BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

BOARD OF DIRECTORS' REGULAR MEETING

MAY 18, 2005

A meeting of the Bay Area Air Quality Management District Board of Directors will be held at 9:45 a.m. in the 7th floor Board Room at the Air District headquarters, 939 Ellis Street, San Francisco, California.

Questions About an Agenda Item

The name, telephone number and e-mail of the appropriate staff person to contact for additional information or to resolve concerns is listed for each agenda item.

Meeting Procedures

The public meeting of the Air District Board of Directors begins at 9:45 a.m. The Board of Directors generally will consider items in the order listed on the agenda. However, any item may be considered in any order.

After action on any agenda item not requiring a public hearing, the Board may reconsider or amend the item at any time during the meeting.

BOARD OF DIRECTORS' REGULAR MEETING
AGENDA

WEDNESDAY	**BOARD ROOM**
MAY 18, 2005	**7TH FLOOR**

9:45 A.M.

CALL TO ORDER

Opening Comments	Marland Townsend, Chairperson
Roll Call	Clerk of the Boards
Pledge of Allegiance	
Commendation/Proclamation	

PUBLIC COMMENT PERIOD

Public Comment on Non-Agenda Items, Pursuant to Government Code Section 54954.3 *Members of the public are afforded the opportunity to speak on any agenda item. All agendas for regular meetings are posted at District headquarters, 939 Ellis Street, San Francisco, CA, at least 72 hours in advance of a regular meeting. At the beginning of the regular meeting agenda, an opportunity is also provided for the public to speak on any subject within the Board's subject matter jurisdiction. Speakers will be limited to three (3) minutes each***.**

PRESENTATION

The Board of Directors will receive presentations from Robertson Middle School students who have completed the Clean Air Challenge curriculum. Students have been selected to present their final projects and to thank the Board.

CONSENT CALENDAR (ITEMS 1 – 9)

Staff/Phone (415) 749-

1. Minutes of May 4, 2005 — **M. Romaidis/4965** mromaidis@baaqmd.gov

2. Communications — **J. Broadbent/5052** jbroadbent@baaqmd.gov

   Information only

3. Report of the Advisory Council — **B. Zamora/4962** Bzamora@co.sanmateo.ca.us

4. Monthly Activity Report — **J. Broadbent/5052** jbroadbent@baaqmd.gov

   Report of Division Activities for the month of April 2005.

5. Resolution Supporting World Environment Day and the San Francisco Urban Environmental Accords — **J. Broadbent/5052** jbroadbent@baaqmd.gov

   The Board of Directors will consider approval of a resolution supporting the World Environment Day 2005 and the San Francisco Urban Environmental Accords.

6. Set Public Hearing for June 1, 2005 to Consider Approval of Proposed Amendments to Regulation 2, Rule 1: Permits, Section 407: Permit (Authority to Construct) Expiration and approval of the filing of a California Environmental Quality Act (CEQA) Notice of Exemption

J. Broadbent/5052
jbroadbent@baaqmd.gov

The proposed amendments to Regulation 2, Rule 1, Section 407 will allow an Authority to Construct to be renewed by request beyond the four year time limit if the authority to construct has been substantially used or the project is a long term project that is covered by an EIR.

7. Set Public Hearings for June 1, 2005 and June 15, 2005 to Consider the Air District's Proposed FY 2005/2006 Budget

J. Broadbent/5052
jbroadbent@baaqmd.gov

Pursuant to Health and Safety code Section 40131, the Air District is setting public hearings for June 1, 2005 and June 15, 2005 to review the Air District's Proposed FY 2005/2006 Budget. Final action on the budget will be taken at the conclusion of the second public hearing on this matter scheduled for June 15, 2005.

8. Set Public Hearing for June 15, 2005 to Consider Approval of Proposed Amendments to Regulation 3: Fees and approval of the filing of a California Environmental Quality Act (CEQA) Notice of Exemption

J. Broadbent/5052
jbroadbent@baaqmd.gov

The proposed amendments to Regulation 3: Fees, would increase fees on July 1, 2005 based on the results of the Cost Recovery Study by Stonefield Josephson, Inc.

9. Set Public Hearing for June 15, 2005 to Consider Proposed New Regulation 2, Rule 5: New Source Review of Toxic Air Contaminants; Proposed Manual of Procedures, Volume II, Part 4: New and Modified Sources of Toxic Air Contaminants; proposed amendments to various District rules for consistency with proposed Regulation 2, Rule 5; and certification of a California Environmental Quality Act (CEQA) Environmental Impact Report.

J. Broadbent/5052
jbroadbent@baaqmd.gov

The proposed rule and chapter to the Manual of Procedures will incorporate existing Air Toxics New Source Review policies to prevent significant increases in health risks resulting from new and modified sources of toxic air contaminants. The rule will also reduce existing health risks by requiring updated control requirements when older, more highly polluting sources are modified or replaced.

COMMITTEE REPORTS AND RECOMMENDATIONS

10. Report of the **Budget and Finance Committee** Meeting of May 5, 2005

CHAIR: J. MILLER

J. Broadbent/5052
jbroadbent@baaqmd.gov

11. Report of the **Public Outreach Committee** Meeting of May 16, 2005

CHAIR: S. YOUNG **J. Broadbent/5052**
jbroadbent@baaqmd.gov

PUBLIC HEARING

12. Public Hearing to Consider Amendments to District Manual of Procedures, Volume III: Laboratory Methods; and Approval of a Notice of Exemption pursuant to the California Environmental Quality Act **G. Kendall/4932**
gkendall@baaqmd.gov

Amendments to the Laboratory Methods in the Manual of Procedures are being proposed to incorporate advances in analytical equipment, add clarity, improve accuracy, reduce costs and respond to comments by EPA technical staff.

OTHER BUSINESS

13. Report of the Executive Officer/APCO

14. Chairperson's Report

15. Board Members' Comments

Any member of the Board, or its staff, on his or her own initiative or in response to questions posed by the public, may: ask a question for clarification, make a brief announcement or report on his or her own activities, provide a reference to staff regarding factual information, request staff to report back at a subsequent meeting concerning any matter or take action to direct staff to place a matter of business on a future agenda. (Gov't Code § 54954.2)

16. Time and Place of Next Meeting - 9:45 a.m., Wednesday, June 1, 2005 -939 Ellis Street, San Francisco, CA 94109

17. Adjournment

CONTACT CLERK OF THE BOARD - 939 ELLIS STREET SF, CA 94109 **(415) 749-4965**
FAX: (415) 928-8560
BAAQMD homepage:
www.baaqmd.gov

- To submit written comments on an agenda item in advance of the meeting.
- To request, in advance of the meeting, to be placed on the list to testify on an agenda item.
- To request special accommodations for those persons with disabilities. Notification to the Clerk's Office should be given at least 3 working days prior to the date of the meeting so that arrangements can be made accordingly.

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Townsend and Members
of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: May 10, 2005

Re: Clean Air Challenge Presentation - Robertson Middle School Students

RECOMMENDED ACTIONS

Information.

DISCUSSION

As part of the *Spare the Air* youth outreach program, the Air District--partnering with Enterprise for Education and Agilent Technologies--has sponsored the Clean Air Challenge Curriculum for middle and high school students throughout the region. The Clean Air Challenge teaches students about what causes pollution, the health effects of ozone and transportation solutions. It is aligned with California's mandated science and math requirements and presents "real life" air quality and urban pollution issues. In fiscal year 2004-2005, 170 teachers were trained to teach the curriculum.

Teacher Jane Huvane of Robertson Middle School in Daly City has used the Clean Air Challenge to teach air quality issues to her students since the program began in 2002. Part of the program is an oral presentation that students give as a final project. Several Robertson Middle School students have been selected to present an abbreviated version of their final projects to the Board and thank the Board for providing the Clean Air Challenge to their community. The students include Emerald Depadua, Jonathan Gonzalez, Sherie Martinez, Janette Juan, David Hernandez and Brent Aguilar.

BUDGET CONSIDERATION/FINANCIAL IMPACTS

Funding for this program comes from the Air District, Supplemental Environmental Projects (SEP), Agilent Technologies and other partners.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Luna Salaver
Reviewed by: Jean Roggenkamp

AGENDA: 1

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Memorandum

To: Chairperson Townsend and Members
of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: May 11, 2005

Re: Board of Directors' Draft Meeting Minutes

RECOMMENDED ACTION:

Approve attached draft minutes of the Board of Directors' meeting of May 4, 2005.

DISCUSSION

Attached for your review and approval are the draft minutes of the May 4, 2005, Board of Directors' meeting.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

AGENDA NO.: 1

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 ELLIS STREET – SAN FRANCISCO, CA 94109

Draft Minutes: Board of Directors' Regular Meeting – May 4, 2005

Call To Order

Opening Comments: Chairperson Marland Townsend called the meeting to order at 9:52 a.m.

Roll Call: Present: Marland Townsend, Chair, Harold Brown (9:56 a.m.), Roberta Cooper, Chris Daly, Dan Dunnigan, Erin Garner, Scott Haggerty, Jerry Hill, Liz Kniss, Jake McGoldrick, Julia Miller, Mark Ross, Michael Shimansky, Gayle B. Uilkema, Brad Wagenknecht, Shelia Young.

Absent: Mark DeSaulnier, Patrick Kwok, Nate Miley, John Silva, Tim Smith, Pam Torliatt,.

Pledge of Allegiance: Director Cooper led the Board in the Pledge of Allegiance.

Commendation/Proclamation: There were none.

Public Comment Period: There were none.

Consent Calendar (Items 1 – 6)

1. Minutes of April 20, 2005
2. Communications. *Information only*
3. Report of the Advisory Council
4. Quarterly Report of Air Resources Board Representative
5. Quarterly Report of the Clerk of the Boards
6. Referral of Proposed Budget for Fiscal Year 2005/2006 to the Budget and Finance Committee

   Pursuant to Administrative Code Division II, Section 3.2 Fiscal Policies and Procedures, and in compliance with Section 29064 of the Government Code, the Board referred the proposed budget for Fiscal Year 2005/2006 to the Budget and Finance Committee for review and consideration.

Director Harold Brown arrived at 9:56 a.m.

Board Action: Director Wagenknecht moved approval of the Consent Calendar; seconded by Director Miller; carried unanimously.

Committee Reports and Recommendations

7. Report of the Mobile Source Committee Meeting of April 25, 2005

Action(s): The Committee recommends Board of Director approval of the following:

A) Receive report entitled *Transportation Fund for Clean Air (TFCA) Report on FY 2004/2005 Allocations and Effectiveness;*

B) Selection of Macias, Gini & Company as the auditor to conduct fiscal audits of 44 TFCA Regional Fund projects; and

C) Authorize the Executive Officer/APCO to execute a contract with the selected auditor in the amount of $85,610 for the provision of the audit services.

Director Haggerty presented the report and stated that the Mobile Source Committee met on Monday, April 25, 2005. At the meeting, staff presented an annual report entitled *Transportation Fund for Clean Air Report on fiscal Year 2004/2005 Allocations and Effectiveness.* The annual report fulfills the requirement that the Air District review the expenditure of the Transportation Fund for Clean Air (TFCA) revenues to determine their effectiveness in improving air quality. The annual report for fiscal year 2004/2005 summarizes all projects funded; funding allocations; and estimated emission reductions. The Committee recommends Board approval of the annual report.

Staff presented information on its request for the selection of a firm to conduct an audit of TFCA Regional Fund projects. Three proposals were received and staff reviewed the criteria for evaluation of the proposals. Staff requested, and the Committee recommends, Board approval to award a contract in the amount of $85,610 to the firm of Macias, Gini and Company to conduct fiscal audits of 44 TFCA Regional Fund projects.

Staff described activities to comply with the Committee's request to further evaluate pedestrian and arterial management projects funded by TFCA. The activities include a performance audit to examine these project types in detail; workshop(s) to discuss TFCA policies with Congestion Management Agencies and other stakeholders; and reviewing the findings and presenting recommendations to the Mobile Source Committee.

Board Action: Director Haggerty moved that the Board approve the recommendations and report of the Mobile Source Committee; seconded by Director Young; carried unanimously without objection.

Presentation

8. Report on the 2005 Spare the Air Campaign

Staff reviewed plans for the upcoming 2005 Spare the Air season, including free morning commutes on the first (5) five Spare the Air days announced during the weekdays.

Jean Roggenkamp, Deputy Air Pollution Control Officer, introduced the Spare the Air Program for 2005, and provided an overview of the program.

Ms. Roggenkamp stated that the goal of the program is to reduce the precursor compounds (NOx and VOC) that lead to ground level ozone formation and to avoid excesses of federal and state air quality standards. This is accomplished by asking the public to reduce driving, reduce the use of gasoline lawn and garden equipment, like lawn mowers and leaf blowers, and to avoid using consumer products that have high levels of VOC's such as hairsprays, bug sprays and BBQ lighter fluid.

The program will run from June 1, 2005 through October 14, 2005. It is funded by the Air District and the Metropolitan Transportation Commission (MTC) with Transportation Fund for Clean Air (TFCA) and Congestion Mitigation Air Quality (CMAQ) dollars.

The presentation was continued by Terry Lee, Director of Public Information. Ms. Lee provided further details on the program and reported that this year the Air District has a very ambitious program and will build on its core program by expanding the free transit component of last year's program to include all transit agencies. The presentation included an explanation on the following components of the Spare the Air Program:

Employers
Advertising
Sparetheair.org Website
Media Outreach
Measurement
Email Notification AirAlerts
Free Transit
Funding

The following transit agencies are participating in the program as of today:

ACE
AC Transit
Alameda/Oakland Ferry
BART
Benicia Transit
Caltrain
County Connection
Golden Gate Transit
LAVTA/Wheels
Muni
SamTrans
Santa Rosa CityBus
Sonoma County Transit
Tri Delta Transit
Union City Transit
VTA
Vallejo Baylink Ferry
VINE (Napa Valley)
West Cat

Director Townsend thanked Ms. Lee for the presentation and for the good work she and her staff are doing on this program.

Other Business

9. Report of the Executive Officer/APCO – Mr. Broadbent reported on the following items:

   1. The American Lung Association (ALA) is having its Clean Air Award Luncheon on Thursday, May 12, 2005 at 11:30 a.m., at the World Trade Club in San Francisco. The featured speaker is Robert Kennedy, Jr.

      Mr. Broadbent also reported that the ALA came out with their grading system last week, and purposely separated their luncheon event from the grading system. He further reported that in response to the Board of Directors' request, staff took the Board's direction and sent out a preemptive press release and there is a letter that is being written to ALA's national organization; this letter will be signed by the District as well as those agencies that are participating in the Joint Policy Committee. At the direction of the Board, the District has not co-sponsored this event.

      Director Uilkema referred this item to the Budget and Finance Committee.

   2. At the next Board of Directors' meeting on May 18, 2005 there will be a short presentation from students who have completed the Air District's Clean Air curriculum. As part of the District's educational efforts, these students will share their experiences on what they have learned.

10. Chairperson's Report: Chairperson Townsend stated he had no report.

Closed Session – The Board convened to Closed Session at 10:30 a.m.

11. Conference with Legal Counsel –

    Existing Litigation Government Code Section 54956.9(a)

    A need existed to meet with Counsel to discuss existing litigation:

    Bay Area Air Quality Management District Employees' Association v. Bay Area Air Quality Management District, PERB, Unfair Labor Practice Complaint, Case No. SF-CE-288-M.

Open Session – The Board reconvened to Open Session at 10:42 a.m.

Mr. Bunger stated that the Board met in Closed Session with Counsel and other necessary staff to discuss the matter identified at item 11 on the agenda and provided general direction to Counsel on the item.

12. Board Members' Comments: There were none.

13. Time and Place of Next Meeting – 9:45 a.m., Wednesday, May 18, 2005, 939 Ellis Street, San Francisco, CA 94109.

14. Adjournment – The meeting adjourned at 10:43 a.m.

Neel Advani
Deputy Clerk of the Boards

AGENDA: 4

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Memorandum

To: Chairperson Townsend and Members
of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: May 18, 2005

Re: Report of Division Activities for the month of April 2005

ADMINISTRATIVE SERVICES DIVISION – J. McKAY, ACTING DIRECTOR

The Proposed Budget was distributed to Board Members. The budgeting process includes strategy around the expense-side impact of increases to PERS funding, medical coverage and the 27 pay-period year. On the revenue-side, the challenge is a second year of reduced property tax revenue. Fortunately, this is the last year of the decrease.

The final FYE 2004 audit report was distributed to the Budget & Finance Committee.

The Third Quarter Financial Report for FY 2005-2005 will be presented at the second Budget and Finance Committee meeting in May.

Status of various capital projects in process:

	Started	% Complete	Completion Date
➢ Phase II Fire Alarm System	11/2003	85%	6/2005
➢ Executive Offices	12/2004	95%	5/2005
➢ Phase IV HVAC Upgrade	To be submitted in the May Budget and Finance meeting.		

COMPLIANCE & ENFORCEMENT DIVISION – K. WEE, DIRECTOR

Enforcement Program

Staff continued work with the Legal Division on Tesoro Refinery’s number five boiler house abatement order language for the upcoming hearing on May 5, 2005.

On April 19, 2005, staff issued a public nuisance Notice of Violation after receiving 6 complaints of offensive “garlic” odors and confirmed 5 to Bananas restaurant at 191 Pine St. Staff traced the odor directly to the restaurant’s stack. Restaurant management and the property owners are discussing compliance options.

On April 20, 2005, C&E staff along with Legal staff attended the Northern California District Environmental Crimes Task Force meeting in Berkeley. Active cases were discussed as well as opportunities to work together in the future. The new US Attorney representative expressed interest the District's Notices of Violations.

On April 21, 2005, Inspection and Engineering Staff conducted an inspection of all three Pacific Steel Casting plants for compliance with District rules and regulations. Last month the District issued Pacific Steel Casting a Public Nuisance Notice of Violation for seven confirmed odor complaints. This month staff has received 33 complaints (19 confirmed) from the community but the daily trigger for public nuisance has not been reached. Source tests of individual emission sources/points continue as part of the District's investigation into the possible odor sources from the plant that is impacting the community.

Compliance Assurance Program

Staff met with Coast Guard officials to board the cruise ship, Celebrity Mercury. This first inspection was a fact-finding investigation to develop and inspection program for CARB's ATCM on cruise ship incinerators. Staff investigated boarding procedures and how cruise ships operate their environmental departments. Sources reviewed included generators, wastewater treatment, oil/water separator, hazardous waste storage, paint storage, incinerators, dry cleaners and coatings. The Celebrity Mercury follows the International Marine Organization (IMO) environmental standards to handle all these waste streams not regulated by the District.

Compliance Assistance Program

Industry Compliance School for Regulation 8, Rule 45, Automotive Refinishing, is in preparation for June classes. The courses held in San Francisco, Emeryville, and Sunnyvale will help Autobody Shops understand how to comply with District air pollution regulations. The course will be free to all registrants.

Staff in conjunction with the Port of Oakland organized a Terminal Appointment System demonstration for truckers and trucking firm dispatchers on April 21, 2005. As a result of this meeting staff contacted the California Truckers Association (CTA) regarding completing additional appointment system demonstrations at CTA's next work group meeting. The goal of these outreach efforts is for the truckers to make more appointments which should result in shorter wait times at the Port of Oakland and less truck idling emissions.

Staff attended the Green Business (GB) County Coordinators' meeting at ABAG headquarters in Oakland. The coordinators re-considered the issue of defining and targeting small and medium businesses for the certification program. Compliance and Enforcement staff presented a brief overview of the ABAG GB program to the Engineering Division staff at their monthly staff meeting. The presentation covered how C&E Division staff interacts with the various county programs and how pollution prevention is promoted through the GB program. District C&E Division staff will be working with Administrative Services staff following budget completion to explore attaining GB certification for the District offices in San Francisco.

Staff also attended an EPA seminar on the advantages of Environmental Management Systems (EMS) for public agencies. Other attendees, such as the Port of Oakland, County and City Public Departments and Water agencies, were encouraged to develop an EMS. An

EPA Public Entity EMS Resource Center (PEER) is located at Region IX. The PEER center provides a network of support for local governments in developing their EMS.

Training

On April 28, 2005 staff attended the first Cal/EPA Cross Media Training Committee meeting on in Sacramento. This committee is working to integrate air pollution training curriculum into all other media training programs.

Staff completed the second class of 2005 In-Service Training course #2 on April 21. The third class is scheduled for May 5. The 3rd course will cover the topics of Landfills, CARB Diesel ATCMs, SEPs, new codes for timesheets and an overview of the Planning Division grants program. The next CARB training class is scheduled for June 28, covering a review of MACT rules.

Operations

On April 5, 2005, the first meeting for the preparation of a radio replacement/upgrade Request for Proposal (RFP) was conducted with the Thayer Consulting (Thayer) representatives. The meeting included an outline of District needs, logistical and project timelines discussions. Thayer has been provided with all technical documentation on the current radio system and completed a series of interviews with senior Inspection and Communications Center staff, visited repeater sites and observed staff field functions on Inspector ride-a-longs.

On April 26, 2005, a joint Regulation 12, Rule 11, Flare Monitoring, work group comprised of staff from Engineering, Rule Development and Technical Divisions and refinery inspectors was held. This workgroup will be working to confirm some of the assumptions around minimum flow at refinery flares and to provide additional information to Rule Development staff for the upcoming flare control rule.

Operations and ISS staff completed and tested changes to the IRIS Complaint and Dispatch applications. Staff has completed the conversion of the historic Reportable Compliance Activity (RCA) documents from the optical disc system to the NEKO document imaging and retention system. The conversion rate was 97%, with only 132 records (from a total of 3,563) failing to transfer (these will be manually transferred). Staff has completed the following new Administrative Operating Procedures (AOPs): After-Hours Answering Service Operations; Refinery Startup/Shutdown Notifications; Confidential Document Preparation and Retrieval. Additionally, staff is working on the following draft AOPs: Training; Reportable Compliance Activity; Officer of the Day; and Compliance Counselor Operations.

(See Attachment for Activities by County)

ENGINEERING DIVISION – B. BATEMAN, DIRECTOR

Toxics Program

The Toxic Evaluation Section completed a total of 39 risk screens during April. The majority of these risk screens were for diesel engine emergency generators and gas stations. A risk analysis was completed to evaluate potential health impacts associated with an incident at

Tesoro Refinery in Martinez. Another risk analysis was initiated to study a flaring incident at the Chevron-Texaco Refinery in Richmond. Staff conducted a workshop for the proposed Air Toxics New Source Review Rule, and a Draft EIR was issued for this rulemaking. This rule is scheduled to be considered for adoption by the Board of Directors this coming June.

