disturbing in view of the ineffectual record of antitrust laws in guarding against such practices. Aside from per se antitrust violations such as price fixing, the courts have generally refused to apply antitrust sanctions to trade standards groups.

A 1972 Federal Trade Commission staff study on standardization supports this assessment, and I quote:

> A survey of legal precedent shows clearly . . . the difficulty courts have had in dealing with the shortcomings of standards and certification programs, particularly their antitrust aspects. Most antitrust cases in the standards area deal with a standards program that has been used to foster conduct which itself constitutes a per se violation of the antitrust laws. . . . Unfortunately, courts have had more difficulty dealing with less obvious restraints of trade attending product standards.

Moreover, few small businesses whose products have been excluded from the marketplace, and even fewer affected consumers, can afford to pursue long and expensive antitrust litigation. The company whose automatic damp vent that was said to be discriminated against by the American Gas Association has just filed a multimillion dollar antitrust suit. It is going to cost that company a lot just to maintain that suit.

The Nation's antitrust laws provide little comfort to consumers and small firms who have been hurt by standards abuses, although there are some exceptions to that observation.

Another common abuse is the use of trade product standards to deceive consumers so as to boost or maintain sales. Later in our testimony we shall show how excessive lighting level standards cause the Nation to waste at least $3½ billion worth of electricity annually through overlighting.

A second example is the plastics industry's use of fire testing trade standards to misrepresent certain polystyrene and foamed polyurethane plastics as "nonburning" or "self-extinguishing." In fact, under actual fire conditions these plastics can burn intensely and release flammable gases. Polystyrene and polyurethane plastics have resulted in numerous fatal fires, including the 1970 dance hall fire in France in which 145 teenagers died.

In 1973 the Federal Trade Commission charged the American Society for Testing and Materials and a group of plastics manufacturers with misrepresenting the fire hazard characteristics of these plastics. Over a billion pounds of the plastics were used for construction and home furnishings in 1972.

According to the FTC complaint, plastics manufacturers used ASTM standards to justify claims that their products did not burn or were self-extinguishing. Yet, the Commission found that, once ignited, the plastics "frequently produce greater fire hazards than traditional materials," spreading flames and generating smoke, heat, and flammable and toxic gases more quickly than ordinary materials such as wood or cotton.

Now, you may say, well that sort of thing is sort of abstractly scientific, but it came home in a very tragic way on the Canary Islands a few weeks ago when two jumbo jets collided in what should have been, for a majority of the casualties, a survivable crash. But apart from those who were in the planes at the point of impact, and who could not have survived that collision, the other passengers in the planes were burned to death or gassed to death. To the extent that they were gassed to death, they were gassed to death by the cyanide and carbon monoxide and other toxic gases in the seat cushions and upholstery and carpeting that were in the plane.

Where, indeed, was ASTM all these years, quite apart from the plastic manufacturers, and the artificial fabric manufacturers? Where were they in delineating the standards in such a clear manner that they would have put the airlines and the airline passengers on greater notice to have raised this issue publicly and developed the pressure for more rigorous standards to prevent the use of such material. It might even have developed a process that might have reached the Federal Aviation Administration in finally issuing what it has long been sitting on, and that is the standards for new kinds of materials with less toxic or no toxic gases in seat cushions and other materials making up the airplanes' interior.

Plastic makers and ASTM had known of these serious fire hazards at least 6 years before the Federal Trade Commission complaint, but had neither warned the public nor put a halt to the misleading claims.

The FTC charged ASTM with knowingly permitting the plastics industry to use ASTM standards to misrepresent the burning characteristics of plastic products, complaining that ASTM had been "dominated or unduly influenced" by the industry and become "infected with commercial intent."

The following year, the plastics manufacturers signed a consent order in which they agreed to stop misrepresenting their products, to notify the public of the fire hazard, and to undertake a $5 million research effort to find remedies to the problem.

Trade standards assume even greater importance, and their abuses even greater severity, when governmental bodies adopt them into law. This governmental adoption is a widespread phenomenon. Federal, State and local governments routinely base their statutes and regulations upon trade standards, thereby elevating them to a mandatory status enforceable by law. Yet governmental bodies, particularly those on the State or local level, often have neither the time nor the expertise to develop their own standards or to study trade standards closely. Therefore, governmental adoption often occurs with only cursory review of the standard's content. The 197[illegible] FTC staff study on standardization supports this view:

> Voluntary standards have a tremendous impact on the development of legislation, particularly safety codes enacted by State and local governments. These codes are for the most part developed with little independent scrutiny by the government body.

Similarly, the 1970 final report of the National Commission on Product Safety found that States had adopted trade standards for electrical appliances, fire extinguishers, and gas appliances "apparently without independent evaluation of their effectiveness."

Trade standards groups fully encourage this widespread governmental adoption. The American National Standards Institute, which is the big one, ANSI, for example, candidly states in its 1976 annual report that one reason the Federal Government has adopted so many trade standards is ". . . ANSI's and its federated membership's successful efforts to encourage use of concensus standards in implementing legislation. . . ." By the way, ANSI had to change its name after a number of congressional hearings contained testimony raising objections to its former name, which was the U.S. Standards Institute, as if it was conveying some official U.S. Government imprimatur. One of ANSI's most successful efforts has been in obtaining the adoption of over 240 of its standards by the Occupational Safety and Health Administration here in Washington.

Indeed, in November 1976, ANSI and OSHA signed a formal agreement designed to facilitate future use of ANSI standards. Little attention should therefore be paid to claims that such trade standards are not lobbied vigorously into legal standards or regulations by their shapers.

In a really ironic way, we have had Congress enact safety laws which have been administered in such a way as simply to further the facilitation of the transfer of private standards into Federal law as a way of circumventing the true congressional intent and making a mockery out of many health and safety laws passed by the U.S. Congress.

Routine governmental adoption of trade standards is particularly disturbing in matters of public health and safety. Time and again in recent years legislatures have placed responsibility for health and safety standards in the hands of Government agencies, where it properly belongs. Yet, Government standardsetters often turn right around and, in effect, give that power back to the private sector by adopting or incorporating by reference trade standards without giving them full review.

The dangerously misleading trade standards for testing plastic products, widely incorporated by reference into State and local construction codes, demonstrate how this faith in private standards is sadly misplaced.

A second example of unwise governmental adoption of trade safety standards is aluminum wiring. As we discuss later in our testimony, aluminum wiring created a fire hazard in 2 million homes because State and local construction codes blindly referenced lax trade standards. These myriad abuses in the trade product standards system provide ample reason for Federal regulation.

This subcommittee can choose among several different approaches to curb the abuses. One method would be to provide a right of

private legal action to aggrieved consumers and businesses. But by itself such a right would not provide the necessary consumer protection. Consumers are seldom aware of the harm wrought by standards abuses. If by chance they do learn of an abuse that affects them, it is usually too late to obtain a useful remedy. From the consumer viewpoint, therefore, standards abuses must be corrected at their source, the standards writing stage. For businesses, however, a right of action specifically based upon the FTC's title 1 rules would be useful.

I am not discounting entirely the usefulness of private consumer legal actions or class actions, but they are a sort of remedial, last gap measure, useful to have around, abut we have to focus on a structure of Government standards setting that inspires prevention and foresees and forestalls abuses in the first place.

Now, it is my personal judgment, Mr. Chairman, that a more promising approach would be to replace the present trade standards system with governmental or consumer institutions capable of setting product standards independently.

If the industries want to have their own groups, fine; they can have their own groups as they do now. But this standards setting function is so fundamental for the proper working of so many Federal health and safety laws that it should go hand in glove with these safety laws instead of the present situation which incorporates industry standards by reference.

For example, our public school systems should have access to independent analyses to determine how much lighting their students need to read by, rather than be forced to follow the self-serving recommendations of the lighting industry's watt hucksters.

Similarly, local building code officials should have access to independently determined safety standards for household wiring, rather than be forced to depend upon the industry apologists at Underwriters Laboratories.