Title V Program

The public comment period began for the reopened refinery Title V permits (Revision 2). This revision addresses issues raised by EPA in October 2004 and by the refineries in their permit appeals, and incorporates recently issued authorities to construct and permits to operate. Work began on Revision 3 of the refinery Title V permits, which will address issues raised by EPA in March 2005 in response to public petitions.

The public comment period began for renewal of the Title V permit for Rexam Beverage Can (Fairfield). The renewal permit for Mirant Delta (Pittsburg) was issued.

Permit Evaluation Program

Staff participated in a STAPPA/ALAPCO permitting committee conference call. Permit application submittals remain at very high levels. The majority of these are applications for Enhanced Vapor Recovery upgrades at gas stations and new diesel engine generators.

Engineering Special Projects Program

Staff completed the first phase of the Diesel Engine ATCM implementation program. A survey and questionnaire on compliance options was developed for facilities with existing, “in-use engines”. Mail out is scheduled in May.

Staff met with the State Lands Commission, U.S. Coast Guard Shippers and Shipping Agents to discuss the District’s marine loading and housekeeping rule making activities.

Community Air Risk Evaluation (CARE) Program

Work continued on a variety of tasks including a Scope of Work document and project timeline, the contract for a consultant to produce a gridded air toxics emissions inventory, a contract for the analysis of additional hydrocarbons on District PM filters, staff training in Geographical Information Systems (GIS), additional software and hardware purchases for GIS functionality, and preparation for the next Task Force meeting. The CARE program manager presented a program update to the District Advisory Council's Technical Committee last week, and a CARE program overview at an Air and Waste Management Association conference.

INFORMATION SYSTEMS DIVISION – J. McKAY, DIRECTOR

Toolsets for Permits/Enforcement/Legal

Work on an in-house pilot project has started. The Board approved funds to initiate an RFP to implement plans for this Project. Likely participants in the pilot include OpenText and other Content Management vendors. An update of the extensive requirement documentation that was previously developed continues. The design methodology for replacement of IRIS and Databank has concluded with clear focus on the importance of Content Management tools. While this may not allow the District to accomplish all of its objectives with a single vendor offering, it will allow the opportunity to substitute purchased modules for custom code.

Infrastructure

User migration is approximately 75% complete. The upgrade is motivated by security needs and equipment obsolescence.

LEGAL DIVISION – B. BUNGER, DISTRICT COUNSEL

The District Counsel's Office received 127 Violations reflected in Notices of Violation ("NOVs") for processing.

Mutual Settlement Program staff initiated settlement discussions regarding civil penalties for 84 Violations reflected in NOVs. In addition, Mutual Settlement Program staff sent 12 Final 30 Day Letters regarding civil penalties for 15 Violations reflected in NOVs. Finally, settlement negotiations by Mutual Settlement Program staff resulted in collection of $41,750 in civil penalties for 53 Violations reflected in NOVs.

Counsel in the District Counsel's Office initiated settlement discussions regarding civil penalties for 26 Violations reflected in NOVs. Settlement negotiations by counsel in the District Counsel's Office resulted in collection of $854,250 in civil penalties for 112 Violations reflected in NOVs.

(See Attachment for Penalties by County)

PLANNING DIVISION – H. HILKEN, DIRECTOR

Grant Programs

On April 14, staff released the Transportation Fund for Clean Air (TFCA) Regional Fund grant application packet; applications are due at the Air District by June 30. On April 25, staff presented to the Mobile Source Committee: 1) recommendation for approval of the TFCA annual report for fiscal year 2004/2005; 2) selection of a firm to perform the fiscal audit of completed TFCA Regional Fund projects; 3) staff's strategy to respond to the Committee's directive to further evaluate two TFCA eligible project types. Staff participated in a California Air Resources Board workshop regarding guidelines for the upcoming expansion of the Carl Moyer Program. A total of 629 eligible light-duty vehicles were purchased and scrapped by the three Vehicle Buy Back (VBB) Program contractors.

Rule Development Program

Staff convened a refinery wastewater treatment systems technical working group with an initial meeting on April 4 in Concord. The group will be addressing emissions from the biological and chemical wastewater treatment systems at refineries. Staff met with various stakeholders to discuss proposed Regulation 12, Rule 12: Flares at Petroleum Refineries, Regulation 8, Rule 5: Organic Liquid Storage Tanks, and Regulation 8, Rule 44: Marine Vessel Loading. Staff participated in conference calls with statewide workgroups for auto refinishing and architectural coatings. Staff spoke at a meeting of the Geological Society of America regarding naturally occurring asbestos.

Air Quality Planning Program

The District co-sponsored the California Climate Action Registry conference in Berkeley April 18 – 20, at which the Executive Officer moderated a panel on Bay Area climate change activities. Staff has developed a draft list of particulate matter control measures as required by SB 656, and expect to hold a public workshop and report to the Stationary Source Committee in May. Staff submitted comments on ARB's Air Quality and Land Use Handbook. Staff wrote five comment letters regarding air quality impacts of development projects and plans in the Bay Area: BART Warm Springs Extension; North San Jose Development Policies Update; San Carlos Circulation Element Update; The Villages at Fairfield; and the Gentry Property Annexation (Suisun City)

Research and Modeling

Staff participated in conference calls of the Northern California Agencies SIP/Transport Workgroup to discuss the status of 8-hour ozone modeling. Currently two 8-hour ozone episodes are being simulated (July 8-13, 1999 and July 28-August 3, 2000). The schedule for completion of modeling work is June, 2006. Staff also participated in conference calls of the Central California Ozone Study (CCOS) and the California Regional Particulate Air Quality Study (CRPAQS). Both studies are in the process of establishing new projects for additional data analysis and modeling. Staff prepared a draft analysis that presents preliminary findings of a study identifying the sources of Bay Area particulate matter. The analysis will inform the CARE program and SB 656 particulate matter reduction activities.

PUBLIC INFORMATION & OUTREACH – T. GALVIN LEE, DIRECTOR

April highlights in the Public Information Division include continuing coordination and planning for the 2005 Spare the Air advertising campaign and the Free Commute Program, revamping the Spare the Air website to include information on the District's 50th anniversary, and participation in several Earth Day events.

The Employer Outreach Program finalized pre-season packets for employers and schools. Approximately 575 school packets and 1100 employer packets were sent. School recruitment began in mid-April. To-date, 12 new school districts encompassing approximately 100 new schools have been registered for notification. Schools are provided with STA information and materials order forms. Employer recruitment also began at the end of April. A prospect list was developed from the RIDES database and several new employers have been registered for the Spare the Air employer program.

Staff recruited several new electronic sign boards to display real-time Spare the Air messages during the summer season. They include the Serramonte Mall, the IKEA store in East Palo Alto, and at the Antioch Auto Mall. Other electronic sign board recruitment continues.

TECHNICAL DIVISION – G. KENDALL, DIRECTOR

Air Quality

Air quality was in the Good AQI category throughout the entire month of April. Weather systems passed through the Bay Area every four to five days bringing clean air masses onshore and producing good vertical mixing. Temperatures remained cool, with highs in the 60's and low 70's. District stations recorded eight days of rain in April.

Air Monitoring

The enhanced wintertime sampling schedules for $PM_{2.5}$ monitors ended on March 31. Seven of the eight ozone monitors shut down during the low ozone winter period under a waiver granted by the EPA began operation on April 1. The eighth monitor, located at a Water District site in Hayward, will not begin operation until seismic upgrades at that facility are completed.

Meteorology and Forecasting

January 2005 air quality data were quality assured and entered into the EPA Air Quality System (AQS) database. Staff continued to make daily air quality and burn forecasts. Staff also made daily acreage allocations for the Suisun Marsh area for the extended spring Marsh Burn season, which continued until April 15th this year. An internal audit of the District meteorological monitoring system was completed. One staff member attended the Smoke Management Techniques class in Sacramento.

Quality Assurance

The Quality Assurance (QA) group continued its regular, ongoing performance audits by conducting audits on 19 monitors at 14 of the District's air monitoring stations. One staff member attended the 24th Annual National Conference on Managing Environmental Systems in San Diego, California. QA staff conducted a "shut-down" performance audit on a PM_{10} sampler operated by GAIA Incorporated near the Port of Oakland.

Laboratory

In addition to the ongoing, routine analyses, an air sample taken from the sludge handling building of the San Mateo Water Treatment Plant was analyzed for reduced sulfur compounds, methane, toxic compounds and total non-methane organic compounds. The percentage of phenolic compounds were determined in two mold resin samples from Pacific Steel Casting in Berkeley. Ten samples taken from the sand resin mix operation at Pacific Steel Casting were analyzed for phenolic compounds, six samples were analyzed for trimethylamine, and two gaseous samples were analyzed for hydrocarbons and sulfur compounds.

Source Test

Ongoing Source Test activities included Continuous Emissions Monitoring (CEM) Field Accuracy Tests, source tests, gasoline cargo tank testing, and evaluations of tests conducted by outside contractors. The ConocoPhillips Refinery's open path monitor monthly report for the month of March was reviewed. The Source Test Section provided ongoing participation in the District's Further Studies Measures for refineries.

These facilities have received one or more Notices of Violations
Report period: April 1, 2005 – April 30, 2005

Alameda County

Status Date	Site #	Site Name	City	Regulation Title
4/12/2005	Q6673	Norcal Dry Cleaner Equipment, Inc	Fremont	Authority to Construct
4/25/2005	A8391	Western Digital Corporation	Fremont	Failure to Meet Permit Conditions
4/26/2005	A2501	Livermore Crematory	Livermore	Failure to Meet Permit Conditions
4/25/2005	A2066	Waste Management of Alameda County	Livermore	Major Facility Review (Title V)
4/27/2005	B4766	American President Lines	Oakland	Idling Port Trucks
4/12/2005	B1441	May Cleaners	Oakland	Authority to Construct; Permit to Operate
4/19/2005	L3921	Professional Asbestos & Lead Services	Pleasanton	Asbestos Demolition, Renovation
4/26/2005	A3358	RMC Pacific Materials, Inc	Pleasanton	Failure to Meet Permit Conditions
4/11/2005	G2509	CST Environmental	San Leandro	Asbestos Demolition, Renovation
4/14/2005	Q6733	J L Construction Company	San Leandro	Asbestos Demolition, Renovation

Contra Costa County

Received Date	Site #	Site Name	City	Regulation Title
4/7/2005	A5515	Metallics Refining Inc	Antioch	Particulate Matter and Visible Emissions
4/27/2005	A9343	FTG Construction Materials	Brentwood	Particulate Matter and Visible Emissions
4/14/2005	A0581	ST Shore Terminals LLC	Crockett	Storage of Organic Liquids
4/11/2005	C8939	R & R Auto Service	El Cerrito	Gasoline Dispensing Facilities
4/27/2005	B2758	Tesoro Refining and Marketing Company	Martinez	Area Monitoring Downtime; Public Nuisance; Major Facility Review (Title V); Equipment Leaks Storage of Organic Liquids
4/26/2005	B1956	Equilon Enterprises LLC	Martinez	Gasoline Bulk Terminals&Gasoline Delivery Vehicles
4/26/2005	Q7013	Copart	Martinez	Particulate Matter and Visible Emissions
4/26/2005	Q7034	California Pacific Holdings	Orinda	Open Burning
4/1/2005	A2368	Sugar City Building Materials	Pinole	Failure to Meet Permit Conditions
4/19/2005	N8239	S R Quality Painting	Pleasant Hill	Asbestos Demolition, Renovation
4/4/2005	Q6444	BP West Coast Products	Richmond	Gasoline Dispensing Facilities
4/14/2005	A1840	West Contra Costa County Landfill	Richmond	Major Facility Review (Title V); Solid Waste Disposal Sites
4/7/2005	A0010	Chevron Products Company	Richmond	Continuous Emission Monitoring and Recordkeeping Procedures; Equipment Leaks
4/12/2005	A0016	ConocoPhillips - San Francisco Refinery	Rodeo	Authority to Construct; Permit to Operate; Process Vessel Depressurization
4/14/2005	Q3317	Todd Armstrong	Walnut Creek	Asbestos Demolition, Renovation
4/26/2005	C1749	Ygnacio Valley Shell #136245	Walnut Creek	Gasoline Dispensing Facilities

Marin County

Received Date	Site #	Site Name	City	Regulation Title
4/18/2005	C8882	ALFA GAS	Mill Valley	Permit to Operate
4/27/2005	B6984	Gary Migale-Painting Contractor	Novato	Authority to Construct; Permit to Operate
4/26/2005	B6985	Wood Design	Novato	Authority to Construct; Permit to Operate
4/14/2005	B6931	Marin Furniture Clinic	San Rafael	Authority to Construct; Permit to Operate

Napa County

Received Date	Site #	Site Name	City	Regulation Title
4/14/2005	Q6739	Adair Tench	Napa	Open Burning
4/29/2005	A4015	Highway Safety Products/Div of Radiator Specialty	Napa	Failure to Meet Permit Conditions
4/7/2005	J0314	Joseph Phelps Vineyards	Saint Helena	Open Burning
4/26/2005	Q7008	Marcia Stagnaro	Calistoga	Open Burning
4/21/2005	C7638	Napa Valley Petroleum	Napa	Gasoline Dispensing Facilities
4/26/2005	Q7036	Ristow Winery	Napa	Open Burning
4/26/2005	B6981	The Silk Purse	Napa	Authority to Construct; Permit to Operate
4/14/2005	Q6754	Tres Sabores	Saint Helena	Open Burning

San Francisco County

Received Date	Site #	Site Name	City	Regulation Title
4/14/2005	A6166	Anschutz Printing Company	San Francisco	Graphics Arts Printing and Coating Operations
4/19/2005	Q6881	Bill Kennedy	San Francisco	Asbestos Demolition, Renovation
4/4/2005	B1924	California Pacific Medical Center	San Francisco	Authority to Construct; Permit to Operate
4/21/2005	Q4387	Call and Haul	San Francisco	Asbestos Demolition, Renovation
4/7/2005	C8940	Chevron	San Francisco	Permit to Operate
4/25/2005	A8792	Fine Arts Cleaners	San Francisco	Perc Dry Cleaning
4/14/2005	Q6729	Gerard R. Loorga	San Francisco	Asbestos Demolition, Renovation
4/19/2005	Q6882	Ground Zero Engineering	San Francisco	Asbestos Demolition, Renovation
4/14/2005	Q5661	Hang Construction	San Francisco	Asbestos Demolition, Renovation
4/14/2005	Q6730	Malcolm Davis	San Francisco	Asbestos Demolition, Renovation
4/25/2005	B4264	M-B Body Shop of San Francisco	San Francisco	Motor Vehicle Coating Operations
4/11/2005	Q6634	NuLook Window & Construction	San Francisco	Asbestos Demolition, Renovation
4/12/2005	A4248	One Hour Cleaners	San Francisco	Perc Dry Cleaning
4/18/2005	Q6822	Paul's Hauling	San Francisco	Asbestos Demolition, Renovation
4/11/2005	C9923	Tosco Fac# 4074	San Francisco	Gasoline Dispensing Facilities

San Mateo County

Received Date	Site #	Site Name	City	Regulation Title
4/19/2005	Q6878	J.D. Construction	Brisbane	Asbestos Demolition, Renovation
4/18/2005	A4166	Somerset Printing	Burlingame	Graphics Arts Printing and Coating Operatio
4/19/2005	Q5136	Jump Hauling	Daly City	Asbestos Demolition, Renovation
4/11/2005	L8898	Westlake Village Apts	Daly City	Asbestos Demolition, Renovation
4/13/2005	A2266	Browning-Ferris Industries of CA, Inc	Half Moon Bay	Major Facility Review (Title V)
4/21/2005	Q6927	Juan Carlos Velasquez	Redwood City	Asbestos Demolition, Renovation
4/19/2005	Q5746	Dan Voreyer	San Bruno	Asbestos Demolition, Renovation
4/19/2005	Q6880	Patrick Martin Uniacke	San Bruno	Asbestos Demolition, Renovation
4/18/2005	Q5743	Precision Pacific	San Carlos	Asbestos Demolition, Renovation
4/14/2005	A0051	United Airlines, SF Maintenance Center	San Francisco	Parametric Monitoring and Recordkeeping Procedures; Major Facility Review (Title V)
4/7/2005	C7949	Coast Gasoline Station	San Mateo	Authority to Construct; Permit to Operate
4/13/2005	A8362	A Silvestri Corp	South San Francisco	General Solvent and Surface Coating Operations
4/14/2005	Q4026	UPC Hauling	South San Francisco	Asbestos Demolition, Renovation

Santa Clara County

Received Date	Site #	Site Name	City	Regulation Title
4/4/2005	D0758	Costco Gasoline	Gilroy	Gasoline Dispensing Facilities
4/21/2005	Q5271	T. T. Construction	Los Altos	Asbestos Demolition, Renovation
4/25/2005	A8296	Ford Cleaners	Milpitas	Perc Dry Cleaning
4/25/2005	Q6984	Dent Pro Colors	Morgan Hill	Motor Vehicle Coating Operations
4/28/2005	Q7078	Diamond Tank Lines	San Jose	Gasoline Dispensing Facilities
4/12/2005	B2160	One Stop Auto Finish	San Jose	Motor Vehicle Coating Operations
4/4/2005	C9862	Piedmont Shell	San Jose	Gasoline Dispensing Facilities
4/11/2005	A0778	San Jose/Santa Clara Water Pollution Control	San Jose	Gasoline Dispensing Facilities
4/26/2005	D0385	Valero Refining Co SS#7112	San Jose	Gasoline Dispensing Facilities
4/12/2005	D0021	West San Carlos Gas	San Jose	Gasoline Dispensing Facilities
4/11/2005	B4991	Silicon Valley Power Pico Power Plant	Santa Clara	Failure to Meet Permit Conditions
4/18/2005	A2504	Star Spray	Santa Clara	Authority to Construct
4/18/2005	Q6820	DJB Construction	Saratoga	Asbestos Demolition, Renovation

Solano County

Received Date	Site #	Site Name	City	Regulation Title
4/14/2005	B5574	Valero Logistics Operations, L P	Benicia	Storage of Organic Liquids
4/14/2005	B2626	Valero Refining Company - California	Benicia	Continuous Emission Monitoring and Record keeping Procedures; Equipment Leaks; Major Facility Review (Title V); Particulate Matter and Visible Emissions
4/26/2005	B2626	Valero Refining Company - California	Benicia	Failure to Meet Permit Conditions
4/12/2005	A3505	Woodard Chevrolet	Fairfield	Motor Vehicle Coating Operations

Sonoma County

Received Date	Site #	Site Name	City	Regulation Title
4/18/2005	D0371	Peter's Valero	Petaluma	Gasoline Dispensing Facilities
4/14/2005	Q6740	Sue VanBell	Petaluma	Open Burning
4/21/2005	A5395	Boomer's Fabricare Ctr Inc	Santa Rosa	Permit to Operate
4/7/2005	A5617	John's Formica Shop	Santa Rosa	Failure to Meet Permit Conditions
4/26/2005	Q7032	Tim Forbes	Santa Rosa	Open Burning
4/26/2005	Q7010	George Iverson	Sebastopol	Open Burning

April 2005 Closed NOVs with Penalties by County

Alameda

Site Name	Site Occurrence	City	Penalty	# of Violations Closed
7-Eleven Store #18916	C0407	Fremont	**$1,200**	2
A "1" Gas & Food Market	C0933	San Leandro	**$500**	1
Beneto Tank Lines	N1032	San Leandro	**$1,000**	1
ConocoPhillips #5734	C9248	Fremont	**$750**	2

Costco Wholesale	B3361	Livermore	**$2,000**	1
Magnum Drywall	P6754	Fremont	**$2,500**	3
O C Jones and Sons Construction	C9915	Berkeley	**$650**	1
Owens Brockway Glass Container, Inc	B1362	Hayward	**$1,500**	1
Owens-Brockway Glass Container Inc	A0030	Oakland	**$27,000**	4
Pleasanton Garbage Service, Inc	A2451	Pleasanton	**$500**	1
Sanmina - SCI	A1559	Newark	**$2,000**	1
Springtown Gasoline	C8281	Livermore	**$600**	1

Total Violations Closed: **19**

Contra Costa

Site Name	Site Occurrence	City	Penalty	# of Violations Closed
Beneto Tank Lines	N1032	Martinez	**$2,000**	1
Chevron Station #96956	C1689	San Ramon	**$500**	1
Conocol Phillips	Q1452	Martinez	**$1,500**	2
Shell Martinez Refinery	A0011	Martinez	**$5,000**	3
Tesoro Refining and Marketing Company	B2758	Martinez	**$800,000**	77

Total Violations Closed: **84**

Marin

Site Name	Site Occurrence	City	Penalty	# of Violations Closed
Orchid Cleaners	A8132	San Rafael	**$500**	2
Park Madera Shell	C5664	Corte Madera	**$1,000**	1

Total Violations Closed: **3**

Napa

Site Name	Site Occurrence	City	Penalty	# of Violations Closed
ARCO Facility #04971- MOHAMAD ALI MOKALLA	C2036	Napa	**$500**	2
Larry Gragg	N4972	Napa	**$1,500**	1
			Total Violations Closed:	**3**

San Francisco

Site Name	Site Occurrence	City	Penalty	# of Violations Closed
Conoco/Phillips -- Peter Papapietro	C9304	San Francisco	**$500**	1
Prana Investments	P8093	San Francisco	**$7,500**	9
The Presidio Trust	B2517	San Francisco	**$1,000**	1
			Total Violations Closed:	**11**

San Mateo

Site Name	Site Occurrence	City	Penalty	# of Violations Closed
ACE Hauling	P4897	Pacifica	**$500**	9
Dan Voreyer	Q5746	San Bruno	**$1,000**	2
Eagle Car Wash	C9557	Burlingame	**$400**	1
Precision Pacific	Q5743	San Carlos	**$2,000**	3
			Total Violations Closed:	**15**

Santa Clara

Site Name	Site Occurrence	City	Penalty	# of Violations Closed
Almaden Shell	C9694	San Jose	**$500**	1
BP Service Station/TOSCO	C9311	San Jose	**$250**	1

Gary Mylar	Q3953	Gilroy	**$150**	1
J & L Seven Distributors	Q4815	Milpitas	**$125**	1
K Auto Body Repair	B3036	Santa Clara	**$3,000**	3
Raisch Co c/o Reed & Graham	A0122	Santa Clara	**$2,000**	1
Reco Gas and Minimart	C6186	San Jose	**$500**	1
Spectrum Industries Finishing	B2655	San Jose	**$750**	2
Streamline Auto Body	B1750	Campbell	**$375**	1
T & T Auto Service and Gas Station	C9561	San Jose	**$350**	1
Thompson & Harvey Transportation, Inc	N9287	San Jose	**$750**	1
Twinsolutions LLC	B4733	Santa Clara	**$8,750**	4
Valley Fair Unocal 76	C8469	San Jose	**$400**	1