To carry out these duties well, governmental institutions will need a whole new set of tools, such as their own testing labs—or the ability to call upon independent research organizations—and built-in mechanisms for public interest representation.

The approach chosen for title 1, to direct the FTC to write and enforce procedural rules for trade standard setting groups, does not, of course, fashion such a democratic and fair product standards system in which trade standards would have to compete with well-founded alternatives from impartial sources. Instead of shifting the balance of power from producers to consumers, it adjusts the existing system for smoother running.

Nonetheless, title 1 offers important improvements. Its requirements for reforms such as balanced standards committees and effective appeals mechanisms would at long last introduce some procedural fairness into what really should be called the "trade standards" system.

A few words about how these trade standards groups operate. Their procedures for obtaining the participation of consumers, procedures adopted recently, and other independent interests are disgracefully inadequate. Industry representatives always far outnumber those representing consumers on committees where standards are written, the most important step in the standards setting process.

On the ANSI and National Fire Protection Association mobile home standards committee, for example, manufacturer and supplier representatives make up 36 percent of the voting membership, while consumer representatives comprise only 4 percent. The remaining members are representatives of private associations, Government officials, and a handful of others.

Moreover, the industry's representatives have the financial resources to attend meetings regularly, while consumer members can afford to attend only sporadically, if at all.

As a result, the industry's strength far exceeds its theoretical maximum; the mobile home industry's nominal 36 percent representation routinely tops 50 percent at committee meetings.

The American Society for Testing and Materials committee on safety standards for bathtubs and showers—people slip very frequently in bathtubs and showers—provides another example of consumer underrepresentation.

Consumers, who do the slipping in the bathtubs and in the showers, many of them from a Pennsylvania senior citizens group, comprise a far greater percentage of that committee than most such groups, about 10 percent.

Yet, the bathroom products industry so dominates the committee's deliberations that at one point the chairperson canceled a committee meeting because it conflicted with the National Association of Home Builders annual exhibition. Besides their numerical underrepresentation, consumers also lack the preparation time and access to technical resources necessary for effective standards work. Industry representatives, on the other hand, who are paid for their standards work, have ample time and resources to prepare and support their arguments. In contrast, consumer representatives usually must work as volunteers.

Both the American National Standards Institute and Underwriters Laboratories rely upon "consumer council" advisory bodies as their primary source of consumer input. But these councils are little more than public relations gimmicks. Their review of proposed standards comes too late in the process to have a significant impact. Only by active participation in actually writing a standard can consumers have a meaningful voice in its content. Moreover, most of NASI's consumer council members are not even consumers. Instead, they represent producers or industrial and commercial intermediaries. the same is true for many of the members of UL's consumer council.

ANSI's council, for example, includes bogus consumer advocates such as representatives from the American Bankers Association, the Can Manufacturers Institute, du Pont, and Whirlpool. UI 's 1976 council roster lists representatives from corporations such as J. C. Penney, Woolworth, Sears, Roebuck, and Lever Brothers. At least half of ANSI's board of directors represent companies easily identified as big business, including A.T. & T., Exxon, du Pont, IBM, U.S. Steel, and Xerox, and corporations and trade associations comprised all but a handful of ANSI's hundreds of supporting members.

Moving ahead, I would like to discuss in conclusion two examples of how trade standards systems harm consumers and they illustrate the need for title 1's procedural requirements.

The first involves excessive lighting levels, how industry uses standards to boost sales artificially.

Now, President Carter is going to make a number of addresses and messages this week on energy. He will call for energy efficiency. But I will wager you that nowhere in the administration's message will there be a critique or even an observation on the critical crippling affect on our energy needs that the standards systems which I am about to discuss will continue to have.

The electric companies want to sell more electricity. The illuminating fixtures manufacturers want to put in more lights. They have a vested interest in waste. Operating on the popular myth that the more light there is, the better, in office buildings, schools, libraries, supermarkets, and the like, the electric utilities and the illuminating fixtures manufacturers have continually escalated the standard for lighting intensity in our buildings.