Total Violations Closed: 19

Solano

Site Name	Site Occurrence	City	Penalty	# of Violations Closed
Ashland Chemical Company	A7618	Fairfield	**$3,500**	2
Beneto Tank Lines	N1032	Benicia	**$2,000**	1
Flyers #28	C0818	Suisun City	**$250**	1

Total Violations Closed: 4

Sonoma

Site Name	Site Occurrence	City	Penalty	# of Violations Closed
Con Faraudo	P1094	Fulton	**$250**	1
G and J Gas, Inc	D0199	Sonoma	**$500**	1

John Scudero	P8858	Santa Rosa	**$5,000**	4
Mesa Boogie	1CA98	Petaluma	**$1,000**	1
			Total Violations Closed:	**7**

ACRONYMS AND TERMINOLOGY

ABAG	Association of Bay Area Governments
AC	Authority to Construct issued to build a facility (permit)
AMBIENT AIR	The surrounding local air
AQI	Air Quality Index
ARB	[California] Air Resources Board
ATCM	Airborne Toxic Control Measure
BAAQMD	Bay Area Air Quality Management District
BACT	Best Available Control Technology
BANKING	Applications to deposit or withdraw emission reduction credits
BAR	[California] Bureau of Automotive Repair
BARCT	Best Available Retrofit Control Technology
BIODIESEL	A fuel or additive for diesel engines that is made from soybean oil or recycled vegetable oils and tallow. B100=100% biodiesel; B20=20% biodiesel blended with 80% conventional diesel
BTU	British Thermal Units (measure of heat output)
CAA	[Federal] Clean Air Act
CAL EPA	California Air Resources Board
CCAA	California Clean Air Act [of 1988]
CCCTA	Contra Costa County Transportation Authority
CEQA	California Environmental Quality Act
CFCs	Chlorofluorocarbons
CMA	Congestion Management Agency
CMAQ	Congestion Management Air Quality [Improvement Program]
CMP	Congestion Management Program
CNG	Compressed Natural Gas
CO	Carbon monoxide
EBTR	Employer-based trip reduction
EJ	Environmental Justice
EIR	Environmental Impact Report
EPA	[United States] Environmental Protection Agency
EV	Electric Vehicle
HC	Hydrocarbons
HOV	High-occupancy vehicle lanes (carpool lanes)
hp	Horsepower
I&M	[Motor Vehicle] Inspection & Maintenance ("Smog Check" program)

ILEV	Inherently Low Emission Vehicle
JPB	[Peninsula Corridor] Joint Powers Board
LAVTA	Livermore-Amador Valley Transit Authority (“Wheels”)
LEV	Low Emission Vehicle
LNG	Liquefied Natural Gas
MPG	Miles per gallon
MTC	Metropolitan Transportation Commission
NAAQS	National Ambient Air Quality Standards (federal standards)
NO_x	Nitrogen oxides, or oxides of nitrogen
NPOC	Non-Precursor Organic Compounds
NSR	New Source Review
O_3	Ozone
$PM_{2.5}$	Particulate matter less than 2.5 microns
PM_{10}	Particulate matter (dust) less than 10 microns
$PM>_{10}$	Particulate matter (dust) over 10 microns
POC	Precursor Organic Compounds
pphm	Parts per hundred million
ppm	Parts per million
PUC	Public Utilities Commission
RFG	Reformulated gasoline
ROG	Reactive organic gases (photochemically reactive organic compounds)
RIDES	RIDES for Bay Area Commuters
RTP	Regional Transportation Plan
RVP	Reid vapor pressure (measure of gasoline volatility)
SCAQMD	South Coast [Los Angeles area] Air Quality Management District
SIP	State Implementation Plan (prepared for *national* air quality standards)
SO_2	Sulfur Dioxide
TAC	Toxic Air Contaminant
TCM	Transportation Control Measure
TFCA	Transportation Fund for Clean Air [BAAQMD]
TIP	Transportation Improvement Program
TMA	Transportation Management Association
TOS	Traffic Operations System
tpd	tons per day
Ug/m^3	micrograms per cubit meter
ULEV	Ultra low emission vehicle
ULSD	Ultra low sulfur diesel
USC	United States Code
UV	Ultraviolet
VMT	Vehicle miles traveled (usually per *day*, in a defined area)
VTA	Santa Clara Valley Transportation Authority
ZEV	Zero Emission Vehicle

AGENDA: 5

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Townsend and Members
of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: May 18, 2005

Re: Resolution Supporting World Environment Day 2005 and the
San Francisco Urban Environmental Accords

RECOMMENDED ACTION

Staff recommends that the Board of Directors adopt the attached resolution supporting World Environment Day 2005 and the San Francisco Urban Environmental Accords.

DISCUSSION

World Environment Day 2005 will be celebrated in San Francisco from June 1 through June 5, 2005. This is the first time this international event sponsored by the United Nations has been hosted in the U.S. More than 100 mayors from international cities have been invited to San Francisco for World Environment Day.

The mayors and other participants in World Environmental Day will be asked to select three actions for their cities to pursue in order to improve the environment (food, land, air and water), the metropolis, transportation, energy and open space as set forth in the San Francisco Urban Environmental Accords. The attached resolution expresses support for World Environment Day and the San Francisco Urban Environmental Accords and urges the cities of the Bay Area to select implementing actions that benefit air quality.

In addition, on Wednesday, June 1, the Air District is hosting a luncheon seminar for the international mayors attending World Environment Day regarding the “Top 10 Elements of a Successful Clean Air Program.” The seminar will be preceded by a display of air monitoring equipment and alternative fuel vehicles, and followed by an optional tour of the technical facilities at District headquarters. Chairman Townsend and Executive Officer Broadbent will make opening remarks, and a number of Air District staff will make brief presentations and engage in a dialogue on air pollution control.

All Air District Board members are invited to participate. Bay Area mayors are being invited to attend, as well as local, regional, national and international media.

BUDGET CONSIDERATION/FINANCIAL IMPACTS

None.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Emily Hopkins
Reviewed by : Teresa Lee

Bay Area Air Quality Management District

Resolution No. 2005 - __

A Resolution Supporting UN World Environment Day, June 1 -5th 2005 and the San Francisco Urban Environmental Accords

WHEREAS, 60 years ago the United Nations was founded in San Francisco, and to commemorate this event and UN World Environment Day 2005, representatives from cities all over the world are coming together in San Francisco to address global cooperation on environmental, economic, human and social issues;

WHEREAS, for the first time in history, the majority of the human population lives in cities, with the current rate of global urbanization resulting in one million people moving into cities each week;

WHEREAS, the San Francisco Urban Environmental Accords developed collaboratively and by consensus offer a range of opportunities for mayors internationally to balance human and ecological needs through locally appropriate actions, moving vital issues of sustainability -- including air quality -- to the top of their legislative agendas;

WHEREAS, collective action from previous World Environment Day accords has produced advances in sustainability, integrating vibrant economies and the planet’s natural systems, and sharing effective experiences and strategies;

WHEREAS, for the reasons outlined above, the Board of Directors of the Bay Area Air Quality Management District recognizes the need for and the potential benefits of cities working to implement the San Francisco Urban Environmental Accords to the best of their abilities and to select courses of action that pose the least threats to human health and the health of natural systems; and

WHEREAS, representatives of the Bay Area Air Quality Management District, along with the hosting City and County of San Francisco Department of the Environment, have initiated a dialogue with the mayors and delegates attending World Environment Day 2005 regarding the elements of successful clean air programs in urban environments;

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors of the Bay Area Air Quality Management District urges the mayors of the cities of the Bay Area to consider signing the San Francisco Urban Environmental Accords, and further urges them to select actions that benefit air quality, and to develop and implement all feasible measures and actions as expeditiously as practicable in order to clean the air and protect public health.

The foregoing resolution was duly and regularly introduced, passed and adopted at a regular meeting of the Board of Directors of the Bay Area Air Quality Management District on the Motion of Director _________________, seconded by Director __________________, on the _____ day of ____________ 2005 by the following vote of the Board:

AYES:

NOES:

ABSENT:

____
Marland Townsend
Chairperson of the Board of Directors

ATTEST:

____
Mark Ross
Secretary of the Board of Directors

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Townsend and Members
of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: May 11, 2005

Re: Set Public Hearing on Proposed Amendments to Regulation 2: Permits, Rule 1: General Requirements, Section 407: Permit Expiration

RECOMMENDED ACTION:

Set public hearing for June 1, 2005 to consider proposed amendments to Regulation 2: Permits, Rule 1: General Requirements, Section 407: Permit Expiration and approval of the filing of a CEQA Notice of Exemption.

DISCUSSION

Under District rules, any person who seeks to construct or modify a source of air pollution must first obtain an authority to construct (AC) from the District. Section 407 states that an AC expires after two years, or, if renewed, after four years. In 2004, the District proposed to allow AC renewal beyond four years in order to harmonize District requirements with California Environmental Quality Act requirements. The Air District's Board of Directors considered and adopted various permit rule amendments in December 2004, but the AC renewal language was withdrawn prior to the hearing by staff for additional development. The District has now developed new rule language and is proposing adoption of the new language.

The revised amendments to Section 2-1-407 would do the following:

- Clarify that a renewal request is required for each renewal;
- Provided that the term of the AC is extended for the time necessary for the APCO to consider renewal if the APCO fails to act on the request before expiration;
- Retain the current four-year limit on the term of an AC for most projects;
- Allow an AC for a longer-term projects covered by an Environmental Impact Report (EIR) to be renewed beyond four years;
- Allow an AC that has been substantially used to be renewed beyond four years;
- Clarify the prerequisites for renewal.

The District has determined that these proposed amendments to Regulation 2, Rule 1, Section 407 are exempt from provisions of the California Environmental Quality Act (Public Resources Code Section 21000 et seq.) pursuant to State CEQA Guidelines, Sections 15061, subd. (b)(3) and 15273. The proposed amendments are administrative in nature, and do not in themselves affect air emissions from any sources or operations subject to the rule. It can therefore be seen with certainty that there is no possibility that these proposed amendments will have a significant environmental impact. The District intends to file a Notice of Exemption pursuant to State CEQA Guidelines, Section 15062.

The affected industry and public have had the opportunity to comment on the proposed amendments. A public hearing notice, the proposed amendments, and a staff report are available on the web at http://www.baaqmd.gov/pln/ruledev/regpublichearings.asp.

BUDGET CONSIDERATION/FINANCIAL IMPACTS

None.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Daniel Belik
Reviewed by: Henry Hilken

AGENDA : 7

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Townsend and Members
of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: May 11, 2005

Re: Set Public Hearing on the Air District's Proposed FY 2005/2006 Budget

RECOMMENDED ACTION:

Set public hearing for June 1, 2005 and June 15, 2005 to consider the Air District's Proposed FY 2005/2006 Budget.

DISCUSSION

Pursuant to Health and Safety code Section 40131, the Air District is setting public hearings for June 1, 2005 and June 15, 2005 to review the Air District's Proposed FY 2005/2006 Budget. Final action on the budget will be taken at the conclusion of the second public hearing on this matter scheduled for June 15, 2005.

BUDGET CONSIDERATION/FINANCIAL IMPACTS

None.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Mary Ann Goodley
Reviewed by: Jeff McKay

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To:	Chairperson Townsend and Members of the Board of Directors
From:	Jack P. Broadbent Executive Officer/APCO
Date:	May 11, 2005
Re:	Set Public Hearing on Proposed Amendments to Regulation 3: Fees

RECOMMENDED ACTION:

Set public hearing for June 15, 2005 to consider proposed amendments to Regulation 3: Fees and approval of the filing of a CEQA Notice of Exemption.

DISCUSSION

The proposed fee increase is based largely on the results and recommendations of a study recently completed for the District by the accounting firm Stonefield Josephson, Inc. (*Bay Area Air Quality Management District Cost Recovery Study, Final Report; March 30, 2005*). This Cost Recovery Study concluded that, on an overall basis, existing fee revenue is far less than the District's regulatory program activity costs. The Study recommended that, if this revenue gap is to be reduced, fees should be increased by more than annual Cost of Living Adjustments. The proposed fee increases for the various Fee Schedules are based on the magnitude of the revenue gap for each Schedule as determined in the Cost Recovery Study. The proposed amendments to the District's fee regulation would be effective on July 1, 2005, and would increase fee revenue in order to enable the District to address increasing regulatory program activity costs. Fees for equipment in the various schedules in Regulation 3 would be increased by 0%, 5% or 15%.

The proposed amendments would add two new fees, a fee to extend the term of an Authority to Construct, and a fee for a Potential to Emit demonstration. In addition, fees would be increased for new and modified source filings, duplicate permits, emission banking filings and withdrawals, interchangeable emission reduction credits alternative compliance plans, permit renewal processing, health risk screening analyses, and refinery flares.

The District has determined that these amendments to Regulation 3 are exempt from provisions of the California Environmental Quality Act (Public Resources Code Section 21000 et seq.) pursuant to State CEQA Guidelines, Sections 15061, subd. (b)(3) and 15273. The amendments increase District fees that are used to meet District operating expenses. In addition, the amendments are administrative in nature, do not affect air emissions from any sources, and can be seen with certainty to have no possibility of causing significant environmental effects. The District intends to file a Notice of Exemption pursuant to State CEQA Guidelines, Section 15062.

The proposed amendments were discussed at a public workshop on May 6, 2005. The proposal was made available for public comment during the period from April 21, 2005 through May 29, 2005. A public hearing notice regarding the proposed amendments, regulatory language, and a draft staff report have been made available on the District's website at http://www.baaqmd.gov/pln/ruledev/regpublichearings.asp.

BUDGET CONSIDERATION/FINANCIAL IMPACTS

The proposed amendments would increase fee revenue for the District's upcoming fiscal year (FY) 2005-06 by approximately $1.4 million from the projected revenue levels in the current FY 2004-05 budget, representing an increase in overall fee revenue of approximately 7 percent. These figures include decreases in emissions-based fees resulting from decreases in emissions at affected facilities. The proposed budget includes these fee increases.

Respectfully submitted,

Jack P. Broadbent
Executive Officer / Air Pollution Control Officer

Prepared by: Brian Bateman
Approved by: Peter Hess

AGENDA : 9

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To:	Chairperson Townsend and Members of the Board of Directors
From:	Jack P. Broadbent Executive Officer/APCO
Date:	May 11, 2005
Re:	Set Public Hearing on Proposed Regulation 2: Permits, Rule 5: New Source Review of Toxic Air Contaminants and Manual of Procedures, Volume II, Part 4: New and Modified Sources of Toxic Air Contaminants, and Proposed Amendments to District Regulation 2, Rule 1: General Requirements; Regulation 2, Rule 2: New Source Review; Regulation 2, Rule 9: Interchangeable Emissions Reduction Credits; Regulation 8, Rule 34: Solid Waste Disposal Sites; Regulation 8, Rule 40: Aeration of Contaminated Soil and Removal of Underground Storage Tanks; Regulation 8, Rule 47: Air Stripping and Soil Vapor Extraction Operations; and Regulation 11, Rule 16: Perchloroethylene and Synthetic Solvent Dry Cleaning Operations; and certification of a CEQA Environmental Impact Report

RECOMMENDED ACTION:

Set public hearing for June 15, 2005 to consider adoption of a new proposed rule, Regulation 2: Permits, Rule 5: New Source Review of Toxic Air Contaminants and a new section of the Manual of Procedures, Volume II: Engineering Procedures, Part 4: New and Modified Sources of Toxic Air Contaminants, adoption of proposed amendments to various District rules for consistency with proposed Regulation 2, Rule 5, and to certify a CEQA Environmental Impact Report.

DISCUSSION

The District is proposing to codify the policies and procedures that make up the existing Air Toxics New Source Review (NSR) Program by adopting a new rule, Regulation 2, Rule 5: New Source Review of Toxic Air Contaminants, and a new part to its Manual of Procedures. Amendments to several other District rules are also proposed in order to maintain consistency with Regulation 2, Rule 5.

The goal of the Air Toxics New Source Review program is to prevent significant increases in health risks resulting from new and modified sources of toxic air contaminants (TACs) based on preconstruction permit review. The program is also intended to reduce existing health risks by requiring updated control requirements when older, more highly polluting sources are modified or replaced. District staff completes a site-specific health risk screening analysis (HRSA) as part of the permit evaluation process for any proposed project with TAC emissions that exceed specified de minimis toxic trigger levels. The proposed new rule and amendments to existing rules would change the existing Air Toxics New Source Review program by:

- adding a project risk limit for acute health risks (Hazard Index = 1.0);
- requiring TBACT for chronic non-cancer health risks (at Hazard Index > 0.20);
- using updated toxicity values and exposure assessment procedures (primarily from the OEHHA Air Toxic Hot Spots Program Guidance Manual for Preparation of Health Risk Assessment);
- removing "special" project cancer risk limits for perchloroethylene dry cleaners, thereby limiting *all* sources to cancer risk of 10 in a million; and
- eliminating discretionary risk authority for the APCO; all sources now limited to cancer risk of 10 in a million and non-cancer Hazard Index of 1.0.

The District chose to prepare a draft Environment Impact Report (EIR) in accordance with provisions of the California Environmental Quality Act (Public Resources Code Section 21000 et seq.) pursuant to State CEQA Guidelines, Section 15082. The Draft EIR concludes that significant adverse air quality impacts may occur due to the conversion of dry cleaners from using perchloroethylene to other less toxic alternatives that are ozone precursors (petroleum solvents). The health benefits associated with decreased exposure to perchloroethylene provide an overriding consideration to any possible increase in ozone forming volatile organic compounds from an increase in the use of alternative dry cleaning solvents. The Draft EIR is available on the District's website at http://www.baaqmd.gov/pln/ruledev/regulatory_public_hearings.asp. The comment period on the draft EIR runs until 5:00 p.m. on Monday, May 23, 2005.

Staff initiated this project, conducted initial workshops, and received considerable commentary in 2003 and 2004. A public workshop on revised language incorporating the revisions to the existing program was held on April 8, 2005. Draft regulatory language and a staff report are available on the District's website at http://www.baaqmd.gov/pln/ruledev/regulatory_public_hearings.asp.

BUDGET CONSIDERATION/FINANCIAL IMPACTS

An increase in the Risk Screening Fee to fund additional staff is necessary to perform more complex Health Risk Screening Analyses required by the new rule and changes to State risk assessment guidelines. These fee changes are included in the proposed changes to Regulation 3: Fees, which will also be considered for adoption on June 15.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Scott Lutz
Approved by: Brian Bateman

AGENDA: 10

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Townsend and Members
of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: May 11, 2005

Re: Report of the Budget & Finance Committee Meeting of May 5, 2005

RECOMMENDED ACTION

Receive and file.

BACKGROUND

The Budget & Finance Committee met on May 5, 2005. The Committee received the following reports:

- Financial Audit Report for Fiscal Year 2003/2004 from the auditor;
- Proposed Amendments to the Fee Regulation; and a
- Presentation of Fiscal Year 2005/2006 Draft Budget.

The Third Quarter Financial Report for FY 2004/2005 was deferred to the next meeting of the Committee.

Chairperson, Julia Miller will give an oral report of the meeting.

BUDGET CONSIDERATION/FINANCIAL IMPACT

None.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Mary Ann Goodley

AGENDA NO: 4

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Interoffice Memorandum

To: Chairperson Miller and Members
of the Budget and Finance Committee

From: Jeff McKay
Interim Director of Administrative Services

Date: May 5, 2005

Re: District Financial Audit Report for Fiscal Year 2003/2004

RECOMMENDED ACTION:

Informational report. Receive and file.

DISCUSSION:

The audit report confirms that the District's financial reports' **"…**present fairly, in all material respects, the financial position of the Bay Area Air Quality Management District as of June 30, 2004, and the results of its operations for the year then ended in conformity with accounting principles generally accepted in the United States of America.". The Independent Auditors report shows that an unqualified audit report was issued. The Report on Schedule of Expenditures of Federal Awards states, "…the information … is fairly presented in all material respects in relation to the basic financial statements taken as a whole." The Report on compliance in accordance with OMB Circular A-133 states "In our opinion, Bay Area Air Quality Management District complied, in all material respects, with the requirements referred to above that are applicable to its major federal program for the year ended June 30, 2004".

BUDGET CONSIDERATION/FINANCIAL IMPACT:

None.

Respectfully submitted

Jeff McKay
Intereim Director of Administrative Services

FORWARDED________________________________

Prepared by: Jeff McKay

AGENDA: 6

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Interoffice Memorandum

To:	Chairperson Miller and Members of the Budget and Finance Committee
From:	Jeff McKay Interim Director of Administrative Services
Date:	April 27, 2005
Re:	Draft Budget for Fiscal Year 2005/2006

RECOMMENDED ACTION:

The Executive Officer/APCO requests that the Budget and Finance Committee review the Budget for FY 2005/2006 and make any recommendations for further discussion at the May 25, 2005 Budget and Finance Committee meeting. This will allow staff the necessary time to make the changes for a second review by the Committee and the first public hearing date set for June 1, 2005.

BACKGROUND:

At the May 4, 2005 regular Board of Directors' meeting, the Fiscal Year 2005/2006 Preliminary Budget document will be referred to the Budget and Finance Committee for review and recommendations. Additional copies will be available at the Committee meeting.

DISCUSSION:

Staff will present the proposed budget for Fiscal Year 2005/2006. The proposed budget is balanced with the inclusion of a $1.3 million transfer in from undesignated reserves. General Fund Revenues, Transfers-In from Designated Reserves for PERS Funding, Production System Funding, Building and Facilities Funding, and Capital Equipment Funding along with TFCA Indirect Cost Recovery and TFCA Revenues and Mobile Source Incentive Indirect Cost Recovery and Revenues are $56.9 million. Proposed consolidated expenditures are $58.2 million. Proposed capital requests are $1,027,440 and there is a proposed 7.43 FTE increase, 3.12 of which are in the General Fund.

Staff will publish, prior to May 1, 2005, a notice to the general public that the first of two public hearings on the budget will be conducted on June 1, 2005 and that the second hearing will be conducted on June 15, 2005. Staff requests that the Budget and Finance Committee complete its review and take action on the proposed budget at the May 25, 2005 Budget and Finance Committee meeting. This will allow staff the necessary time required to amend, if necessary, the budget for the first public hearing to be held on June 1, 2005.

BUDGET CONSIDERATION/FINANCIAL IMPACT:

The proposed consolidated budget for FY 2004/2005 is $58,170,998.