As a Nation we light our buildings far more brightly than is necessary for visual safety, comfort, or efficiency. Experts estimate that U.S. lighting levels can be safely reduced by at least one-third, a reduction that would slash the Nation's total electric lighting bill by at least $3.5 billion a year. Responsibility for the excessive lighting levels rests with a standards group called the Illuminating Engineering Society. About the principal goal of the Illuminating Engineering Society is to illuminate the profits of the corporations that dominate it.

The Illuminating Engineering Society's widely recommended lighting levels have increased dramatically in recent decades and now stand as the world's highest.

A good example of the IES standards' wasteful excess are its school lighting recommendations. The students in the audience today should take this information back to their schools and conduct an energy waste survey in order to determine how the IES has gotten to their school in such a way as to further burden the property taxes that their parents have to pay in order to pay for the overlighting in their schools.

Some of these schools have so much lighting that the lights light the lights. For certain classroom areas, such as study halls, the Illuminating Engineering Society recommends 70 footcandles—one footcandle is equal to the light of one candle at the distance of one foot. Seventy footcandles is the equivalent of an astounding ten ceiling globes, each with a 100-watt incandescent bulb, in a 10 by 10 foot room. That is more lighting than this room has by far, quite apart from the sun that is coming in to make the lights that are now on inadvisable.

These IES school lighting levels are more than twice as high as the 1958 IES recommendation of 30 footcandles, which ophthamologists generally agree is an adequate amount of light for most people in most reading situations. Those of us who went to elementary and high school before 1958 do not recall squinting in order to read our textbooks or our notebooks. It was 30 footcandles then, and more than double that now, and still going up if this process is not stopped.

IES recommended lighting levels for offices and libraries are also ridiculously high. IES office lighting levels are roughly twice as high as those recommended by the Federal Energy Administration. The library levels are double those that Keyes Metcalf, former Harvard

librarian and acknowledged dean of library lighting consultants, recommends as adequate for the substantial majority of library users.

High general lighting levels are not necessary for proper vision. Ophthamologists are in general agreement that lower lighting levels will not harm the eye. In fact, there is even some evidence that high levels may impair vision. Nor are high lighting levels necessary for visual comfort or efficiency for most people. Beyond 20 to 30 footcandles, increased foot candle power provides only minimal improvements in the eye's ability to perceive detail, but a maximum sustenance for greater sales by the electric companies for greater profits. There are some buildings now in the U.S. that have over 100 footcandles and excessive lighting by anybody's standards. The reason for the IES's excessively high lighting standards is that the society, the Illuminating Engineering Society, is essentially a trade association for the lighting industry, promoting its interests rather than the general public's.

Fully 57 percent of IES members, and most of the IES "sustaining member" financial angels, are sellers of lighting products or services who have a direct economic stake in keeping lighting levels high. The roster of IES national officers also shows undue industry influence, almost half represent sellers of lighting equipment or electricity. Further, IES obtains well over half of its income from the lighting industry. The lighting industry's candlepower pushers also largely control the IES technical committees, where the critical work of actually writing the lighting level standards takes place. Sellers or installers of lighting equipment or of electricity provide over half the committee's roster. Through its manipulation of the IES standards, then, the lighting industry has devised the ultimate sales tool: In the name of public health and under the guise of a supposed public service organization, the industry sets ever increasing and wasteful lighting levels that in turn stimulate ever escalating sales.

The second example relates to hazardous aluminum wiring. Standards developed by Underwriters Laboratories, the Nation's largest tester of household electrical products, facilitated the installation of hazardous aluminum wiring in over two million homes from 1965 to 1972. This wiring soon earned a reputation as a serious fire hazard.

Fire departments across the country have identified aluminum wiring as the cause of numerous fires—including at least 12 recorded deaths—and dangerous electrical failures.

It was on the basis of these reports that in September 1975 the U.S. Department of Housing and Urban Development banned the use of aluminum wiring in mobile homes. In November 1975, the U.S. Consumer Product Safety Commission "preliminarily determined" certain sizes of aluminum wiring to "present an unreasonable risk of death or injury."