Respectfully submitted

Jeff McKay
Interim Director of Administrative Services

Prepared by: Jeff McKay

FORWARDED________________________________

AGENDA: 7

BAY AREA AIR QUALITY MANGEMENT DISTRICT
Inter Office Memorandum

To:	Chairperson Miller and Members of the Budget and Finance Committee
From:	Brian Bateman Director of Engineering
Date:	April 27, 2005
Re:	Proposed Amendments to District Fee Regulation

RECOMMENDED ACTION:

The Committee will consider recommending to the Board of Directors that staff proceed with the proposed amendments to the fee regulation.

BACKGROUND

The District collects fees to pay for the costs of implementing and enforcing regulatory programs to reduce air pollution from stationary sources. A study of fee revenue, and regulatory program activity costs, was recently completed for the Air District by the accounting firm of Stonefield Josephson, Inc. (*Bay Area Air Quality Management District Cost Recovery Study, Final Report; March 30, 2005*). The Cost Recovery Study concluded that, on an overall basis, existing fee revenue is far less than the regulatory program activity costs. The Cost Recovery Study recommends that, if this revenue gap is to be reduced, fees should be increased by more than the Cost of Living Adjustments.

District staff has drafted amendments to the fee regulation for the upcoming fiscal year (FY) 2005-06 that are consistent with the results and recommendations of the Cost Recovery Study. The draft fee amendments would increase revenue for FY 2005-06 by approximately $2 million, representing an increase in overall fee revenue of about 10.5 percent. (For reference, there was a 1.4 percent increase in the annual Consumer Price Index for the California Bay Area from calendar year 2003 to 2004, as reported by the California Department of Industrial Relations, Division on Labor Statistics and Research).

District staff has contacted the members of the Cost Recovery Steering Committee to arrange a meeting in order to engage in additional dialogue on the details of the study.

DETAILS OF DRAFT FEE AMENDMENTS

The draft fee amendments would increase fees, beginning on July 1, 2005, as follows:

1. The following Fee Schedules, which the Cost Recovery Study indicates have the largest revenue gaps (i.e., costs exceeding revenue by more than 50 percent for the period July 1, 2001 – June 30, 2004), would be **increased by 15 percent**:

   Schedule A: Hearing Board
   Schedule D: Gasoline Transfer at Gasoline Dispensing Facilities, Bulk Plants and Terminals
   Schedule E: Solvent Evaporating Sources
   Schedule F: Miscellaneous Sources
   Schedule G1: Miscellaneous Sources
   Schedule H: Semiconductor and Related Operations
   Schedule I: Dry Cleaners
   Schedule K: Solid Waste Disposal Sites
   Schedule P: Major Facility Review Fees (Title V)

2. The following Fee Schedules, which the Cost Recovery Study indicates have less significant revenue gaps (i.e., costs exceeding revenue by between 15 and 50 percent for the period July 1, 2001 – June 30, 2004), would be **increased by 5 percent**:

   Schedule B: Combustion of Fuels
   Schedule G2: Miscellaneous Sources
   Schedule N: Toxic Inventory Fees

3. The following Fee Schedules, which the Cost Recovery Study indicates have no revenue gaps (for the period July 1, 2001 – June 30, 2004), would **not be increased**:

   Schedule C: Stationary Containers for the Storage of Organic Liquids
   Schedule G3: Miscellaneous Sources
   Schedule G4: Miscellaneous Sources
   Schedule L: Asbestos Operations
   Schedule Q: Excavation of Contaminated Soil and Removal of Underground Storage Tanks

4. The fees in Schedule M: Major Stationary Source Fees, would be **increased by 15 percent**. This will partially compensate for emissions inventory reductions at affected facilities, which have resulted in decreasing fee revenue from this emissions-based fee schedule.

5. The following administrative fees would be **increased by 5 percent**:

   Section 3-302: New and modified source filing fee
   Section 3-309: Duplicate permit fee
   Section 3-311: Banking filing fee and withdrawal fee
   Section 3-312: Regulation 2, Rule 9 Alternative Compliance Plan fee
   Section 3-327: Permit to Operate renewal processing fee

6. The following fees would be created or amended:

- A new fee would be added for an application to renew an Authority to Construct. This activity requires a BACT and offset review by District staff, but there is currently no fee for this activity. The fee would be equal to one half of the initial fee for each new and modified source.
    - ➢ A new fee would be added for a Potential to Emit (PTE) demonstration requested by a facility. This activity requires detailed emissions calculations to be made, or reviewed, by District staff for each source at a facility, but there is currently no fee for this activity. The fee for a PTE demonstration would be $50 per source evaluated, not to exceed a total of $5000 per facility.
    - ➢ The fee for a Health Risk Screening Analysis (HRSA) would be increased. The District has separately proposed to update and enhance its Air Toxics New Source Review program, which will require more complex HRSAs to be prepared by District staff. The fee would represent a $272 increase for permit applications for new and modified sources that require an HRSA. The fee would also be applicable to other provisions in District regulations (e.g., a request for demonstration of permit exemption under Regulation 2-1-316) under which a facility requests that the District prepare or review an HRSA for a facility.
    - ➢ The permit fees for refinery flares would be increased. In recent years, the District has significantly increased its regulatory activities for refinery flares with the adoption of a refinery flare monitoring rule, and the proposal of a refinery flare control rule. The draft fee amendments would move refinery flares subject to Regulation 12, Rule 11: Flare Monitoring at Petroleum Refineries, from Schedule G-1 to the higher-cost Schedule G-3.

NEXT STEPS

A public workshop to discuss the draft fee amendments is scheduled for May 6, 2005. Staff will take into consideration the comments of the affected parties made during the workshop and subsequent public comment period in finalizing the final fee proposal. Staff anticipates that proposed fee rule amendments will be presented to the Board of Directors for adoption on June 15, 2005, with an effective date of July 1, 2005.

Respectfully submitted,

Brian Bateman
Director of Engineering

FORWARDED_______________________________

Reviewed by: Peter Hess

AGENDA: 11

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Townsend and Members
of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: May 11, 2005

Re: Report of the Public Outreach Committee Meeting of May 16, 2005

RECOMMENDED ACTION

Receive and file.

BACKGROUND

The Public Outreach Committee will meet on Monday, May 16, 2005. The Committee will review the attached reports.

Chairperson, Shelia Young will give an oral report of the meeting.

BUDGET CONSIDERATION/FINANCIAL IMPACT

None.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Mary Ann Goodley

AGENDA NO. 4

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Inter-office Memorandum

To: Chairperson Young and
Members of the Public Outreach Committee

From: Teresa Lee
Director of Public Information and Outreach

Date: May 16, 2005

Re: Spare the Air 2004 Summer Survey Results

RECOMMENDED ACTION

Informational only.

BACKGROUND

Staff and Dr. Tim McLarney of True North Research, the Air District's measurement consultant, will review and discuss the key findings from the public opinion surveys conducted during the summer of 2004 on Spare the Air days.

DISCUSSION

For several years the Air District has conducted measurement surveys as part of the *Spare the Air* and *Spare the Air Tonight* campaigns. The primary motivation for conducting summertime measurement surveys is to quantify the behavioral changes and emission reductions that result from issuing *Spare the Air* advisories. Specifically, the surveys measure changes in driving behavior, the use of select household products, and gasoline lawn and garden tools. In addition, the surveys measure overall awareness of the program and of the Air District's mission and functions. Finally the 2004 survey collected some new information -- such as data on the lifestyles and the attitudes of drivers -- that allows staff to begin to draw a profile of what demographic audiences are most receptive to *Spare the Air* messages. This helps to target advertising and media strategies more effectively.

Historical data provided from previous surveys also allows for analysis of trends.

BUDGET CONSIDERATIONS/FINANCIAL IMPACT

Funding for the measurement effort is provided by the Congestion Mitigation Air Quality (CMAQ) grant that the Air District receives for the overall *Spare the Air* program.

Respectfully submitted,

Teresa Lee
Director of Public Information and Outreach

FORWARDED: ____________________________

Reviewed by: Jean Roggenkamp

AGENDA NO. 5

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Inter-Office Memorandum

To: Chairperson Young and
Members of the Public Outreach Committee

From: Teresa Lee
Director of Public Information & Outreach

Date: May 6, 2005

Re: Spare the Air Planning - 2005

RECOMMENDED ACTION

Informational only.

BACKGROUND

Staff and the consultant will update the committee on the 2005 *Spare the Air* campaign.

DISCUSSION

Air District staff are working with O'Rorke Public Relations and Allison and Partners, the District's consultants, on the summertime 2005 *Spare the Air* campaign. It will include:

Advertising – The goal of the 2005 advertising campaign is to help residents see the *Spare the Air* program in a cohesive way and to lead people through the thinking and planning steps towards sparing the air. The campaign will use radio and TV advertising from last year, augmented by a new television and radio spot featuring Executive Officer Jack Broadbent. One of the spots will specifically include a message about the free morning commute program on *Spare the Air* weekdays. There will also be bus signs, billboards, some wrapped buses and signage in all BART stations.

The call to action for the public is to sign up for advance notice of *Spare the Air* advisories (Air Alerts) at www.sparetheair.org and to plan a transit commute by calling 511 or visiting 511.org.

Media – The highest priority for the media campaign is to ensure coverage of *Spare the Air* advisories on radio and television. To increase the impact of the 2005 program staff and the consultant will:

- Utilize media events (such as a kick-off press conference, a fuel-cell car demonstration, etc.)
- Seek editorial support for the program
- Incorporate the Executive Officer as a spokesperson and
- Offer high-quality graphics to the media that visually tell the Air Disrict's story

The following are some of the major activities for the summer season:

- A *Spare the Air* kick-off with a press conference on May 26, 2005
- A World Environment Day delegate event/ fuel-cell car unveiling – June 1, 2005
- An Air District Symposium – June 20, 2005

In addition, there will be ongoing *Spare the Air* media outreach including:

- 7-day-a-week coverage, including calls to the media to notify them of *Spare the Air* days, plus next-day follow-up regarding ridership results
- Meeting with public affairs directors of ethnic broadcast outlets, including Chinese, Vietnamese and Latino, to ensure 2005 *Spare the Air* coverage
- Revising the *Spare the Air* fact sheet
- Distribution of the Air District's background footage (b-roll) to the broadcast media
- Developing and distributing the following feature pitches:
    - Air District profiles for publications like *Diablo Magazine* and *San Francisco Chronicle Magazine*
    - How to have an air-friendly 4th of July barbecue
    - Top-ten ways the Air District has improved air quality in the Bay Area over the past 50 years

<u>Employer Program</u>

The Employer Outreach Program is presently contracted to RIDES Inc. As of July, the Air District will have a different contractor due to RIDES loss of the rideshare contract. Thus far, the existing contractor has:

- Sent pre-season packets to employers, schools and libraries with a welcome letter, informational sheets and a materials order form.

- School recruitment is underway. Thus far 30 new schools and/or school districts encompassing approximately 100 schools have registered for *Spare the Air* notification.

<u>Electronic sign boards</u> are also handled under the RIDES contract. Staff and the consultant have followed up with the electronic sign boards that can display real time *Spare the Air* messages. Thus far, the electronic boards participating are:

- Henry J. Kaiser Convention Center
- Golden Gate Fields
- Bay Meadows
- IKEA in E. Palo Alto
- Pacific Bell Park (depending on availability)
- Oakland Coliseum
- Auto Plaza of Petaluma
- Alameda County Fairgrounds
- Southland Mall
- Serramonte Mall
- Antioch Auto Mall
- Dublin Auto Mall
- AdArt Board on 101 (formerly KFOG board)

Additional electronic sign board recruitment continues. Contact has also been made with the San Leandro Auto Mall at Marina Square. They do not do have real time messaging; all programming is done at least a week in advance. The Auto Mall may be willing to do a non-real time public service message and run it for a week at a time. It could carry a message like “Spare the Air this summer. Drive Less. www.sparetheair.org”. The consultant will follow up on this opportunity.

BUDGET CONSIDERATIONS/FISCAL IMPACT:

Funds for the advertising and media campaign have been allocated in the 2004-05 budget and are proposed for continuation in the 2005-06 budget. The largest source of funding for the program comes from the Congestion Mitigation Air Quality (CMAQ) program.

Respectfully submitted,

Teresa Lee
Director of Public Information & Outreach

FORWARDED: ______________________________

Reviewed by: Jean Roggenkamp

AGENDA NO. 6

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Inter-office Memorandum

To:	Chairperson Young and Members of the Public Outreach Committee
From:	Teresa Lee Director of Public Information and Outreach
Date:	May 6, 2005
Re:	Air District's 50th Anniversary

RECOMMENDED ACTION

Informational only.

BACKGROUND

Staff will update the committee on the progress made in planning the District's 50th anniversary celebration.

DISCUSSION

Planning for the District's 50th anniversary is well underway. Recent activities include:

- The 2005 Air Quality Symposium will be held on June 20th at Yerba Buena Gardens in San Francisco. The symposium will include 300 to 400 key invited guests. The event will begin with a luncheon speaker, followed by panel discussions and an address by Dr. Steven Schneider of Stanford University. Dr. Schneider is a world renowned expert on climate change. Governor Christine Todd Whitman will deliver the keynote address at approximately 3:30 PM, followed by a reception. "Save the Date" postcards have been sent out and formal invitations will follow.

- An Annual Report of the District's activities, including statistics and trends, will be available for the anniversary symposium.

- The Air District website (www.baaqmd.gov) is being augmented with materials on the District's history, including a timeline with appropriate pictures and significant events (such as landmark regulations, clean air progress, etc.) from the past 50 years. The website is expected to go "live" in late May.

- Media feature stories will include the 50th anniversary theme. Staff will also seek editorial support of the Districts accomplishments and goals. To assist with media outreach, background (or "B") roll of District activities has been compiled from footage in the video "Sparing the Air for a Healthier Future."

- Collateral material has been produced including a 50th anniversary logo, stationery, bookmark, portfolio and pin. Items in production include kites and wrist bands.

BUDGET CONSIDERATIONS/FINANCIAL IMPACT

Funding of $50,000 has been allocated for the 50th anniversary. Additional funding will be secured by sponsorships and/or underwriting.

Respectfully submitted,

Teresa Lee
Director of Public Information and Outreach

FORWARDED: ____________________________

Reviewed by: Jean Roggenkamp

BAY AREA AIR QUALITY MANAGEMENT DISTRICT **AGENDA NO. 7**
Inter-Office Memorandum

To: Chairperson Young and
Members of the Public Outreach Committee

From: Teresa Lee
Director of Public Information & Outreach

Date: May 6, 2005

Re: Spring Lawn Mower Buy-Back Programs

RECOMMENDED ACTION

Informational only.

BACKGROUND

Staff will give a status report on the 2005 lawn mower buy-back programs.

DISCUSSION

For several years, the Air District has coordinated lawn mower buy-back programs in cooperation with Home Depot and Black and Decker. The public can turn in an old gasoline mower and purchase an electric mower for a $100 discount. This year, three lawn mower programs are being held:

- Saturday, May 7th at Home Depot in Sunnyvale
- Saturday, May 14th at Home Depot in Pleasanton
- Saturday, May 21st at Home Depot in Concord

At the first event in Sunnyvale, 170 mowers were exchanged. Media coverage was good, including a segment on Channel 7 ("Michael Finney on Your Side") and Henry Tenenbaum, host of "Henry's Garden" on KRON Channel 4. In addition, staff used paid advertising and a press release to get the word out about the mower event.

BUDGET CONSIDERATIONS/FINANCIAL IMPACT

Funding for this program has been approved by the Board.

Respectfully submitted,

Teresa Lee
Director of Public Information & Outreach

FORWARDED: ____________________________
Reviewed by: Jean Roggenkamp

AGENDA NO. 8

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Inter-Office Memorandum

To: Chairperson Young and
Members of the Public Outreach Committee

From: Teresa Lee
Director of Public Information & Outreach

Date: May 6, 2005

Re: Referrals from Committee

RECOMMENDED ACTION

Informational only.

BACKGROUND

Staff response to referrals from the last meeting of the Public Outreach Committee.

DISCUSSION

There were four follow-up items from the last meeting of the Public Outreach Committee. The following is a status report on the items.

1. Chairperson Young requested staff contact PG&E again regarding bill stuffers for the wintertime outreach program.
   Contact has been made with PG&E, in progress.

2. Chairperson Young requested staff contact the Waste Management Authorities again regarding the lawn mower buy-back program.
   Complete. Staff contacted all the waste management agencies in the Bay Area.

3. The Committee requested that staff draft a letter to the American Lung Association's national organization, with copies to the local affiliates, regarding the Air District's position on the grading system and that it be sent to all the Board members for signature.
   A draft of a letter to the American Lung Association has been prepared and is being internally reviewed.

4. The Committee directed staff to send out a preemptive press release on the American Lung Association Report Card.
   Completed.

Respectfully submitted,

Teresa Lee
Director of Public Information & Outreach

FORWARDED: ____________________________
Reviewed by: Jean Roggenkamp

AGENDA: 12

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Townsend and Members
of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: May 11, 2005

Re: Public Hearing to Consider Adoption of Proposed Amendments to the District's Manual of Procedures, Volume III: Laboratory Methods and Approval of the Filing of a CEQA Notice of Exemption

RECOMMENDED ACTION:

Staff recommends the Board take the following actions:

- Adopt proposed amendments to the District's Manual of Procedures, Volume III: Laboratory Methods; and
- Approve the filing of a CEQA Notice of Exemption.

BACKGROUND

The District's Manual of Procedures contains methodologies for enforcing the emission standards contained in the District's Rules and Regulations. Consequently, the Manual of Procedures is part of the Districts Rules and Regulations, and amendments to the Manual of Procedures require Board approval. A notice for this Public Hearing was published on April 18, 2005.

DISCUSSION

These amendments to Volume III of the Manual of Procedures are being proposed to incorporate advances in analytical equipment, add clarity, improve accuracy, reduce expenses and respond to comments by EPA technical staff.

The following amended Introduction, new method and amended methods are proposed:

- Introduction (proposed changes will allow minor amendments to the procedures with District and sample manufacturer approval, and major changes with EPA approval);
- Method 10A: Determination of Sulfur in Petroleum and Petroleum Products (new method);
- Method 21: Determination of Compliance of Volatile Organic Compounds for Water Reducible Coatings;
- Method 22: Determination of Compliance of Volatile Organic Compounds for Solvent Based Coatings, Inks and Other Related Products;
- Method 31: Determination of Volatile Organic Compounds in Paint Strippers, Solvent Cleaners and Low Solids Coatings;

- Method 33: Determination of Dissolved Critical Volatile Organic Compounds in Wastewater Separators;
- Method 41: Determination of Volatile Organic Compounds in Solvent Based Coatings and Related Materials Containing Parachlorobenzotrifluoride;
- Method 43: Determination of Volatile Methylsiloxanes in Solvent Based Coatings, Inks, and Related Materials;
- Method 45: Determination of Butanes and Pentanes in Polymeric Materials; and
- Method 46: Determination of the Composite Partial Pressure of Volatile Organic Compounds in Cleaning Products.

The Introduction incorporates provisions specifying that changes can be made to a procedure if some aspect of the procedure is not applicable to the type of sample submitted (such as the gas chromatographic analytical column). This requires the agreement of the Air Pollution Control Officer (APCO), sample user and sample manufacturer, and in some cases, EPA. Proposed amendments to Laboratory Methods 21, 22, 31, 33, 41, 43, 45 and 46, delete redundant provisions found in the amendments to the Introduction, simplify, clarify and correct the methods. Method 10A: Determination of Sulfur in Petroleum and Petroleum Products is a new method that compliments existing Method 10. It is more accurate and has a lower limit of detection for sulfur compounds in petroleum products, but cannot be used if water is present in the sample (such as asphalt emulsions).

The District has determined that these amendments to the Manual of Procedures, Volume III, Laboratory Methods, are exempt from provisions of the California Environmental Quality Act (Public Resources Code Section 21000 et seq.) pursuant to State CEQA Guidelines, Sections 15061, subd. (b)(3). Adoption of the proposed amendments will not have any environmental impact. Laboratory methods are used to enforce standards for which an environmental impact analysis has already been conducted; the methods do not establish new standards or amend existing standards. The District intends to file a Notice of Exemption pursuant to State CEQA Guidelines, Section 15062.

The proposed amendments have been made publicly available, and no comments have been received. They have also been approved by EPA technical staff, and legally noticed. The proposed amendments and a staff report are attached.

BUDGET CONSIDERATION/FINANCIAL IMPACTS

The amendments have the potential to save the District money by reducing staff time necessary to perform the analytical procedures. Actual savings realized will be based on the number and type of samples received for analysis.

Respectfully submitted,

Jack P. Broadbent
Executive Officer / Air Pollution Control Officer

Prepared by: Jim Hesson
Reviewed by: Gary Kendall

STAFF REPORT

MANUAL OF PROCEDURES, VOLUME III, LABORATORY METHODS

EXECUTIVE SUMMARY

Amendments to the Manual of Procedures, Volume III, Laboratory Methods are being proposed to incorporate advances in analytical equipment, add clarity, improve accuracy, reduce expenses and respond to comments by EPA technical staff.

There are no economic impacts associated with the adoption of these amendments to the Manual of Procedures. Sections 40728.5 and 40920.6 of the California Health and Safety Code, regarding socioeconomic impact analyses and incremental cost effectiveness analyses are not applicable to this proposal.

Pursuant to the California Environmental Quality Act, there are no environmental impacts from this proposal and the District intends to file a Notice of Exemption pursuant to state CEQA guidelines. Section 40727.2 of the California Health and Safety Code, regarding regulatory impact analyses, is not applicable to this proposal. There are no impacts on District staffing and resources since the proposals either use the same amount of time and materials, or save on expenses. Affected public have been given an opportunity to comment on the proposal, and staff recommend adoption of the proposed amendments.

BACKGROUND

Laboratory Methods are contained in the District’s Manual of Procedures (MOP). Changes to the MOP are adopted by the Board of Directors at a public hearing and become part of the District’s portion of the California State Implementation Plan (SIP). The Clean Air Act requires public notice of SIP submissions, just as California law requires public notice of hearings regarding rule amendments. Although the laboratory procedures are not regulatory standards, they do operate as the means of enforcement of the regulatory standards, and consequently, the accuracy and precision of the test methods define the stringency to which the regulatory standards can be enforced.

The Manual of Procedures contains methodology for enforcing standards throughout District rules. It is subdivided into eight sections, Enforcement Procedures, Engineering Permitting Procedures, Laboratory Methods, Source Test Policy and Procedures, Continuous Emission Monitoring Policy and Procedures, Air Monitoring Procedures, Guidelines for Environmental Processes Under the California Environmental Quality Act, and Procedures for Calculating and Generating Mobile Source Emission Reduction Credits. Although highly technical, proposed amendments to procedures and methods are distributed to the public to comment on prior to a public hearing to consider adoption. A public hearing gives the Board the opportunity to consider any comments by affected members of the public regarding the stringency and accuracy of the proposal.

DESCRIPTION OF AMENDMENTS TO THE MANUAL OF PROCEDURES, VOL. III

Introduction: The methodology now includes a section specifying that minor, intermediate and major changes can be made to a procedure if some aspect of the procedure is not applicable to the type of sample submitted (such as length of the analytical column). This requires the agreement of the Air Pollution Control Officer (APCO), user and manufacturer, and in the case of a major change, EPA approval is needed. A disclaimer has been added to indicate that specification of brand names in the methods does not constitute endorsement of that particular brand.

Proposed Method 10A: Determination of Sulfur in Petroleum and Petroleum Products.

Petroleum and petroleum products such as fuel oils, residual oils and crude oils are analyzed for sulfur content by the energy dispersive X-ray Fluorescence Spectroscopy technique. The method is fast, non-destructive and requires minimal sample handling. It is more accurate and has a lower detection limit than Method 10. Method 10A supplements Method 10 and is only applicable to samples which do not contain water. Method 10A will be used to determine compliance with Regulation 9: Inorganic Gaseous Pollutants, Rule 1: Sulfur Dioxide, Section 304: Limit on Sulfur Content in Liquid and Solid Fuels; and to determine permit exemptions pursuant to Regulation 2: Permits, Rule 1: General Requirements, Sections 123.3.2 and 123.3.7: Limits on Sulfur Content.

Proposed Amendments to Methods: The proposed changes to the following methods exclude a provision allowing APCO discretion to alter the procedure because this discretion (minor, intermediate, and major changes) is now addressed in the introduction, add clarity, improve accuracy, correct errors, and add flexibility by allowing the use of other appropriate solvents, sample dilutions, gas chromatographic columns and operational parameters:

Method 21: Determination of Compliance of Volatile Organic Compounds for Water Reducible Coatings;

Method 22: Determination of Compliance of Volatile Organic Compounds for Solvent Based Coatings, Inks and Related Materials;

Method 31: Determination of Volatile Organic Compounds in Paint Strippers, Solvent Cleaners and Low Solids Coatings;

Method 33: Determination of Dissolved Critical Volatile Organic Compounds in Wastewater Separators;

Method 41: Determination of Volatile Organic Compounds in Solvent Based Coatings and Related Materials Containing Parachlorobenzotrifluoride;

Method 43: Determination of Volatile Methylsiloxanes in Solvent Based Coatings, Inks, and Related Materials;

Method 45: Determination of Butanes and Pentanes in Polymeric Materials; and

Method 46: Determination of the Composite Partial Pressure of Volatile Organic Compounds in Cleaning Products.

ECONOMIC IMPACTS

There are no economic impacts associated with the proposed amendments to Volume III of the Manual of Procedures. Although the accuracy and precision of the laboratory methods determines to what extent the standards in rules can be enforced, they are not standards in themselves. Consequently, economic impacts are limited to the costs of the laboratory methods for industries to self audit their compliance status, if they desire. None of the rules require a determination of compliance by the industries affected by the rules, and the costs of recordkeeping, monitoring, product reformulation and control equipment have already been considered during the adoption of those specific regulations.

California Health and Safety Code, Section 40728.5 requires an analysis of the socioeconomic impacts of rule amendments adopted that “will significantly affect air quality or emissions limitations.” This requirement of Section 40728.5 is not applicable to the District adoption of these amendments, because the amendments do not alter or affect air quality or emissions limitations. They simply provide a mechanism to enforce existing standards.

California Health and Safety Code, Section 40920.6 requires an assessment of incremental cost effectiveness for one or more potential control options which achieve the emission reduction objectives of the proposed amendment. Section 40920.6 does not apply. There are no emission reduction objectives associated with the adoption of laboratory methodology. The standards for which this section of law apply have already undergone the appropriate economic analyses at the time of their adoption.

ENVIRONMENTAL IMPACTS

Adoption of the proposed amendments will not have any environmental impact. Laboratory methods are detailed means by which to enforce standards for which an environmental impact analysis has already been completed, they do not set new standards or change existing standards. Therefore, the District has determined that these amendments to the Manual of Procedures are exempt from the provisions of the California Environmental Quality Act pursuant to State CEQA Guidelines, Section 15061, subd. (b)(3), and Section 15321. The District intends to file a Notice of Exemption pursuant to State CEQA Guidelines, Section 15062.

REGULATORY IMPACTS

Under California Health and Safety Code, Section 40727.2, upon adoption, amendment or repeal of air district regulations, a comparison of existing federal and district rules that affect the same equipment or source type is required. However, Section 40727.2 (g) states, “If a district’s proposed new or amended rule or regulation does not impose a new emission limit or standard, or impose new or more stringent monitoring, reporting, or recordkeeping requirements, or if the proposed new or amended rule or regulation is a verbatim adoption or incorporation by reference of a federal New Source Performance Standard adopted pursuant to Section 111 of the Clean Air Act (U.S.C. 7411) or an airborne toxic control measure adopted by the state board pursuant to Section 39666, a district may elect to comply with subdivision 40727.2 (a) by preparing an alternative analysis demonstrating that the proposed new or amended rule or regulation falls within one or more of the categories specified in this subdivision."

CH&SC Section 40727 does not apply. Each of the elements that trigger this section of the law specifically speaks to direct requirements for industry affected by a regulation. Emission limitations, monitoring, recordkeeping and reporting requirements all have direct costs to industry. The methodology by which to determine compliance is not a direct cost. Industry is required to be in compliance with adopted standards, and requirements to do certain tests or monitor for compliance by certain methods may be imposed. If so, those would be requirements within the rules, and would be subject to Section 40727, however, the methods themselves are not.

RULE DEVELOPMENT HISTORY

On September 5, 1979, the Board of Directors recodified District regulations and first adopted a Manual of Procedures as a separate document from the rules and regulations. Since then, from time to time the Board has amended the MOP to incorporate new policy, procedures or methods or improve existing ones. Advances in analytical equipment to enable District staff to save time or to be more accurate in emission measurement, and new standards that require new procedures and methods are the primary reasons for MOP amendments.

On September 15, 2004, staff solicited written or verbal comments on these proposed amendments to Volume III of the MOP in lieu of scheduling a public workshop. In addition, the draft methods were published on the District's web site. Typically, commenters would be laboratory staff members at other Districts, ARB, EPA, affected industries locally, and, in the case of products that will have to comply with new standards, at affected industries across the country. Because of the highly technical nature of the methods, comments tend to be few and commenters are easily able to discuss the proposal with District laboratory staff over the phone or via e-mail. To date, only one comment has been received. The question pertains to the more specific title of Method 22 in the method document, and this has been addressed by changing the title in the Introduction in order to be consistent with that of the method header.

DISTRICT STAFF IMPACTS

Proposed Method 10A does not replace existing Method 10 due to the differences in applicability of the methods. Where Method 10A is usable, there is no adverse impacts on district staff since the method involves a significant reduction in run time and a decrease in cost is anticipated. Staff estimates no impact resulting from the seven proposed changes, since there is minimal increase in time of analysis associated with the changes in gas chromatographic columns and operating parameters

CONCLUSION

The laboratory procedures are proposed mainly to reduce costs, incorporate advances in analytical equipment and improve method accuracy.

Pursuant to the California Health and Safety Code, Section 40727, regulatory amendments must meet findings of necessity, authority, clarity, consistency, non-duplication, and reference. The proposed amendments are:

> Required to enforce provisions of previously adopted rules and regulations and to improve the sensitivity and flexibility of the existing methods.
>
> Authorized by the California Health and Safety Code Section 40000, 40001, 40702, and 40725 through 40728;
>
> Clear, in that the laboratory methods are written so that they can be understood by persons affected by them;
>
> Consistent with other District rules and test methods, and not in conflict with any state or federal law;
>
> Non-duplicative of other statutes, rules or regulation; and
>
> Are implementing, interpreting, or making specific the provisions of California Health and Safety Code Sections 40000 and 40702.

The proposed amendments have met all legal noticing requirements and interested parties have been notified. One comment received has been discussed with the interested party. District staff recommends adoption of the amendments to the Manual of Procedures, Volume III, Laboratory Methods: Introduction, and Methods 10A, 21, 22, 31, 33, 41, 43, 45 and 46; and approval of the CEQA Notice of Exemption.

h:/tech2/lab/2004-2005staffreport.doc

1) INTRODUCTION

This volume of the Manual of Procedure specifies the analytical Methods used for the determination of compliance to the Regulations of the Bay Area Air Quality Management District (BAAQMD). As new Methods are developed and found acceptable, they may replace or be added to the existing Methods in this manual.

2) GENERAL PROVISIONS

2.1 Laboratory Quality Assurance Program: The goal of these procedures is to provide accurate and precise analyses, and it is essential that a laboratory assurance program be established and maintained.

2.2 Objectives of the Laboratory Quality Assurance Program are:

2.2.1 To provide ongoing information for monitoring unsatisfactory performance of personnel, equipment or procedures.

2.2.2 To provide prompt detection and correction of conditions which contribute to the generation of inadequate data.

2.2.3 To collect and supply information necessary to describe the quality of the data.

2.3 Implementation of the following elements will produce data of acceptable precision and accuracy.

2.3.1 Routine monitoring of the known variables which may affect the quality of data.

2.3.2 Routine training and evaluation of analysts.

2.3.3 Corrective action.

2.4 Representative Sampling

2.4.1 Analytical results, regardless of the accuracy and precision of the procedure, cannot be better than the representativeness of a submitted sample.

2.5 Sample Submission and Continuity

2.5.1 All samples will be identified and the identification carried forth with the analytical results.

2.6 Reagents

2.6.1 Reagent grade or better chemicals shall be used. Lesser grades may be used provided it is first ascertained that their use will not degrade the accuracy of the determination.

2.6.2 Unless otherwise specified, inorganic reagents used in the preparation of standards shall be dried at 105°C for two hours and kept dessicated until used.

2.7 Distilled water or its equivalent shall be used for reagent preparations.

2.8 Gas Chromatography

2.8.1 Gas chromatographic units used shall have the required systems and sensitivities as specified in the procedure.

2.8.1.1 Each chromatograph will be equipped with a recorder that provides permanent charts for record purposes.

2.8.1.2 All carrier gases, fuel gases and air supplies will be free of interfering substances.

2.8.1.3 Analytical columns are specified in this manual for each procedure. The separation characteristics of an alternate column must be comparable to those specified.

2.9 Atomic Absorption

2.9.1 Atomic absorption spectrophotometers utilized should have the following minimum specifications:

a) Analytical wavelength coverage of 1937A to 7800A.
b) Less than 0.3% light scatter at 3000A.
c) Less than 1% noise at full gain.
d) Slit system to provide 5A resolution.

2.9.2 Acetylene, nitrous oxide, and air supplies used will be those commonly used for best analytical results.

2.10 Spectrophotometers

2.10.1 Spectrophotometers employed for colorimetric and turbidimetric procedures should be capable of operation in the 340 to 700 nm range.

2.10.2 Spectrophotometers should have a grating or prism system capable of ± 25 nm reproductivity of wavelength settings.

2.10.3 Spectrophotometers should be checked for wavelength accuracy once per year using a didymium filter or comparable system.

2.11 Volumetric Glassware

2.11.1 Class A glassware shall be used for all volumetric flasks, pipettes and burets employed in the procedures. Class A specifications are identical to those found in the National Bureau of Standards publication "Circular 602".

3) APPLICABILITY

3.1 Each analytical procedure is applicable to a specific regulation, division and section. The designated numbering system applying to the regulation appears on the upper left corner of each procedure.

4) METHODOLOGY

4.1 Alternate analytical procedures may be used provided that such procedures have established equivalency to an accepted reference Method. Any questions relating to equivalency may be referred to the Chief of Laboratory Services.

4.1.1 Appropriate ASTM and EPA approved Methodologies will be deemed equivalent procedures.

4.2 <u>If the test Method specified in a federally enforceable regulation is not applicable to the type of sample submitted for analysis, minor, intermediate and major changes, as defined in 40 CFR §63.90, can be made to the procedure. Any change in the Method requires the mutual agreement of the manufacturer, user, and the Air Pollution Control Officer (APCO). A major change requires the additional approval of the U. S. Environmental Protection Agency (US EPA).</u>

5) DISCLAIMER

5.1 Any reference to specific product brands does not indicate an endorsement of that particular brand by the BAAQMD. Specific brand names and instrument descriptions listed are for products or equipments used by the BAAQMD. Other equivalent instrumentation or products can be used.

METHOD 10A

DETERMINATION OF SULFUR IN PETROLEUM AND PETROLEUM PRODUCTS

REF: Reg. 2-1-123. 3.2
2-1-123. 3.7
9-1-304

1. PRINCIPLE

1.1 The sulfur content of petroleum and petroleum products such as fuel oils, residuals and crude oils is determined by the energy dispersive X-ray fluorescence spectroscopy technique.

1.2 The method is fast non-destructive and requires minimal sample handling. The sample is placed in the path of a beam radiated from an X-ray tube. The primary X-rays generated by the tube excite sulfur atoms generating fluorescent X-rays; the partial remaining rays are scattered. The fluorescent rays are selectively filtered, and the X-ray detector detects the fluorescent and scattered rays. The detector generates electric pulses that are proportional to the energy of the incoming X-rays. The sulfur concentration is calculated by comparing the counts obtained from the pulses with those of calibration standards.

1.3 The limit of detection of this method is 0.05 % sulfur (by weight). The upper limit is 5.00% sulfur (by weight) and can be extended by appropriate dilution.

1.4 Samples containing heavy metal additives and lead alkyls may interfere with the test method and elements such as silicon, phosphorous, calcium, potassium, and halides can interfere at concentrations greater than one tenth of the measured concentration of sulfur, or more than a few hundred milligrams/kilogram. The presence of water, precipitates and solvents with high vapor pressure in the sample matrix may introduce errors in the measurement process. Follow the procedures specified in the manufacturer's "Instruction Manual" when analyzing these types of materials.

2. APPARATUS

2.1 Sulfur-in-oil Analyzer: The Horiba Instruments, Inc. SLFA-1100 H model is equipped with an X-ray source.

2.2 Sample Holders A and B, disposable sample cells, inner and outer frame of the cell and transparent films. These parts are available from Horiba Instruments, Inc. 17671 Armstrong Avenue, Irvine, CA 92714. Phone: 1-800-446-7422

3. REAGENTS

3.1 National Institute of Standards and Technology (NIST) or other commercially available standards containing 0 to 5 % (by weight) sulfur in various matrices.

3.2 Iso-octane, mineral oil or other suitable matrices diluents, reagent grade.

4. CALIBRATION

4.1 Number of calibration curves: The analyzer can be set to store five calibration curves (1 to 5). Each calibration curve can include up to 20 standards and has a specific concentration range and matrix. The calibration curve to be used for the analysis is dependent upon sample concentration and matrix and can be preset in the CONDITION menu. When 'A' for the automatic selection of curve number is entered in the CONDITION menu, the analyzer will automatically use the best fitting curve, based on sample concentration. For setting up of the method, refer to the 'Measurement Conditions' on page 12 of the Horiba Instruction Manual.

4.2 Preparation of a calibration curve:

4.2.1 To operate the analyzer and enter data for the standard concentrations refer to the steps described in the Horiba Instruction Manual page 32 through 39.

4.2.2 Calibration curves can be prepared using one of the following three modes:

AUTO: First, key-in the concentration values of the multiple standards, and then measure the standards. A calibration curve is obtained automatically from the results of the measurements.

MAN 1: Manually enter the coefficients A, B, and C for the calibration curve. This mode is useful when backup battery has run down and the coefficients for the calibration curve are lost from the memory. The coefficients (K) for the curves should be recorded separately.

MAN 2: Manually enter both the concentration value and the K value for the calibration curve. This mode can be used when (1) data points need to be added to increase the accuracy of the calibration curve obtained in the AUTO mode, or (2) outlying data points need to be deleted.

4.2.3 Calibrate the analyzer with at least five standards of differing concentrations (0 to 5 % by weight). Refer to pages 14 to 23 of Horiba Instruction Manual for proper calibration of the instrument. Use standards that have the same matrices as the sample.

4.3 Degrees of calibration curve: Two degrees of calibration are available, linear and quadratic. Refer to page 15 of Horiba Instruction Manual for appropriate use of degree of calibration.

5. ANALYTICAL PROCEDURE

5.1 Preparation of the Sample Cells:

5.1.1 Follow the steps described in the Horiba Instruction Manual, page 32 through 34. The amount of sample needed to fill the sample cell is 4-10 mL. **(NOTE 1)**

NOTE 1: Samples that solidify at normal room temperature must be heated until fluid before pouring in the sample cells. Make a pinhole on the paper surface of the sample cell. After ensuring that the sample temperature is back to room temperature, start measurement. Be careful not to heat the samples above 60 ^{o}C.

5.1.2 Turn on the POWER switch located at the rear of the unit. The READY menu will appear within 60 seconds on the screen. The X-ray lamp will also light up.

5.2 Measurement of the sample concentration:

5.2.1 Place the sample cell facing the cell window downward on the cell table.

5.2.2 The soft keys F1, F2, F3 and F4 on the panel correspond to COND, ID#, CAL and MAINT on the screen.

5.2.3 Press the F1 key to select analytical conditions. Measurement Time is entered in seconds (10, 30, 100, 300 or 600 seconds). Selection of a longer measurement time will generally result in better accuracy of the analysis. However, for the analysis of highly volatile samples select measurement time 10 or 30 seconds to minimize changes in concentration during measurement. Select three repetitions of the measurement. Select a calibration curve (#1, #2, #3, #4, #5 or A). The selection of ‘A’ will automatically use the appropriate calibration curve based on sample concentration. The automatic selection of the standard curve may not match the sample matrix. **(NOTE 2)**

NOTE 2: It is always best to use standards with matrices and properties closest to those of the samples to be measured. If

the calibration is carried out with standards that differ greatly from the sample under measurement, errors may occur.

5.2.4 Press the F2 key to enter sample ID#.

5.2.5 Press the F4 key to enter date and time in the system.

5.2.6 Press the ‘MEAS’ key on the panel to measure the sample. The measurements will be replicated for the previously specified repeat times and each measurement will be continued for the previously entered time. At the end of all replicate measurements, the printer will print sample ID#, Date, Time, # of the calibration curve used, measurement time, repeat times, individual replicate result (wt %s), average of the replicate results (wt %s) and standard deviation.

5.2.7 Samples that are out of range: Analytical results over 5.0 % sulfur by weight are out of linear range of the instrument. This may cause errors in analytical results. Therefore, ensure that the concentration of the sample to be measured is within the concentration range of the standards used for calibration. Samples containing more than 5.0 % sulfur by weight can be diluted with a material that is similar to that of the sample matrix.

6. CALCULATIONS

6.1 The automatic printout at the end of analysis shows the sample concentration (%S by weight).

6.2 If the sample is diluted, multiply the result by ~~with~~ the appropriate dilution factor.

7. QUALITY CONTROL

7.1 Blank Analysis: A sample of iso-octane is used as a blank and is analyzed before sample analysis to check the analytical system for contamination. If the blank analysis shows a concentration greater than 0.001 wt % sulfur, the blank should be repeated. If the blank still shows sulfur content greater than 0.001 wt %, the contamination source should be corrected before analyzing samples.

7.2 Calibration Standard Analysis: Calibration standards are purchased from NIST as needed. The matrix should be similar to that of the sample. The system needs to be recalibrated after a major repair on the instrument (such as X-ray tube replacement), or after a failure to meet requirements on quality control sample and instrument sensitivity.

7.3 Control Sample Analysis: The control sample is analyzed at the beginning and at the end of the sample set, and after every 10 samples if the sample set contains more than 10 samples. A control chart is maintained for the control samples. The upper and lower warning limits are set for two standard deviation (± 2σ). The upper and lower control limits are at three standard deviations (± 3σ).

7.4 Control sample out-of-control: When the measured value of sulfur in the control sample exceeds the 3σ limit or when two successive measurements of the control sample exceed the 2σ limit, the control sample is called out-of-control. If the Q.C. sample continues to be out-of-control, the calibration and Q.C. sample must be rerun. Determine the cause of the problem before analyzing any samples, if the control sample continues to be out-of-control.

7.5 Replicate Analysis: The instrument automatically performs three replicate analyses during the measurement. The printout includes individual and average reading of the replicates. The Horiba SLFA-1100 H model is also capable of performing 5 or 10 replicates during measurement. If the closest two values of the three analyses show a difference that is greater than five %, all the samples analyzed after the previous replicate must be reanalyzed. Corrective action should be taken to determine the cause of the problem.

8. REFERENCES

8.1 Horiba Instruction Manual – Horiba Ltd.

8.2 "Standard Test Method for Sulfur in Petroleum and Petroleum Products by Energy Dispersive X-Ray Fluorescence Spectrometry" ASTM Designation D 4294-98, Book of ASTM Standards, Volume 5.02, 1998.

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METHOD 21

REF: Regs:
8- 3
8-4
8-11
8-12
8-13
8-14
8-19
8-20
8-23
8-26
8-29
8-31
8-32
8-35
8-38
8-43
8-45
8-51

DETERMINATION OF COMPLIANCE OF VOLATILE ORGANIC COMPOUNDS FOR WATER REDUCIBLE COATINGS

1) PRINCIPLE

1.1 This method is applicable to the determination of total water content and volatile organic compounds **(VOC)** of water reducible coatings. Water is determined by gas chromatography using ethanol as an internal standard. The total non-volatiles **(NV)** are determined by heating an aliquot of the coating for a specified time and temperature in an oven. Methylene chloride and 1,1,1-trichloroethane concentrations must be determined by gas chromatography, ~~if the total VOC exceeds the regulatory limits,~~ if considered as exempt compounds in the regulation.

1.2 For a multicomponent system, the components should be first mixed in the appropriate ratio; then the water, exempt compounds, density and total non-volatiles are determined on this mixture. The total non-volatile content is determined by allowing the test specimens to have an induction period of 30 minutes in the aluminum dish prior to oven heating.

1.3 This method may not be applicable to all types of coatings or printing inks. ~~Other procedures may be substituted with mutual agreement of the manufacturer, user and the Air Pollution Control Officer~~ ~~**(APCO)**.~~

1.4 This method excludes water when calculating the VOC content of the coating. If exempt compounds such as acetone or methyl acetate are present in the coating, the material must also be analyzed by BAAQMD Method 22 or ASTM D6133-02.