The long string of weak UL standards began in 1966 when UL gave the go-ahead—with only minimal restrictions—for wiring certain outlets and switches with aluminum, despite aluminum's known propensity to overheat and cause fires.

By 1969, however, enough fire departments and homeowners were complaining about fires and smoking wall sockets to wake even a sleeping giant like UL, which then cosponsored a survey with the National Electrical Manufacturers Association to study the problem.

Despite its knowledge of the aluminum wiring hazard in the late sixties, UL did not significantly upgrade its standards until 1971.

The most important of those changes amounted to a long overdue prohibition of "old technology" aluminum wiring connection devices. This prohibition supposedly took effect in September 1971, but in fact UL privately authorized the electrical industry to ignore it and to continue wiring homes with the same connection devices that UL had declared unsafe.

Not until almost a year later, when "new technology" connection devices became available and the industry's profits were no longer endangered, did UL reconcile its private and public policies and require the "new technology" connection devices.

UL's present aluminum wiring standards, though an improvement over earlier ones, remain inadequate to cope with aluminum wiring's dangerous properties. The Consumer Product Safety Commission has criticized the standards as deficient in 13 important aspects. UL's failure to protect the public occurred because in developing its standards UL relies heavily upon product manufacturers at the expense of a consumer orientation.

The cornerstone of this undue industry influence is UL's financial base: UL derives most of its income from manufacturers who pay it for testing their products.

In the late sixties, for example, Mr. Chairman, UL missed the fact that hundreds of thousands of color TV sets were emitting dangerous levels of radiation to unsuspecting viewers in their homes. UL has an interesting record in what it chooses to test and what it chooses not to test, and what it chooses to inform the public from its ample files of safety defects and what it chooses not to inform the public.

A second important source of undue industry influence here is the role UL gives manufacturers in shaping its standards. For its aluminum wiring standards, UL not only solicited the view of its regular manufacturer advisory groups, but also sponsored a special advisory committee that gave the aluminum wiring industry an even stronger voice. A lopsided 73 percent of this committee's non-UL members represented sellers of aluminum wiring products. In contrast, UL's consumer advisory council is little more than a public relations gimmick, as we have already discussed. Given the pro-industry bias of UL's standards setting system, it is not surprising that its aluminum wiring standards guard manufacturers' sales but ignore the public safety. Those are two examples of many to further the record as a basis for support of the legislation that is before this subcommittee. Thank you, Mr. Chairman.

Senator ABOUREZK. Thank you very much, Mr. Nader, for a well prepared statement.

You stated at one point in the statement, and I quote, "a more promising approach would be to replace the present trade standards system with governmental institutions capable of setting the product standards independently." Is it your view that the establishment of product standards is more appropriately a Government function than an industry function, or do you think it might be a joint undertaking of both the Government and the private sectors?

Mr. NADER. Well, industry may want to have its own standards for industry purposes. But when Government has to fulfill congres-

sional mandates for health and safety, the Government should have its own standards capability.

After all, if you look at the purposes for which these standards are used—that is, the health and safety protection of the public, the facilitation of competition in the marketplace, and the enhanced procurement ability of the biggest consumer of all, which is the U.S. Government—it will easily justify the taxpayer expenditure on a Government standards system with Government laboratories, Government testing installations, and Government proving grounds for such situations as automobile and aviation standards.

So that there is just no question in my mind that the taxpayer will be much better off and people will be subject to much greater health and safety environments, and the Government will get more for its money in its multibillion procurement of such things as light bulbs, apparel, drugs, and automobiles, and the thousands of other products that it justifies and independent Government standards capability.

Senator ABOUREZK. Before I ask the next question, I don't want to forget this. I have to announce that you are appearing here today on behalf of yourself, and not on behalf of any organization that your are a member of.

Mr. NADER. That is right.

Senator ABOUREZK. If the Government did have its own standards-setting agency, would you recommend also some sort of protection against industries lobbying, in effect, to accomplish the same things that they are accomplishing now with the private standards?