2) APPARATUS

2.1 **Gas Chromatograph (GC).** This unit is fitted with a thermal conductivity detector **(TCD)**, a~~ glass sleeve~~ liquid injection port with glass insert, a temperature programmer and a compatible integrator or data station.

The suggested GC operating parameters are as follows:

	Initial	**Final**
Oven Temperature (^oC)	**110**	**220**
Time Delay (min)	**0**	**10**
Temperature Program Rate (^oC/min)	**10**	
***Injector Temperature (^oC)**	**250**	
Detector Temperature (^oC)	**250**	
Carrier Gas	**He**	
Carrier Gas Flow (cc/min)	**20**	
Filament Current (ma)	**~~150~~ 100**	
Injection Sample Size (µl)	**2**	

~~*** Glass sleeve insert is used in the injection port.**~~

2.2 **Analytical Column:** Any analytical column capable of separating and resolving the compounds of interest is acceptable. The suggested analytical columns are;

2.2.1 Primary Column. A 6' x 1/8" O.D. SS column packed with Porapak Q, 80 - 100 mesh.

2.2.2 Alternate column to confirm the presence of chlorinated hydrocarbons **(ClHC).** Use only if interfering peaks are found.

A 12' x 1/8" O.D. SS column packed with 20% SP-2100/0.1% Carbowax 1500,
100 - 120 Mesh Supelcoport.

2.3 **10 µl Syringe.**

2.4 **Burrell Wrist Action Shaker.**

2.5 **Desiccator.**

2.6 **Aluminum Foil Dish.** 57 mm diameter x 10 mm high with a flat bottom.

2.7 **Forced Draft Oven.** Capable of maintaining a temperature of 110 ± 5^{o}C.

2.8 **Analytical Balance.** Capable of weighing to ± 0.0001 g

2.9 **Top Loading Analytical Balance.** Capable of weighing to ± 0.01 g.

2.10 **Disposable ~~Beral Pipette~~ Transfer Pipets.** 3 ml with 1 and 2 ml graduations.~~These are available from Curtin Matheson, Company~~ **~~(Catalog #376-970).~~**

2.11 **Spatula.**

2.12 **Gardner Weight Per Gallon Cup. These are available from Thomas Scientific. ~~(Catalog #8353A01).~~**

2.13 **Vials** with screw caps. 2 dram size.

2.14 **Eberbach Shaker.**

2.15 **Red Devil Paint Shaker** for gallon size containers.

2.16 **Disposable Syringe, 3-5 cc.** Used for coatings with highly volatile solvents.

3) REAGENTS

3.1 **Distilled Water**

3.2 **Ethyl Alcohol.** 200 proof.

3.3 **Dimethylformamide (DMF).** Spectroquality. Water content must not exceed 0.05% (w/w). Other suitable solvents, Reagent Grade.

3.4 **Helium.**

3.5 **Isopropyl Alcohol.** Reagent grade or highest available purity.

3.6 **1,1,1-Trichloroethane (1,1,1,-TCA).** Reagent grade or highest available purity.

3.7 **Methylene Chloride.** Reagent grade or highest available purity.

3.8 **Sodium Sulfate (Na_2SO_4).** Anhydrous Powder.

4) ANALYTICAL PROCEDURE

4.1 Determination of Total Volatiles. (NOTE: 1)

4.1.1 Mix the coating thoroughly for about 30 minutes, using an Eberbach shaker or 5 minutes ~~with~~ using the Red Devil Paint Shaker. It is essential that the samples be well mixed to obtain valid results. Stirring with a spatula may also be required.

4.1.2 Precondition the aluminum dish **(2.6)** containing a paper clip in the oven for at least 30 minutes at 110 ± 5^{o}C. Cool and store in a desiccator. Weigh accurately the aluminum dish with the paper clip to ± 0.0001 g.

4.1.3 Using a disposable ~~Beral~~ ~~pipette~~ transfer pipet, weigh accurately 0.4 to 0.6 g **(± 0.0001 g)** of the thoroughly mixed coating **(4.1.1)** in the pre-weighed aluminum dish **(4.1.2)** containing a paper clip.

4.1.4 Disperse the coating by adding 2 ml of distilled water and stir with the paper clip until the sample is evenly dispersed. Dry the sample in the oven at $110^{o} \pm 5^{o}$C for 1 hour. Cool the sample in the desiccator and weigh.

4.1.5 Run the analysis ~~samples~~ in duplicate. Reanalyze the sample if results ~~should not~~ vary by more than ±1% (absolute) ~~of~~ from the mean.

NOTE 1: For multicomponent systems, premix the components in the correct proportions. Weigh accurately 0.2 - 0.4 g (± 0.0001 g) of mixture into a tared aluminum dish with paper clip. Disperse the sample in the aluminum dish using the paper clip, without adding any solvent. Allow an induction period of 30 minutes, prior to oven drying. Use the same mixture for the determination of density, exempt compounds and water content of the coating.

4.2 Calculations for the Determination of Total Volatile and Non-Volatile Contents.

4.2.1 Weight of Coating (g) = (4.1.3) - (4.1.2)

4.2.2 Weight of Non-Volatile (NV) in g = (4.1.4) - (4.1.2)

4.2.3

$$\% \text{ NV (W/W)} = \frac{(4.2.2)}{(4.2.1)} \times 100$$

4.2.4 % Total Volatiles in Coating (W/W) = 100 - (4.2.3)

4.3 Determination of Density.

4.3.1 Calibrate the volume of the Gardner weight per gallon cup as described in ASTM D 1475~~-85~~ 90.

4.3.2 Accurately weigh the cup **(4.3.1)** to ± 0.01 g.

4.3.3 Transfer an aliquot of the thoroughly mixed coating **(4.1.1)** to the cup. Cap the container, leaving the overflow orifice open. Immediately remove excess sample by wiping dry with absorbent material. Avoid occluding air bubbles in the container.

4.3.4 Accurately weigh the filled cup to ± 0.01 g,

4.3.5 Run the analysis ~~sample~~ in duplicate. Reanalyze the sample if the results vary by more than 0.006 g/ml.

4.3.6 **Calculation of Density.**

$$D\ (\text{g/ml}) = \frac{(4.3.4) - (4.3.2)}{(4.3.1)}$$

Where: D = Density, g/ml.

(4.3.1) = Volume of the calibrated cup, ml.

(4.3.4) = Weight of the cup filled with coating, g.

(4.3.2) = Weight of the cup, g.

4.4 Determination of the Water Content of the Coating by Gas Chromatography

4.4.1 Set up the gas chromatograph as described in **Section 2.1 and 2.2.**

4.4.2 Determination of the Response Factor, (R_w), of Water. **(NOTES 2 and 3)**

NOTE 2: **Screen each sample for the presence of interfering peaks prior to analysis. If the sample contains ethanol, use 2-propanol as the internal standard. If the sample contains both ethanol and 2-propanol, use another appropriate internal standard.**

NOTE 3: **If the sample is not dispersible in DMF, use a more suitable solvent such as dimethysulfoxide (DMSO).**

4.4.2.1 Ethanol **(200 proof)** is used as an internal standard. The response factor of water relative to the internal standard is determined as follows:

4.4.2.2 Prepare a blank by weighing accurately 0.2 g of ethanol **(± 0.0001 g)** in a pre-weighed sample vial containing 2 ml of DMF ~~dimethyformamide~~. Cap and shake the vial vigorously for about 1 minute. Using a 10 µl syringe inject 2 µl of the mixture into the gas chromatograph. ~~**(NOTES 2 and 3)**~~ **(NOTES 4 and 5)**

NOTE ~~2~~ 4: If a water peak is seen in the chromatogram of the blank, then treat the DMF ~~dimethylformamide~~ and ethanol with anhydrous Na_2SO_4 powder, and reinject the blank into the gas chromatograph. Use the dried reagents to determine R_w, and also for sample analysis.

NOTE ~~3~~ 5: DMF ~~Dimethylformamide~~ is harmful if inhaled or absorbed through the skin. It is suspected to be embryotoxic. Use only with adequate ventilation. Avoid contact with skin, eyes and clothing.

4.4.2.3 Weigh accurately 0.2 g of water and 0.2 g of ethanol **(± 0.0001 g)** in a pre-weighed sample vial containing 2 ml of DMF ~~dimethylformamide~~. Cap and shake the vial contents thoroughly for 15 minutes, using the Burrell Wrist Action Shaker. **(NOTE 5)**

~~**NOTE 3: Dimethylformamide is harmful if inhaled or absorbed through the skin. It is suspected to be embryotoxic. Use only with adequate ventilation. Avoid contact with skin, eyes and clothing.**~~

4.4.2.4 Using a 10 µl syringe, inject 2.0 µl of the mixture from **(4.4.2.3)** into the gas chromatograph. Integrate and record the peak areas of water and ethanol. The order of elution is water, ethanol, methylene chloride, 1,1,1- trichloroethane, if present), and DMF ~~dimethylformamide~~. Retain the chromatogram.

4.4.3 Calculations.

4.4.3.1 The response factor **(R_W)** for water is determined by using the following equation: ~~**(NOTE 4)**~~ **(NOTE 6)**

$$R_w = \frac{(W_i) \times (A_{H_2O})}{(W_{H_2O}) \times (A_i)}$$

Where: W_i = Weight of the internal standard, g.

W_{H_2O} = Weight of water, g.

A_{H_2O} = Area of water peak.

A_i = Area of the internal standard.

~~**NOTE 4**~~ **NOTE 6: Peak height cannot be substituted for peak area in the equation. It is necessary to determine the response factor for water daily or with each series of determinations.**

4.4.4 Determination of the Water Content of the Coating.

4.4.4.1 Weigh accurately 0.4 to 0.6 g **(± 0.0001 g)** of the mixed coating **(4.1.1)** and 0.2 g **(± 0.0001 g)** of ethanol in a tared vial containing 2 ml of DMF. If the concentration of water is greater than 65%, rerun the sample using 0.2 to 0.3 g **(± 0.0001 g)** of the coating. **(NOTES 2 and 3)**.

~~**NOTE 5: Screen each sample for the presence of interfering peaks prior to analysis. If the sample contains ethanol, use 2-propanol as the internal standard. If the sample contains both ethanol and 2-propanol, use another appropriate internal standard.**~~

4.4.4.2 Shake the mixture on a Burrell Wrist Action Shaker for 15 minutes. It is essential that the sample be thoroughly mixed. The sample is allowed to stand for about 5 minutes after shaking and prior to injection. This is to allow the solids to settle at the bottom of the vial.

4.4.4.3 A 2 µl aliquot of the supernatant liquid from **(4.4.4.2)** is injected into the gas chromatograph. The areas of the water, ethanol and other peaks are integrated and recorded. Retain the chromatogram.

4.4.4.4 Run the analysis ~~samples must be run~~ in duplicate. Reanalyze the sample ~~agree within~~ if the results vary by more than ± 1% (absolute) ~~of~~ from the mean.

4.4.5 Calculation for % Water in the coating.

4.4.5.1 The percent of H_2O (W/W) in the coating is determined by the following equation:

$$\% \ H_2O \ (W/W) = \frac{(A_{H_2O}) \times (W_i) \times 100}{(A_i) \times (W_s) \times (R_w)}$$

Where:
A_{H_2O} = Area of water peak.
A_i = Area of the internal standard peak.
W_i = Weight of the internal standard, g.
W_s = Weight of the coating sample, g.
R_w = Response factor for water (4.4.3.1).

5) COMPLIANCE CALCULATIONS FOR SAMPLES THAT CONTAIN WATER

5.1 Weight (g) of Total Volatiles/ l of Coating = 1000 ml/l x (4.2.4) x (4.3.6) x 10^{-2}

Where: (4.2.4) = % Total Volatiles in the Coating (W/W)
(4.3.6) = Density, g/ml

5.2 Weight (g) of Water/l of Coating = 1000 ml/l x (4.3.6) x (4.4.5.1) x 10^{-2}

Where: (4.4.5.1) = % Water in the coating (W/W).

5.3 Volume (ml) of Water /l of Coating = Weight of water, g/l (5.2)

Assume density of water = 1 g/ml.

5.4 g VOC/l of Coating (less H2O)

$$= \left[\frac{(5.1) - (5.2)}{1000 \text{ ml/l} - (5.3)} \right] \times 1000 \text{ ml/l}$$

5.5 lb VOC/gal of Coating (less H_2O) = (5.4) x 8.34 x 10^{-3}

Where: $$8.34 \times 10^{-3} = \frac{3.785 \text{ l/gal}}{454 \text{ g/lb}}$$

6) COMPLIANCE CALCULATIONS FOR SAMPLES THAT CONTAIN WATER AND EXEMPT COMPOUNDS

6.1 Weight (g) of Total Volatiles /l of Coating = 1000 ml/l x (4.2.4) x (4.3.6) x 10^{-2}

Where: (4.2.4) = % Total Volatiles in the Coating (w/w).
(4.3.6) = Density, g/ml.

6.2 Weight (g) of Water/l of Coating = 1000 ml/l x (4.3.6) x (4.4.5.1) x 10^{-2}

Where: (4.4.5.1) = % Water in the coating (W/W).

6.3 Total Weight (g) of Exempt Compounds/ l of Coating = Sum of the individual weights (g) of exempt compounds in 1 liter of coating **(Note 7)**

6.4 Volume (ml) of Water /l of Coating = Weight (g) of water in I liter of Coating (5.2)

Assume density of water = 1 g/ml.

6.5 Total Volume (ml) of Exempt Compounds /l of Coating = Sum of the individual volumes (ml) of exempt compounds in 1 liter of coating **(Note 7)**

6.6 g VOC/l of Coating (less H2O, less exempt compounds) =

$$\frac{[\,(6.1) - (6.2) - (6.3)\,]}{[\,1000 \text{ ml/l} - ((6.4) + (6.5))\,]} \times 1000 \text{ ml/l}$$

6.7 lb VOC/gal of Coating (less H_2O, less exempt compounds) = (6.6) x 8.34 x 10^{-3}

Where: $$8.34 \times 10^{-3} = \frac{3.785 \text{ l/gal}}{454 \text{ g/lb}}$$

NOTE 7: **Weights and volumes of exempt compounds from BAAQMD Method 22 and ASTM D6133-02.**

7) REFERENCES

7.1 **Hollis, O.L., "Separation of Gaseous Mixtures using Porous Aromatic Polymer Beads"**, Anal. Chem. 38, 309, 1966.

7.2 **~~“Volatile Content of Paint"~~ “Standard Test Method for Volatile Content of Coatings",** ASTM ~~Designation~~ D2369-~~87~~ 95, ~~Book of ASTM Standards~~ Annual Book of ASTM Standards, Vol. 06.01, 1995.

7.3 **~~"Density of Paint, Varnish, Lacquer and Related Products~~" “Standard Test Method for Density of Liquid Coatings, Inks, and Related Products”,** ASTM ~~Designation~~ D1475-~~85~~ 90, Annual Book of ASTM Standards, Vol. 06.01, 1993.

7.4 **"Standard Test Method for ~~Determination of~~ Water Content of ~~Water Reducible Paints~~ Coatings by Direct Injection into a Gas Chromatograph"**, ASTM Method D3792-91 , ~~Book of ASTM Standards,~~ Annual Book of ASTM Standards, Vol. 06.01, 1993.

7.5 **"Standard Test Method for Determination of Dichloromethane and 1,1,1-Trichloroethane in Paints and Coatings by Direct Injection into a Gas Chromatograph",** ASTM ~~Method~~ D4457-85 (Reapproved 1991), ~~Book of ASTM Standards~~. Annual Book of ASTM Standards, Vol. 06.01, 1993.

7.6 **“Standard Test Method for Acetone, p-Chlorobenzotrifluoride, Methyl Acetate, or t-Butyl Acetate Content of Solventborne and Waterborne Paints, Coatings, Resins, and Raw Materials by Direct Injection into a Gas Chromatograph”,** ASTM Method D6133-02, Annual Book of ASTM Standards, Vol. 6.01, 2004.

h:/tech2/eppie/method 21m2r(2.25.05)

METHOD 22

REF: Regs: 8-3 8-14 8-29 8-45
8-4 8-19 8-31 8-51
8-11 8-20 8-32
8-12 8-23 8-38
8-13 8-26 8-43

DETERMINATION OF COMPLIANCE OF VOLATILE ORGANIC COMPOUNDS FOR SOLVENT-BASED COATINGS, INKS AND OTHER RELATED PRODUCTS

1) PRINCIPLE

1.1 This method is applicable to the determination of volatile organic compounds **(VOC)** in solvent-based coatings, inks and other related products. The non-volatile contents are determined by heating an aliquot of the material in an oven for a specific time and temperature.

1.2 The concentrations of acetone, methylene chloride and 1,1,1-trichloroethane (1,1,1-TCA) must be determined by gas chromatography.

1.3 For multi-component systems, the components must first be mixed in the appropriate ratio. The exempt ~~solvents~~ compounds, density and total non-volatiles are determined from this mixture. The total non-volatile content is determined by allowing the test specimens to have an induction period of 30 minutes in the aluminum dish prior to oven heating.

1.4 This method may or may not exclude chlorinated hydrocarbons **(ClHC)** when calculating the VOC content of the sample. If water is present in the sample, it must be analyzed by Method 21, **Section 4.4**.

1.5 If other exempt compounds such as parachlorobenzotriflouride, volatile methyl siloxanes or methyl acetate are present in the sample, the material must also be analyzed by BAAQMD Methods 41 and 43 or ASTM D6133-02.

1.6 This method may not be applicable to all types of coatings, printing inks and other products. ~~Other procedures may be substituted with mutual agreement of the manufacturer, user and the Air Pollution Control Officer **(APCO)**.~~

2) APPARATUS

2.1 Gas Chromatographs:

2.1.1 **For Chlorinated Hydrocarbons:** This unit is equipped ~~fitte~~d with a thermal conductivity or flame ionization detector, ~~a glass-sleeved~~ liquid injection port with glass insert, a temperature programmer and a compatible integrator or data station. The suggested operating parameters are as follows:

Initial Oven Temperature (°C)	**110**
Initial Hold Time (Min)	**0**
Temperature Program Rate (°C/min)	**10**
Final Oven Temperature (°C)	**220**
Final Hold Time (min)	**10**
Injector Temperature (°C)	**250**
Detector Temperature (°C)	**250**
Carrier Gas	**He**
Carrier Gas Flow (cc/min)	**20**
Filament Current (ma)	**~~150~~ 100**
Injection Sample Size (µl)	**2**

2.1.1.1 **Analytical Column:** Any analytical column capable of resolving the compounds of interest is acceptable. The suggested analytical columns for this method are:

2.1.1.1.1 **Primary Column:** A 6’ x 1/8” O.D. SS column packed with Porapak Q, 80-100 mesh.

2.1.1.1.2 **Alternate column to confirm the presence of ClHC**. ~~Use only if interfering peaks are found~~. A 12' x 1/8" O.D. SS column packed with 20% SP-2100/0.1% Carbowax 1500, 100-120 mesh Supelcoport.

2.1.2 **For Acetone**: This unit is equipped ~~fitted~~ with a photoionization detector, a ~~glass sleeved~~ liquid injection port with glass insert, a temperature programmer and a compatible integrator or data station. The suggested operating parameters are as follows:

Initial Oven Temperature (°C)	**40**
Initial Hold Time (Min)	**10**
Temperature Program Rate (°C/min)	**30**
Final Oven Temperature (°C)	**210**
Final Hold time (min)	**10**
Injector Temperature (°C)	**250**

Detector Temperature (^{o}C)	**250**
Carrier Gas	**He**
Carrier Gas Linear Velocity (cm/sec)	**40**
Injection Sample Size (μl)	**1**

2.1.2.1 Analytical Column : Any analytical column capable of resolving the compounds of interest is acceptable. The suggested analytical column for this method is:

A 60 m x 0.32 ~~0.53~~ mm DB-WAX Column, 0.5 μ film thickness (J & W Scientific). ~~Curtin Matheson Scientific, Inc. P. O. Box 1546, Houston Texas 77251-1546~~ ~~**(Catalog # 284-933).**~~

2.2 Disposable syringe, 3-5 cc. Used for coatings with highly volatile solvents**.** ~~These are available from Curtin Matheson, Company~~ ~~**(Catalog # 262-264).**~~

2.3 Needles, Stainless Steel. 21 gauge x 1-1/2" length. ~~These are available from Curtin Matheson, Company~~ ~~**(Catalog # 222-414).**~~

2.4 10 μl Syringe.

2.5 Burrell Wrist Action Shaker.

2.6 Desiccator.

2.7 Aluminum Foil Dish. 57 mm diameter x 10 mm high with a flat bottom.

2.8 Forced Draft Oven. Capable of maintaining a temperature of 110 ± 5^{o}C.

2.9 Analytical Balance. Capable of weighing to ± 0.0001 g

2.10 Top Loading Analytical Balance. Capable of weighing to ± 0.01 g.

2.11 Disposable Transfer Pipets. 3 ml with 1 and 2 ml graduations**.** ~~These are available from Curtin Matheson, Company~~ ~~**(Catalog #376-970).**~~

2.12 Spatula.

2.13 Gardner Weight Per Gallon Cup. This cup is available from Thomas Scientific, P.O. Box 99, Swedesboro, NJ 08085 (~~Catalog #8353A01).~~

2.14 Vials with screw caps, 2 dram size.

2.15 Eberbach Shaker for quart and less size containers**.**

2.16 Red Devil Paint Shaker for gallon-size containers.

3) REAGENTS

3.1 Toluene or other suitable solvent. Reagent grade.

3.2 Methanol, Absolute. Water content must not exceed 0.2% (w/w).

3.3 Dimethylformamide (DMF). Spectroquality. Water content must not exceed 0.05% (w/w). Other suitable solvent, Reagent Grade

3.4 Helium or Nitrogen, 99.995% Purity or Higher**.**

3.5 Hydrogen.

3.6 Air

3.7 Methylene Chloride. Reagent grade or highest available purity.

3.8 1,1,1-Trichloroethane (1,1,1-TCA). Reagent grade or highest available purity.

3.9 Sodium Sulfate (Na_2SO_4). Anhydrous powder.

3.10 Acetone. Reagent grade or highest available purity**.**

3.11 Tetrahydrofuran (THF). Reagent grade or highest available purity

4) ANALYTICAL PROCEDURE

4.1 Determination of Total Volatiles. (NOTE: 1)

4.1.1 Mix the coating thoroughly for about 30 minutes, using an Eberbach Shaker or 5 minutes using a Red Devil Paint Shaker. It is essential that the samples be well mixed to obtain valid results. Stirring with a spatula may also be required.