Mr. NADER. Yes. The best protection is to give the Government its own technical laboratory and proving ground capability.

Senator ABOUREZK. Some kind of insulation from industry lobbying?

Mr. NADER. That is right. Insulation from having to rely on industry data, the way the U.S. Government still has to rely on oil and gas industry data. Imagine, the U.S. Government, one of the biggest buyers of oil and gas, supposedly intent on setting an energy policy for the United States, still relies on the oil and gas industry for reserve data.

I might add that if Sears, Roebuck can afford and economically justify its own testing laboratories and its own specifications directed toward enhancing its purchases of products from manufacturers that it puts in its catalog to sell to consumers, then certainly the Federal Government, which is far larger, has far broader public responsibilities and bigger procurement needs, can justify a similar independent capability.

Senator ABOUREZK. One of the arguments used by the standards-developing organizations against this legislation and against the requirement that standards committees be balanced to include such affected interests as consumers, is that you would be unable to find consumers who are either qualified or willing to serve. Do you have a comment on that position?

Mr. NADER. Yes. You know, that is the age old argument. You remember the British in India. India is simply not ready for democracy because there aren't enough citizens in India who understand democracy, and minority groups in this country aren't ready for full absorption of rights because they don't know how to govern themselves, et cetera.

First of all, demand creates capability. The more demand there is for consumer input, the more incentive and interest articulate and informed consumers will have to come forward from our ample ranks of citizens in the United States and participate.

For instance, 10 years ago President Lyndon Johnson would not have been able to find as many consumer experienced people to go into Government as President Carter is finding. Why? Because there is a growing consumer movement, growing consumer demand, and growing receptivity to consumer advocacy roles.

Secondly, there is a huge area of unemployment in our country called Ph. D.'s, in all kinds of scientific and engineering disciplines. They certainly could be tapped to bring forward a consumer viewpoint.

Thirdly, there are a lot of victims in this country, and if victims know one thing, they know how to ask questions about what victimized them. So, if the trade associations can't find skilled consumer advocates, I suggest they look at some of the consumer complaint letters that come in to Government and come in to their own companies, pick some of the more articulate and detailed ones, and then solicit from those letterwriters' ranks.

Some of these letters represent extraordinarily fine perception and dedication, and could be a reservoir for staffing these standards committees.

In short, Mr. Chairman, I don't buy at all the argument that there aren't enough consumer representatives.

If the industry standards committees were so hot to find consumer representatives, how come I have never received a letter from them. I should be getting letters every day saying who do you recommend for the shoe traction standards committee of ASTM, and many other consumer advocates in the city and in the country should be receiving letters of inquiry if the standards committees and associations can't find people to fulfill these roles.

Senator ABOUREZK. What do you know about ANSI's consumer council, which is what they are recommending we utilize throughout the standards developing industry, rather than this legislation?

Mr. NADER. Again, it is a self-selecting process whereby the more vigorous consumer advocates do not get an opportunity to perform. The definition of consumer involves intermediary companies, or other kinds of associations that represent intermediary companies between the primary seller and the ultimate consumer.

I don't think ANSI is capable of being repaired. I think it knows what its mission is. Its mission is to serve industry and commerce in accordance with the concensus principle, the lowest common denominator, and the politics of the industry that dominates it.

Senator ABOUREZK. Thank you.

Senator Metzenbaum?

Senator METZENBAUM. Yes.

How are the present standards, Mr. Nader, enforced? I know that in some instance in order to get insurance you have to have approval of Underwriters Laboratories. But how are the other enforcement procedures accomplished?

Mr. NADER. Well, first they are enforced by being part of local codes or State and Federal standards. That is the most obvious way they are enforced, because they are incorporated in their totality.

Secondly, they are enforced, as you say, by third party conditions. The insurance industry will say, we will not ensure this building unless the wiring meets Underwriters Lab specifications.

Thirdly, they are enforced to the extent that they are successful as defenses in product liability suits. That is another pernicious misuse of the standards.