4.1.2 Precondition the aluminum dish **(2.7)** containing a paper clip in the oven for at least 30 minutes at 110 ± 5^oC. Cool and store in a desiccator. Weigh accurately the aluminum dish with the paper clip to ± 0.0001 g.

4.1.3 Using a disposable Beral pipette transfer pipet, weigh accurately 0.4 to 0.6 g **(± 0.0001 g)** of the thoroughly mixed coating **(4.1.1)** in the pre-weighed aluminum dish containing a paper clip.

4.1.4 Disperse the coating by adding 2 ml of toluene or any appropriate solvent and stir with the paper clip until the sample is evenly dispersed. Dry the sample in the oven at 110^{e} ± 5^{o}C for 1 hour. Cool the sample in the desiccator and weigh.

4.1.5 Run the analysis in duplicate. Reanalyze the sample if the results vary by more than ± 1% (absolute) ~~of~~ from the mean.

NOTE 1: For multicomponent systems, premix the components in the correct proportions. Weigh accurately 0.2 - 0.4 g (± 0.0001 g) of mixture into a tared aluminum dish with paper clip. Disperse the sample in the aluminum dish using the paper clip, without adding any solvent. Allow an induction period of 30 minutes, prior to oven drying. Use the same mixture for the determination of density, acetone, ClHC, and other exempt compounds, if present.

4.2 Calculations for the Determination of Total Volatile and Non-Volatile Contents.

4.2.1 Weight of Coating (g) = (4.1.3) - (4.1.2)

Where: (4.1.3) = Weight of the coating and aluminum pan with paper clip,g

(4.1.2) = Weight of the aluminum pan with paper clip, g

4.2.2 Weight of Non-Volatile (NV) in g = (4.1.4) - (4.1.2)

Where: (4.1.4) = Weight of the dried coating and aluminum pan with paper clip, g

4.2.3 %NV (W/W) = [(4.2.2) X 100] / (4.2.1)

4.2.4 % Total Volatiles in Coating (W/W) = 100 - (4.2.3)

4.3 Determination of Density.

4.3.1 Calibrate the volume of the Gardner weight per gallon cup as described in ASTM D1475-90.

4.3.2 Accurately weigh the cup **(4.3.1)** to ± 0.01 g.

4.3.3 Completely fill the cup with the thoroughly mixed coating. Cap the container, leaving the overflow orifice open. Immediately remove excess overflow sample material by wiping dry with absorbent material. Avoid occluding air bubbles in the container.

4.3.4 Accurately weigh the filled cup to ± 0.01 g.

4.3.5 Run the analysis in duplicate. Reanalyze the sample if the results vary by more than 0.006 g/ml.

4.3.6 Calculation of Density.

D = [(4.3.4) – (4.3.2)] / V = (g/ml)

Where:
D = Density, g/ml.
V = Volume in ml of the calibrated cup (4.3.1).
(4.3.4) = Weight of the cup filled with coating, g.
(4.3.2) = Weight of the cup, g.

4.4 Calculation for compliance in the absence of exempt ~~solvents~~ compounds or water.

4.4.1 Weight ~~Wt~~ of 1 liter of Coating (g) = 1000 ml x (4.3.6).

4.4.2 g VOC/liter of Coating = (4.2.4) x (4.4.1) x 10^{-2}

Where: (4.2.4) = % total volatiles in coating (W/W)

4.4.3 Lb VOC/gal Coating = (4.4.2) x 8.34 x 10^{-3}

Where: $8.34 \times 10^{-3} = \frac{3.785\,l/gal}{454\,g/lb}$

4.5 Determination of Methylene Chloride and (1,1,1-TCA) ~~1,1,1-Trichloroethane~~ content of the coating by Gas Chromatography (NOTES: 2 AND 3).

4.5.1 Set up the gas chromatograph as described in Section 2.1.1.

NOTE 2: **Screen each sample for the presence of exempt ~~solvents~~ compounds and other interfering peaks prior to analysis. If the sample contains methanol, use 2-propanol or any appropriate compound as the internal standard. If no exempt ~~solvent~~ compound is found, no GC analysis is required, otherwise continue on to Section 4.5.2**

NOTE 3: If the coating contains water, ~~and the VOC content corrected for chlorinated hydrocarbons exceeds the regulation limits,~~ the concentration of water in the coating must be determined per ~~Lab~~ BAAQMD Method 21.

4.5.2 Determination of Relative Response Factor, (R_{ClHC}) for the exempt solvents.

4.5.2.1 Determine the response factor of the chlorinated hydrocarbon **(R_{ClHC})** relative to the internal standard, anhydrous methanol, as follows:

4.5.2.2 Inject 1 µl of the solvent into the gas chromatograph to check for contamination. If the solvent is contaminated, open a fresh bottle and repeat the step. **(NOTE 4)**

4.5.2.3 Weigh accurately 0.2 g **(± 0.0001 g)** of the individual chlorinated hydrocarbon and 0.2 g of methanol **(± 0.0001 g)** in a pre-weighed sample vial containing 2 ml of DMF ~~dimethylformamide.~~ Cap and shake the vial contents thoroughly for 15 minutes, using the Burrell Wrist Action Shaker. **(NOTE: 4)**

NOTE 4: DMF ~~Dimethylformamide~~ is harmful if inhaled or absorbed through the skin. It is suspected to be embryotoxic. Use only with adequate ventilation. Avoid contact with skin, eyes and clothing. If the material to be analyzed is not dispersible in DMF, use a suitable solvent.

4.5.2.4 Inject separately 1 µl of the mixture from **(4.5.2.2)** and **(4.5.2.3)** into the gas chromatograph, using a 10 µl syringe. Integrate and record the peak areas of methanol and the chlorinated hydrocarbon. Retain the chromatogram. The order of elution is methanol, methylene chloride, 1,1,1- trichloroethane and ~~DMF~~ ~~dimethylformamide~~ **(See Figure I).**

4.6 Calculation for the response factor, R_{ClHC} of Chlorinated Hydrocarbon.

4.6.1 Determine the response factor, **R**$_{ClHC}$ for chlorinated hydrocarbon by means of the following equation: **(NOTE: 5)**

$$R_{ClHC} = \frac{W_i \times A_{ClHC}}{W_{ClHC} \times A_i}$$

Where: W_i = Weight of the internal standard, g.
W_{ClHC} = Weight of the chlorinated hydrocarbon, g.
A_{ClHC} = Peak area of the chlorinated hydrocarbon.
A_i = Peak area of the internal standard.

NOTE 5: It is necessary to determine the response factor for chlorinated hydrocarbon with each series of determinations.

4.7 Determination of the ClHC ~~Chlorinated Hydrocarbon~~ content of the coating

4.7.1 Weigh accurately 0.4 to 0.6 g **(± 0.0001 g)** of the mixed coating **(4.1.1)** and 0.2 g **(± 0.0001 g)** of methanol in a tared vial containing 2 ml of DMF. Immediately cap the vial.

4.7.2 Shake the mixture on a Burrell Wrist Action Shaker for 15 minutes. It is essential that the sample be thoroughly mixed. The sample is allowed to stand for about 5 minutes after shaking and prior to injection. This is to allow the solids to settle at the bottom of the vial.

4.7.3 Inject a 1 µl aliquot of the supernatant liquid from **(4.7.2)** into the gas chromatograph. Integrate and record the area of the chlorinated hydrocarbon and the methanol peaks. Retain the chromatogram.

4.7.4 Confirm the presence of the chlorinated hydrocarbon, using the alternate column **(2.1.1.1.2)**.

4.8 Calculation for % ClHC ~~Chlorinated Hydrocarbon~~ in the coating.

4.8.1 Use the data obtained in **(4.7.3)** to calculate the weight % of ClHC found in the sample, if the presence of **ClHC** is confirmed **(4.7.4)**, as follows:

4.8.1.1 $$\%\ \text{ClHC (W/W)} = \frac{A_{ClHC} \times W_i}{A_i \times W_s \times R_{ClHC}} \times 100$$

Where: A_{ClHC} = Area of the individual ClHC peak.
A_i = Area of the internal standard peak.
W_i = Weight of the internal standard, g.
W_s = Weight of the coating sample, g.
R_{ClHC} = Response factor for ClHC.

4.8.2 Run the analysis in duplicate. Reanalyze the sample if the results vary by more than ± 1% (absolute) ~~of~~ from the mean.

4.9 Determination of Acetone Content of the Coating by Gas Chromatography

4.9.1 Set up the gas chromatograph as described in **Section 2.1.2.**

4.9.2 Screen the sample for the presence of peaks interfering with the internal standard.

4.9.2.1 Prepare a solution of internal standard in DMF by weighing approximately 0.1 g of tetrahydrofuran into a vial containing 4 ml of DMF.

4.9.2.2 Inject a 1 μl aliquot of the solution **(4.9.2.1)** into the gas chromatograph. Retain the chromatogram.

4.9.2.3 Weigh approximately 0.3 grams of the mixed sample into a vial containing 4 ml of DMF. Mix thoroughly and allow to stand for 5 minutes. Inject a 1 μl aliquot of the mixture into the gas chromatograph. Compare the chromatogram to that obtained in **Section 4.9.2.2**. If there is no peak that interferes with tetrahydrofuran in the sample chromatogram, then proceed to **Section 4.9.3**. If an interfering peak is found, use methyl tertiary-butyl ether (MTBE) or any other appropriate solvent as internal standard. (NOTE 4)

4.9.3 Determination of Response Factor ($R_{acetone}$) for Acetone.

4.9.3.1 Inject 1 μl of the solvent into the gas chromatograph to check for contamination. If the solvent is contaminated, open a fresh bottle and repeat the step.

4.9.3.2 Weigh accurately 0.1g of tetrahydrofuran and 0.1 g of acetone **(± 0.0001 g)** in a pre-weighed sample vial containing 4 ml of DMF ~~dimethylformamide~~. Cap and shake the vial contents thoroughly for 15 minutes, using the Burrell Wrist Action Shaker. **(NOTE 4)**

4.9.3.3 Inject separately 1 μl of the mixture from ~~**(4.9.3.1)** and~~ **(4.9.3.2)** into the gas chromatograph using a 10 μl syringe. Integrate and record the peak areas of tetrahydrofuran and acetone. Retain the chromatogram. The order of elution is acetone, tetrahydrofuran and DMF ~~dimethylformamide~~ **(See Figure II).**

4.10 Calculation for the Response Factor, $R_{acetone}$, of Acetone.

4.10.1 Determine the response factor, $R_{acetone}$ by means of the following equation: **(NOTE: 6)**

$$R_{acetone} = \frac{W_i \times A_{acetone}}{W_{acetone} \times A_i}$$

Where:

W_i = Weight of the internal standard.

$W_{acetone}$ = Weight of acetone, g.

$A_{acetone}$ = Peak area of acetone.

A_i = Peak area of the internal standard.

NOTE 6: It is necessary to determine the response factor for acetone with each series of determinations.

4.11 Gas Chromatographic Determination of the Acetone Content of the Coating.

4.11.1 Weigh accurately 0.2 to 0.4 g **(± 0.0001 g)** of the mixed coating **(4.1.1)** and 0.1 g **(± 0.0001 g)** of tetrahydrofuran in a tared vial containing 4 ml of DMF. Immediately cap the vial **(NOTE 7).**

4.11.2 Shake the mixture on a Burrell Wrist Action Shaker for 15 minutes. It is essential that the sample be thoroughly mixed. Let the sample stand undisturbed for about 5 minutes prior to injection to allow the solids to settle at the bottom of the vial.

4.11.3 Inject a 1 μl aliquot of the supernatant liquid from **(4.11.2)** into the gas chromatograph. The areas of the acetone and the tetrahydrofuran peaks are integrated and recorded. Retain the chromatogram **(See Figure I).**

NOTE 7: If the sample contains more than 60% acetone, increase the volume of the solvent to 8 ml <u>and weight of the internal standard to 0.2 grams.</u>

4.12 Calculation for % Acetone in the Coating.

4.12.1 Calculate the weight % of acetone in the sample, using the data obtained in **(4.11.3)**, as follows:

4.12.1.1 % Acetone (W/W) $= \dfrac{A_{acetone} \times W_i}{A_i \times W_s \times R_{acetone}} \times 100$

Where:
$A_{acetone}$ = Area of the acetone peak
A_i = Area of the internal standard peak.
W_i = Weight of the internal standard, g.
W_s = Weight of the coating sample, g.
$R_{acetone}$ = Response factor for acetone.

4.13 Run the analysis in duplicate. Reanalyze the sample if the results vary by more than ± 1% (absolute) ~~of~~ from the mean.

5) CALCULATION FOR COMPLIANCE OF COATING CONTAINING ACETONE AND CLHC ~~CHLORINATED HYDROCARBONS~~

5.1 Weight (g) of Total Volatiles /l of Coating = 1000 ml/l x (4.3.6) x (4.2.4) X 10^{-2}

Where: (4.3.6) = Density of Coating, g/ml.
(4.2.4) = % Total Volatiles in the Coating (W/W).

5.2 Weight (g) of Acetone /l of Coating = 1000 ml/l x (4.3.6) x (4.12.1.1) X 10^{-2}

Where: (4.12.1.1) = % Acetone in the Coating (W/W).

5.3 Weight (g) of ClHC /l of Coating = 1000 ml/l x (4.3.6) x (4.8.1.1) x 10^{-2}

Where: (4.8.1.1) = % CIHC in the Coating (W/W).

5.4 Total Weight (g) of Acetone and ClHC /l of coating = Sum of the individual weights (g) of Acetone and ClHC in 1 liter of coating.

5.5 Volume (ml) of Acetone/l of Coating = (5.2) / $D_{ACETONE}$

Where: $D_{ACETONE}$ = 0.7905 g/ml.

5.6 Volume (ml) of CIHC/l Coating = (5.3) / D_{ClHC}

Where: D_{ClHC} = 1.3227 g/ml for Methylene Chloride
= 1.3293 g/ml for 1,1,1-TCA.

5.7 Total Volume (ml) of Acetone and ClHC ~~Chlorinated Hydrocarbon~~ /l of coating = Sum of the individual volumes (ml) of acetone (5.5) and ClHC in 1 liter of coating (5.6).

5.8 **If ClHC and Acetone are considered exempt solvents.**

5.8.1 g VOC/l of Coating (less CIHC, less Acetone) = $\frac{[(5.1) - (5.4) \times 1000\ \text{ml/l}]}{[1000\ \text{ml/l} - (5.7)]}$

5.8.2 lb VOC/gal of Coating (less CIHC, less Acetone) = $(5.8.1) \times 8.34 \times 10^{-3}$

5.9 If only Acetone is considered an exempt solvent.

5.9.1 g VOC/ l of Coating (less Acetone) = $\frac{[((5.1) - (5.2)) \times 1000\ \text{ml/l}]}{[1000\ \text{ml/l} - (5.5)]}$

5.9.2 lb VOC/gal of Coating (less Acetone) = $(5.9.1) \times 8.34 \times 10^{-3}$

5.10 For low solids materials, where acetone is considered part of the coating.

5.10.1 g VOC/l of Coating = [(5.1) - (5.2)]

5.10.2 lb VOC/gal of Coating = $(5.10.1) \times 8.34 \times 10^{-3}$

6) CALCULATION FOR COMPLIANCE OF COATING CONTAINING ACETONE AND OTHER EXEMPT SOLVENTS

6.1 Weight (g) of Total Volatiles /l of Coating = $1000\ \text{ml/l} \times (4.3.6) \times (4.2.4) \times 10^{-2}$

Where: (4.3.6) = Density of Coating, g/ml.
(4.2.4) = % Total Volatiles in the Coating (W/W).

6.2 Weight (g) of Acetone / l of Coating = $1000\ \text{ml/l} \times (4.3.6) \times (4.12.1.1) \times 10^{-2}$

Where: (4.12.1.1) = % Acetone in the Coating (W/W).

6.3 Total Weight (g) of Exempt Solvents / l of Coating) = Sum of the individual weights of the Exempt Solvents in 1 liter of Coating **(Note 8)**

6.4 Total Weight (g) of Acetone and Exempt Solvents / l of Coating = (6.2) + (6.3)

6.5 Volume (ml) of Acetone/ l of Coating = $(5.2) / D_{ACETONE}$

Where: $D_{ACETONE} = 0.7905$ g/ml.

6.6 Total Volume (ml) of Exempt Solvents / l of Coating = Sum of the Individual Volumes of each Exempt Solvent in 1 liter of Coating **(Note 8)**

6.7 Total Volume (ml) of Acetone and Exempt Solvents / l of coating = (6.5) + (6.6)

6.8 g VOC/l Coating (less Acetone, less Exempt Solvents) = [(6.1) – (6.4) x 1000 ml/l]
[1000 ml/l – (6.7)]

6.9 lb VOC/gal Coating (less Acetone, less Exempt Solvents) = (6.8) x 8.34 x 10^{-3}

Note 8: Weights and volumes of exempt compounds from ASTM D6133-02 and BAAQMD Methods 41 and 43.

7) REFERENCES

7.1 Hollis, O.L., **"Separation of Gaseous Mixtures using Porous Aromatic Polymer Beads",** Anal, Chem. 38, 309, 1966.

7.2 **~~"Volatile Content of Paint"~~ "Standard Test Method for Volatile Content of Coatings",** ASTM ~~Designation~~ D2369-~~93~~ 95, ~~Book of ASTM Standards~~ Annual Book of ASTM Standards, Vol. 06.01, 1995.

7.3 **~~"Density of Paint, Varnish, Lacquer and Related Products"~~ "Standard Test Method for Density of Liquid Coatings, Inks, and Related Products",** ASTM ~~Designation~~ D1475-90. Annual Book of ASTM Standards, Vol. 06.01,~~1990~~ (1993).

7.4 **"Standard Test Method for ~~Determination of~~ Water Content of ~~Water Reducible Paints~~ Coatings by Direct Injection into a Gas Chromatograph"**, ASTM Method D3792-91, ~~Book of ASTM Standards,~~ Annual Book of ASTM Standards, Vol. 06.01, 1993.

7.5 **"Standard Test Method for Determination of Dichloromethane and 1,1,1-Trichloroethane in Paints and Coatings by Direct Injection into a Gas Chromatograph",** ASTM ~~Method~~ D4457-85 (Reapproved 1991), ~~Book of ASTM Standards~~. Annual Book of ASTM Standards, Vol. 06.01, 1993.

7.6 **"Standard Test Method for Acetone, p-Chlorobenzotrifluoride, Methyl Acetate, or t-Butyl Acetate Content of Solventborne and Waterborne Paints, Coatings, Resins, and Raw Materials by Direct Injection into a Gas Chromatograph",** ASTM Method D6133-02, Annual Book of ASTM Standards, Vol. 6.01, 2004.

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C-R4A CHROMATOPAC CH=1 REPORT No.=32 CHROMATOGRAM=2:LA10/1.C23 95/07/18 11:01:17

Analysis File : 2:POR.Q

UNIT- GC-14A-1
COLUMN - 6' X 1/8" PORAPAK Q 110 - 220 DEG C AT 10 DEG/MIN

TCD

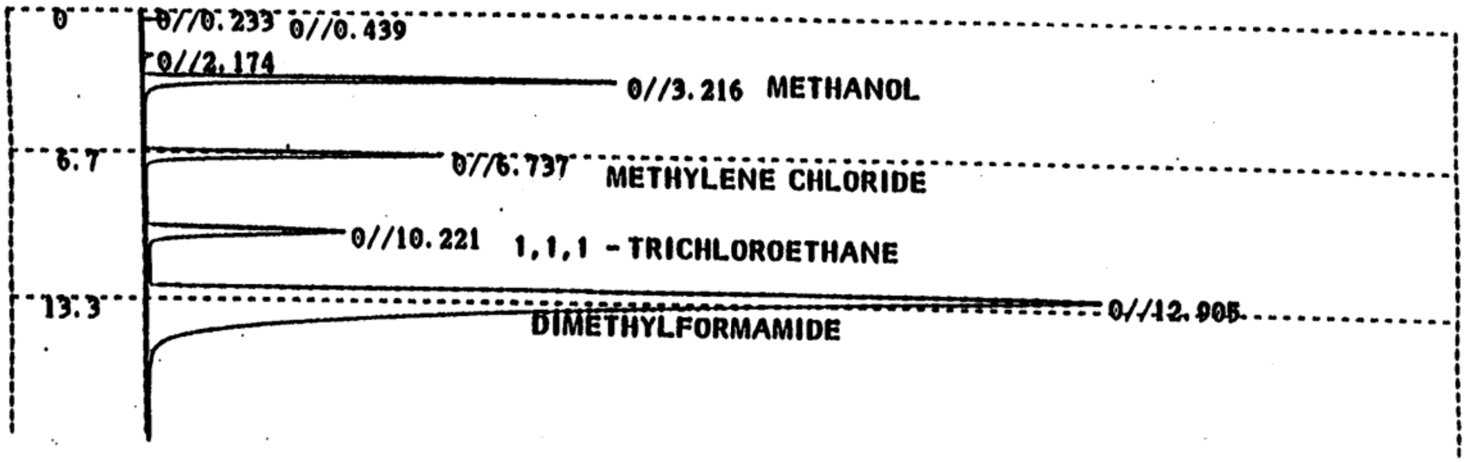

FIGURE I

A TYPICAL CHROMATOGRAM SHOWING
METHANOL, METHYLENE CHLORIDE, 1,1,1 - TRICHLOROETHANE
AND DIMETHYLFORMAMIDE PEAKS

COLUMN: 6' x 1/8" PORAPAK Q

Unit: GC 17A
Column: 60m x 0.25 mm ID 0.5 m FT DB-WAX
Detector: PID

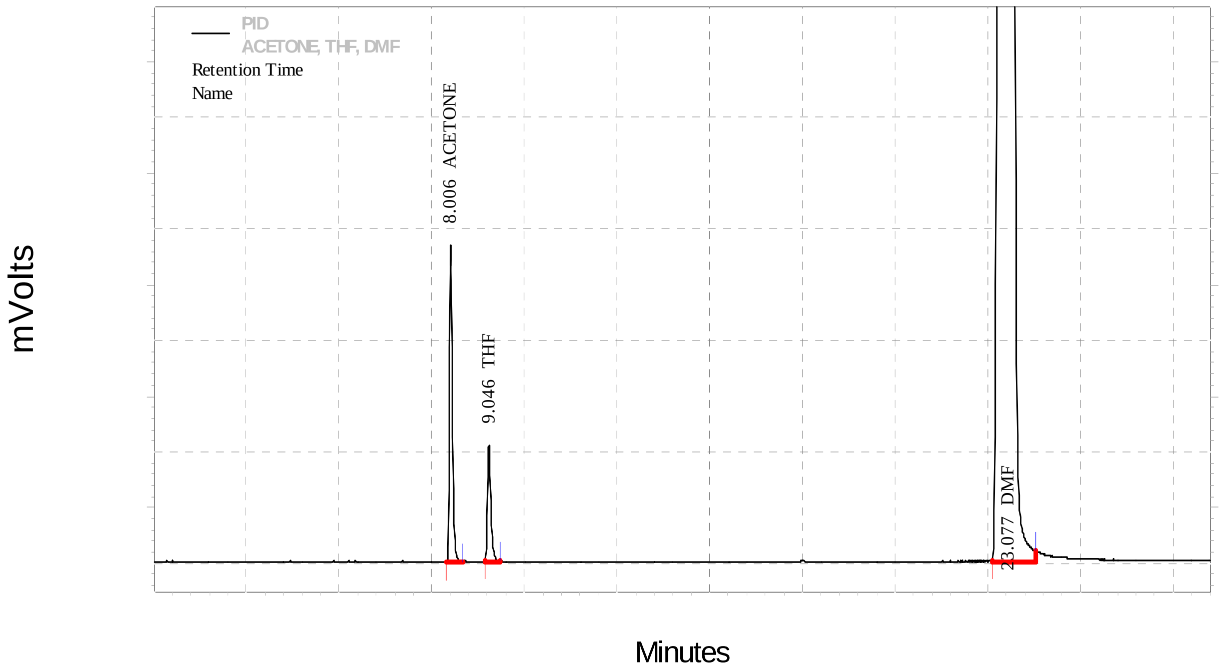

FIGURE II

A TYPICAL CHROMATOGRAM SHOWING
ACETONE, TETRAHYDROFURAN AND DIMETHYLFORMAMIDE PEAKS
COLUMN: 60m X 0.25mm ID, 0.5 um FT DB-WAX

METHOD 31

DETERMINATION OF VOLATILE ORGANIC COMPOUNDS IN PAINT STRIPPERS, SOLVENT CLEANERS AND LOW SOLIDS COATINGS

REF:	**Reg:**	**8-3**	**8-19**	**8-31**	**8-50**
		8-4	**8-20**	**8-32**	**8-51**
		8-14	**8-29**	**8-35**	
		8-16	**8-30**	**8-45**	

1) PRINCIPLE

1.1 This method is applicable to the determination of volatile organic compounds (VOC) in paint strippers, solvent cleaners and low solids coatings. The non-volatile (NV) content is determined by heating an aliquot of the sample in an oven for 1 hour at 110~~^{o}C~~ ± 5^{o}C.