A consumer gets injured, say, in a household appliance accident. Let's say a fire in a household appliance. The consumer sues the manufacturer. The manufacturer comes in with their expert witnesses and says to the judge and jury, this product was not negligently constructed or designed because it meets ANSI standards. And to the extent that that kind of defense is allowed in the courtroom and is treated by the jury and the jury relies on it without knowing how these standards were arrived at, to that extent these standards are translated into enforceable codes to deny the consumer adequate compensation for the injuries.

There is a fourth way they are enforced, and that is monopoly. When they are used to drive out small innovative businesses, and when they are used as a way of retarding the rate of innovation because the existing technology that the companies are invested in is sufficiently profitable and perhaps more profitable than new kinds of innovation would be, then the antitrust violation patterns serve as an enforcement mechanism for these standards.

Senator METZENBAUM. Is S. 825 applicable to a public body, such as a state body that might be set up to provide for similar standards?

Mr. NADER. Mr. Maier would like to respond to that.

Mr. MAIER. As I understand the bill, it only applies to trade standards groups, and not to governmental institutions.

Senator METZENBAUM. If that be the case, and that is the way I read the bill also, would it not then be possible for the very same groups who are presently using the trade associations, almost to speak trade associations, standards setting groups, to go to the various State legislative bodies or the State building and standards groups, the commissions that exist in most States, and accomplish the same purpose and be exempt from the provisions of this law?

Mr. MAIER. That is why we think that it is important to provide those governmental institutions with resources for producing their own standards, for example access to independent testing laboratories.

Senator METZENBAUM. Yes, but that doesn't answer my question. My question is, assume the passage of this legislation, and then assume one of these very same groups says, as they did in the insurance industry, that we will go back to the various State bodies and we will set up something similar to that which we have in Ohio called the rating bureau, which really sets forth the policy language and provides for the kind of coverage you get under your insurance policy, and provides for rates, and it is set up as a State body, but it is really totally run by the insurance industry. My question to you is, how would you preclude, assuming the passage of this legislation, the same kind of activity on the part of the various bodies that presently have the standards from accomplishing their same objective by doing it through the 50 States of the Union, and I think they might very well be able to accomplish just that objective?

Mr. MAIER. Yes, that is a danger. I think it would be difficult to preclude them from lobbying.

Senator METZENBAUM. With that I would agree.

Mr. MAIER. That would be a very difficult task, indeed. As I said, I think the way to do that, to prevent that from happening, though, is to take preventive measures, such as equipping governmental agencies with the resources necessary to develop the standards on their own so that they can say to the private standards groups, look, we don't need your standards, we have the resources to develop them on our own.

Senator METZENBAUM. My question leads me to the point of whether or not we don't need language in this legislation to restrict or at least to regulate such activities on the part of the national organizations, because it is they who would be moving into the various States to accomplish the very same objectives that they have been able to accomplish at the present time under this legislation.

Mr. MAIER. That might be very useful, indeed.

Mr. NADER. You might want to redefine the definition of standards to deal with this escape potential within a State jurisdiction, the evasive maneuver that you have just described.

Senator METZENBAUM. I would recommend that you at least give the subject consideration.

Mr. RAY. I think it would be very difficult to stop these organizations from lobbying. But under this legislation, the Federal Trade Commission, can outlaw a restrictive or unreasonable standard in or affecting interstate commerce. It would be able to force the standards-setting organization to withdraw such standards. Of course, it could issue cease and desist orders or seek civil penalties if they continue to lobby to promote such standards. So, the bill is directed at the source and I think the FTC can get after the kind of activities you describe.

Mr. NADER. Do I understand you correctly, Senator Metzenbaum, that what you were saying is, what would stop a national standards group from setting up a separate State group and just operating within each State's boundaries to lobby its state group standards into state law? Wasn't that your question?

Senator METZENBAUM. That is my question, and it comes about by reason of the fact that some years ago there was a Supreme Court decision that raised the question of Federal regulation of the insurance industry. There was then passed legislation at the congressional level, probably before you were born, Ralph. It was a while ago——

Mr. NADER. 1944.

Senator METZENBAUM. You were still pretty young at the time I think this occurred.

Mr. NADER. I was still a Yankee fan.

Senator METZENBAUM. As a matter of fact, what then happened was Congress passed legislation making it possible for requiring the States to move into this field, or otherwise making the insurance industry subject to Federal regulation. The insurance industry moved into the various States, set up these rating bureaus, which I know in Ohio, and I would guess the same is true throughout the Nation, that are an absolute absurdity, because there is no regulation provided. They are totally controlled by the insurance industry. There is no public representation, and there is no public protection.

What I am concerned about is the passage of this legislation and then leaving a door open through which the same situation that presently prevails could be accomplished on a 50-State basis, and I would guess that the various State associations would have sufficient ability to pass such legislation or achieve their objective in a more than majority of the States of the Union. And I am suggesting, although I know that you are saying that you think that it presently is covered, I would want to be certain that it is covered.

A couple more questions. Would a standards setting group or an approving group such as Good Housekeeping or Consumers Union be subject to the language of this legislative proposal? And if not, why not?

Mr. MAIER. It would be my guess that they would be covered.

Senator METZENBAUM. Thank you. I have no further questions, Mr. Chairman.

Senator ABOUREZK. Mr. Sneeden, Mr. Chumbris?

Mr. CHUMBRIS. No.

Senator ABOUREZK. Thank you very much for your presentation.

[The prepared statement of Mr. Nader and Mr. Maier follows:]

PREPARED STATEMENT OF RALPH NADER

Mr. Chairman, thank you for the invitation to testify on S. 825, The Voluntary Standards and Accreditation Act of 1977.

SOUND REASONS EXIST FOR FEDERAL REGULATION OF TRADE PRODUCT STANDARD-SETTERS

Privately-developed trade standards have an enormous, but largely unrecognized impact on consumers. An estimated 400 trade standards groups publish over 20,000 product standards covering such diverse products as household appliances, portland cement, 16-millimeter movie reels, and microwave tubes. At the urging of trade standards groups, many of these standards have been adopted in government statutes and regulations. For example, state and local governments routinely incorporate by reference trade standards in their construction code requirements.

With their far reaching impact, product standards have the potential to be used for productive purposes. For example, they could facilitate competition by giving consumers more and better purchase information, lower production costs by increasing industrial efficiency, and protect consumers from unsafe products. Unfortunately, present trade standards frequently fail to realize their potential for a positive contribution to the nation's economy.

Instead, trade product standards often harm consumers. The history of standards is strewn with abuses: standards essentially written by large corporations to exclude competitors from the marketplace, standards that misrepresent hazardous products as safe, standards that boost sales while benefitting only the producer, and standards designed to head off tough government safety requirements rather than protect the public.

This committee has already heard testimony on the use of trade standards by large firms for anticompetitive purposes. In the case of automatic vent dampers, the American Gas Association (AGA) has used its grip on standards-setting for gas appliances to prevent the marketing of a device that would reduce energy consumption for gas home heating by an estimated 23 percent. The AGA's efforts have thus blocked consumer access to an energy conservation device that would compete with natural gas. In the case of low water boiler cutoff devices, a dominant manufacturer of boiler controls used its close ties to an American Society of Mechanical Engineers standards committee to spread the word—deliberately and incorrectly—that a small competitor's products did not comply with the standard. By this maneuver, McDonnell & Miller, Inc. (which has more than 85 percent of the annual $10 million boiler control market and is owned by ITT) retained its dominant market share and sent the small manufacturer's sales into an immediate tailspin.

The use of standards to exclude competitors from the marketplace is particularly disturbing in view of the ineffectual record of antitrust laws in guarding against such practices. Aside from *per se* antitrust violations such as price fixing, the courts have generally refused to apply antitrust sanctions to trade standards groups. A 1972 Federal Trade Commission staff study on standardization supports this assessment.

Footnotes at end of statement.