1.2 Water, methylene chloride, 1,1,1-trichloroethane (1,1,1-TCA) and other exempt chlorinated ~~solvents~~ compounds are determined by gas chromatography, using ethanol as the internal standard.

1.3 This method does not exclude water and may or may not exclude exempt chlorinated ~~solvents~~ compounds when calculating the volatile organic compound content of ~~in~~ the sample.

1.4 If other exempt compounds such as acetone, parachlorobenzotriflouride (PCBTF), volatile methylsiloxanes (VMS) or methyl acetate are present in the sample, the material must be analyzed by BAAQMD Methods 22, 41 or 43, or ASTM D6133-02.

2) APPARATUS

2.1 **Gas Chromatograph.** This unit is equipped ~~fitted~~ with a thermal conductivity detector (TCD), a ~~glass sleeve~~ liquid injection port with glass insert, a temperature programmer and a compatible integrator or data station. The suggested operating parameters are as follows:

	Initial	**Final**
Oven Temperature (^{o}C)	**110**	**220**
Time Delay (min)	**0**	**10**
Program Rate (^{o}C/Min)	**10**	

*** Injector Temperature (°C)**	**250**
Detector Temperature (°C)	**250**
Filament Current (ma)	**~~150~~ 100**
Injection Sample Size (µl)	**2**
Carrier Gas	**He**
Carrier Gas Flow (cc/Min)	**20**

~~*** Glass-sleeve insert is used in the injection port.**~~

2.2 Analytical Column: Any analytical column capable of separating and resolving the compounds of interest is acceptable. The suggested analytical columns are;

2.2.1 A 6' x 1/8" O.D. SS Column packed with Porapak Q, 80 to 100 mesh.

2.2.2 Alternate Column to Confirm the Presence of Chlorinated Hydrocarbons (ClHC). ~~Use only if interfering peaks are found.~~

A 12' x 1/8" O.D. SS Column packed with 20% SP-2100 + 0.1% Carbowax 1500, 100 to 120 mesh supelcoport.

2.3 10 µl Syringe.

2.4 Burrell Wrist Action Shaker.

2.5 Refrigerator.

2.6 Aluminum Foil Dish. 57 mm diameter x 10 mm high with a flat bottom.

2.7 Drying Oven, Forced Air. Capable of maintaining a temperature of 110~~°C~~ ± 5°C

2.8 Analytical Balance. Capable of weighing to ± 0.0001 g.

2.9 Top Loading Analytical Balance. Capable of weighing to ± 0.01 g.

2.10 Disposable Transfer Pipets. 3 ml with 1 and 2 ml graduations.~~These are available from Curtin Matheson Company **(Catalog #376-970).**~~

2.11 Spatula.

2.12 Gardner Weight-per-Gallon Cup. 83 cc**. These are available from Thomas Scientific.** ~~**(Catalog # 8353A01).**~~

2.13 Vials with Screw Caps. 2 dram size.

2.14 Paper Clip. Bent to a 90° angle.

3) REAGENTS

3.1 Toluene or other Suitable Solvents.

3.2 Ethanol ~~Ethyl Alcohol~~. Absolute, 200 proof. Other suitable internal standards. Reagent grade or highest available purity.

3.3 Dimethylformamide (DMF). Spectroquality. Water content must not exceed 0.05% (w/w). Other suitable solvents, Reagent Grade.

3.4 Helium.

3.5 Methylene Chloride. Reagent grade or highest available purity.

3.6 Distilled Water.

3.7 1,1,1-Trichloroethane (1,1,1-TCA). Reagent grade or highest available purity.

3.8 Sodium Sulfate (Na_2SO_4). Anhydrous powder**.**

4) ANALYTICAL PROCEDURE

4.1 Determination of Total Volatiles.

4.1.1 Mix the sample thoroughly using a spatula. It is essential that the samples be well mixed to obtain valid results. **(NOTE 1).**

NOTE 1: Due to the high pressure generated by the components of the stripper, the sample must be kept in the refrigerator at all times prior to analysis. Mixing must always be done under the hood, using a spatula and never with a shaker.

4.1.2 Precondition the aluminum dish **(2.6)** containing a bent paper clip **(2.14)** in the oven for at least 30 minutes at 110~~°C~~ ± 5°C. Cool and store in a desiccator. Weigh accurately the aluminum dish with the paper clip to ± 0.0001 g.

4.1.3 Using a disposable transfer pipet ~~Beral pipette~~ (**2.10**), weigh accurately 0.4 to 0.6 g **(± 0.0001 g)** of the thoroughly mixed sample **(4.1.1)** in a pre-weighed aluminum dish containing a paper clip. Disperse the sample by adding 2 ml of distilled water or any appropriate solvent and stirring with the paper clip until the sample is evenly distributed.

4.1.4 Dry the sample in the oven at 110~~°C~~ ± 5°C for 1 hour. Cool the sample in the desiccator and weigh to ± 0.0001 g.

4.1.5 Run the sample in duplicate. If the results ~~should not~~ vary by more than ± 1% ~~of~~ from the mean, repeat (4.1).

4.2 Calculations for the Determination of Total Volatile and Non-Volatile Content.

4.2.1 Weight of Sample = (4.1.3) - (4.1.2)

4.2.2 Weight of Non-Volatile (NV) = (4.1.4) - (4.1.2)

4.2.3

$$\%\ \text{NV (W/W)} = \frac{(4.2.2) \times 100}{(4.2.1)}$$

4.2.4 % Total Volatiles in the Sample = 100% - (4.2.3)

4.3 Determination of Density.

4.3.1 Calibrate the volume of the Gardner weight per gallon cup as described in ASTM D 1475~~-85~~ 98 (2003).

4.3.2 Accurately weigh the cup **(4.3.1)** to ± 0.01 g.

4.3.3 Transfer an aliquot of the thoroughly mixed sample **(4.1.1)** to the cup. Cap the container, leaving the overflow orifice open. Immediately remove excess overflow sample material by wiping dry with absorbent material. Avoid occluding air bubbles in the container.

4.3.4 Accurately weigh the filled cup to ± 0.01 g.

4.3.5 Calculate the density in grams per milliliter of the sample as follows:

$$\text{Density (g/ml)} = \frac{(4.3.4) - (4.3.2)}{(4.3.1)}$$

4.3.6 ~~Samples must be run in duplicate and agree within ± 1% of the mean~~. Run the sample in duplicate. If the results vary by more than .006 g/ml, repeat 4.3.

4.3.7 Calculation for Compliance in the Absence of Exempt ~~Solvents~~ Compounds and Water.

4.3.7.1 Weight (g) ~~Wt~~. of 1 liter of Sample = 1000 ml x (4.3.5)

4.3.7.2 g VOC/l of Sample = (4.2.4) x (4.3.7.1) x 10^{-2}

4.3.7.3 Lb VOC/gal Sample = (4.3.7.2) x 8.34 x 10^{-3}

Where: $$8.34 \times 10^{-3} = \frac{3.785 \text{ l/gal}}{454 \text{ g/lb}}$$

4.4 Gas Chromatographic Determination of the Water and Chlorinated Hydrocarbon Content of the Sample. (NOTES 2 and 3).

NOTE 2: Screen each sample for interfering peaks prior to analysis. Phenolic compounds do not interfere with this determination. If the sample contains ethanol, use another appropriate internal standard.

NOTE 3: If the sample is not dispersible in DMF, use a more suitable solvent such as dimethylsulfoxide (DMSO).

4.4.1 Set up the gas chromatograph as described in **Section 2.1.**

4.4.2 Determination of Relative Response Factors.

4.4.2.1 Ethanol **(3.2)** is used as an internal standard. The response factor of water, methylene chloride and 1,1,1-TCA relative to the internal standard is determined by means of the following procedure:

4.4.2.2 Prepare a blank, by weighing accurately 0.2 g **(± 0.0001 g)** ethanol into a vial containing 2 ml of DMF ~~dimethylformamide~~. Shake the vial for about 2 minutes and let stand for about 5 minutes prior to injection into the gas chromatograph. **(NOTE 4).**

NOTE 4: DMF ~~Dimethylformamide~~ is harmful if inhaled or absorbed through the skin. It is suspected to be embryotoxic. Use only with adequate ventilation. Avoid contact with skin, eyes and clothing.

4.4.2.3 Using a 10-µl syringe, inject 2 µl of the blank **(4.4.2.2)** into the gas chromatograph. If a water peak is observed, dry both the ethanol and DMF ~~dimethylformamide~~ using anhydrous Na_2SO_4 powder.

4.4.2.4 Prepare a standard by weighing accurately 0.2 g of water, 0.2 g of ethanol, 0.2 g of 1,1,1-TCA and 0.2 g of methylene chloride **(± 0.0001 g)**

in a pre-weighed sample vial containing 2 ml of ~~dimethylformamide~~ DMF. Cap and shake the vial contents thoroughly for about 15 minutes using the Burrell wrist action shaker.

4.4.2.5 Using a 10-µl syringe, inject 2 µl of the standard **(4.4.2.4)** into the gas chromatograph. Record the peak areas of water, ethanol and the chlorinated hydrocarbons. The order of elution is water, ethanol, methylene chloride, TCA and DMF. Retain the chromatograms.

4.5 Calculations.

4.5.1 The response factors (R_{ClHC}) for the individual ClHC compound are determined by means of the following equations.

$$R_{ClHC} = \frac{(W_i) \times (A_{ClHC})}{(W_{ClHC}) \times (A_i)}$$

Where: W_i = Weight of the internal standard, g.
A_{ClHC} = Area of the individual ClHC peak
W_{ClHC} = Weight of the individual ClHC, g.
A_i = Area of the internal standard

4.5.2 The response factor, (R_w) for water is determined by means of the following equation:

$$R_w = \frac{(W_i) \times (A_{H_2O})}{(W_{H_2O}) \times (A_i)}$$

Where: W_i = Weight of the internal standard, g.
W_{H_2O} = Weight of water, g.
A_{H_2O} = Area of water peak.
A_i = Area of the internal standard.

4.6 Gas Chromatographic Analysis of the Water and Chlorinated Hydrocarbon Content of the Sample. ~~(NOTE 4)~~ (NOTES 2 and 3)

~~**NOTE 4: Screen each sample for interfering peaks prior to analysis. Phenolic compounds do not interfere with this determination. If ethanol is present in the sample, substitute with another internal standard.**~~

4.6.1 Weigh accurately 0.3 to 0.5 g **(± 0.0001 g)** of the thoroughly mixed sample **(4.1.1)** and 0.2 g **(± 0.0001 g)** of ethanol or any appropriate internal standard in a tared vial containing 2 ml of DMF. Immediately cap the vial. ~~**(NOTE 5).**~~

~~**NOTE 5: The use of an internal standard other than ethanol will be determined by the presence of interfering peaks in the sample.**~~

4.6.2 Shake the vial on a Burrell wrist action shaker for about 15 minutes. It is essential that the sample be thoroughly mixed. Allow the sample to stand for about 5 minutes prior to injection. This is to allow the solids to settle at the bottom of the vial.

4.6.3 Inject a 2µl aliquot of the supernatant liquid from **(4.6.2)** into the gas chromatograph. Record the areas of the water, chlorinated hydrocarbon and ethanol peaks. Retain the chromatogram.

4.7 Calculations.

4.7.1 The water concentration (% w/w) in the sample is determined by the following equation.

$$\%\ H_2O\ (w/w) = \frac{({}^{A}H_2O)\ \times\ (W_i)\ \times\ 100}{(A_i)\ \times\ (W_s)\ \times\ (R_w)}$$

Where: ${}^{A}H_2O$ = Area of water peak.
A_i = Area of the internal standard.
W_i = Weight of internal standard
Ws = Weight of the sample
Rw = Response factor for water (4.5.2).

4.7.2 The concentrations (% w/w) of the chlorinated hydrocarbons in the sample are determined by the following equation.

$$\%\ ClHC\ (w/w) = \frac{(A_{ClHC})\ \times\ (W_i)\ \times\ 100}{(A_i)\ \times\ (W_s)\ \times\ (R_{ClHC})}$$

Where: A_{ClHC} = Area of individual ClHC.
W_i = Weight of the internal standard, ~~g.~~
A_i = Area of the internal standard.
R_{ClHC} = Response factor for the individual ClHC (4.5.1),

W_s = Weight of sample, g.

4.7.3 The total % concentration (w/w) of the chlorinated hydrocarbons in the sample is the sum of the concentrations of each chlorinated hydrocarbon in the sample.

4.7.4 ~~Samples~~ The analysis must be run in duplicate. ~~and~~ Reanalyze the sample if the results vary by more than ~~must agree within~~ ± 1% (absolute) ~~of~~ from the mean.

5) COMPLIANCE CALCULATIONS FOR SAMPLES CONTAINING WATER AND CHLORINATED HYDROCARBONS

5.1 Weight (g) of 1 l sample = (1000 ml) x (4.3.5).

5.2 If ClHC **is considered** a part of the VOC content of the sample:

$$\text{g VOC/l of Sample} = (5.1) - \left[(5.1) \times (4.2.3) \times 10^{-2}\right] - \left[(5.1) \times (4.7.1) \times 10^{-2}\right]$$

5.3 If ClHC **is not considered** a part of the VOC content of the sample:

$$\text{g VOC/l of Sample} = (5.1) - \left[(5.1) \times (4.2.3) \times 10^{-2}\right] - \left[(5.1) \times (4.7.1) \times 10^{-2}\right] - \left[(5.1) \times (4.7.3) \times 10^{-2}\right] =$$

$$\underline{(5.1)\left[1 - (4.2.3) \times 10^{-2} - (4.7.1) \times 10^{-2} - (4.7.3) \times 10^{-2}\right]}$$

5.4 lb VOC/gal of Sample = (5.2) or (5.3) x (8.34×10^{-3})

Where: $$8.34 \times 10^{-3} = \frac{3.785 \text{ l/gal}}{454 \text{ g/lb}}$$

5.5 For Regulation 8, Rule 35:

$$\% \text{ VOC (w/w)} = 100\% - (4.2.3) - (4.7.1)$$

6) COMPLIANCE CALCULATIONS FOR SAMPLES CONTAINING WATER AND OTHER EXEMPT COMPOUNDS:

6.1 Weight (g) of 1 l sample = (1000 ml) x (4.3.5)

6.2 Total Concentration (% w/w) of Exempt Compounds in the Sample = Sum of the Individual Concentrations (% w/w) of Exempt Compounds in the Sample **(Note 5)**

6.3 g VOC/l of Sample =

$$(5.1) - \left[(5.1)\ \mathrm{X}\ (4.2.3)\ \mathrm{X}\ 10^{-2}\right] - \left[(5.1)\ \mathrm{X}\ (4.7.1)\ \mathrm{X}\ 10^{-2}\right] - \left[(5.1)\ \mathrm{x}\ (6.2)\ \mathrm{x}\ 10^{-2}\right] =$$

$$(5.1)\left[1 - (4.2.3)\ \mathrm{X}\ 10^{-2} - (4.7.1)\ \mathrm{X}\ 10^{-2} - (6.2)\ \mathrm{x}\ 10^{-2}\right]$$

6.4 lb VOC/gal of Sample = (5.2) or $(5.3)\ \mathrm{x}\ (8.34\ \mathrm{x}\ 10^{-3})$

Where: $$8.34\ \mathrm{x}\ 10^{-3} = \frac{3.785\ \mathrm{l/gal}}{454\ \mathrm{g/lb}}$$

Note 5: Concentrations of exempt compounds from BAAQMD Method 22 and ASTM D6133-02.

7) REFERENCES

7.1 Hollis, O.L., **"Separation of Gaseous Mixtures Using Porous Aromatic Polymer Beads",** Anal. Chem. 38, 309 1966.

7.2 **~~"Volatile Content of Paint"~~ "Standard Test Method for Volatile Content of Coatings",** ASTM ~~Designation~~ D2369-~~87~~ 04, ~~Book of ASTM Standards~~ Annual Book of ASTM Standards, Vol. 06.01, 2004.

7.3 **~~"Density of Paint, Varnish, Lacquer and Related Products"~~ "Standard Test Method for Density of Liquid Coatings, Inks, and Related Products",** ASTM ~~Designation~~ D1475-~~85~~ 98 (2003), Annual Book of ASTM Standards, Vol. 06.01, 2004. ~~1990~~.

7.4 **"Standard Test Method for ~~Determination of~~ Water Content of ~~Water Reducible Paints~~ Coatings by Direct Injection into a Gas Chromatograph"**, ASTM Method D3792-~~86~~ 99, ~~Book of ASTM Standards,~~ Annual Book of ASTM Standards, Vol. 06.01, 2004.

7.5 **"Standard Test Method for Determination of Dichloromethane and 1,1,1-Trichloroethane in Paints and Coatings by Direct Injection into a Gas Chromatograph",** ASTM ~~Method~~ D4457-~~85~~ 02, ~~Book of ASTM Standards~~. Annual Book of ASTM Standards, Vol. 06.01, 2004.

7.6 **"Standard Test Method for Acetone, p-Chlorobenzotrifluoride, Methyl Acetate, or t-Butyl Acetate Content of Solventborne and Waterborne Paints, Coatings, Resins, and Raw Materials by Direct Injection into a Gas Chromatograph",** ASTM Method D6133-02, Annual Book of ASTM Standards, Vol. 6.01, 2004.

H://tech2/lab/method 31m2r.doc(3.8.05)

METHOD 33

DETERMINATION OF DISSOLVED CRITICAL VOLATILE ORGANIC COMPOUNDS IN WASTEWATER SEPARATORS

REF: Reg 8-8-112
8-8-210

1) PRINCIPLE

1.1 This method is applicable ~~for~~ to the determination of critical volatile organic compounds **(VOC's)**, as defined in Reg 8 Rule 8 Section 210 for wastewater separators.

1.2 The VOC's having a carbon number of C-14 or less are extracted from wastewater samples using carbon disulfide **(CS_2)**, and the extract is analyzed by gas chromatography.

1.3 ~~It has been found that the amount of C_7 or less hydrocarbons and oxygenated compounds in these kinds of samples is insignificant, thus no attempt is made to quantitiate these compounds.~~

2) APPARATUS

2.1 **Gas Chromatograph.** This unit is equipped ~~fitted~~ with a flame ionization detector **(FID)**, ~~a glass sleeve~~ liquid injection port with glass insert, a temperature programmer and a compatible integrator or data station.

2.2 **Analytical Column. (4.2.1)**

2.3 **Vari Whirl Mixer.**

2.4 **10 µl Micro Syringe.**

4.3 **125 ml Separatory Funnel.**

2.6 **~~50~~ 500 ml Graduated Cylinder with Stopper.**

2.7 **1.0 ml Pipets.**

2.8 **Refrigerator.**

2.9 **15 ml Graduated Centrifuge Tubes, with screw caps and Teflon-lined septa.**

2.10 **25 and 10 ml Volumetric Flasks.**

2.11 50 ml Volumetric Pipet.

3) REAGENTS

3.1 Carbon disulfide, reagent grade.

3.2 Reagent grades or the best available grade of each of the following hydrocarbons; n-C_8 thru n-C_{15}. A minimum purity of 99% for each compound is acceptable.

3.3 Fuel Gas, ~~Cylinder~~ Hydrogen, 99.9% or higher purity**.** (Note 1)

3.4 Carrier Gas, Helium or Nitrogen, 99.99% or higher purity. (Note 1)

3.5 Compressed Air. (Note 1)

Note 1: The carrier and fuel gases are compressed under high pressure. Hydrogen is an extremely flammable gas. Compressed air supports combustion. Read the precautionary labels before handling these materials.

4) ANALYTICAL PROCEDURE

4.1 The samples should be processed immediately after they are received in the laboratory.

4.1.1 Shake the sample vigorously and transfer immediately to a 500 ml graduated cylinder. Stopper the cylinder and let stand 10-15 minutes to allow the aqueous and hydrocarbon layers to separate. Using a 50 ml volumetric pipette, take a 50 ml aliquot ~~portion~~ from the aqueous layer (about 100 ml below the water-oil junction). Transfer the aliquot to a 125 ml separatory funnel.

4.1.2 Using a hood, add 10 ml of CS_2 to the sample. Invert the separatory funnel and open the stopcock to release the internal pressure.

4.1.3 Extract the hydrocarbons from the aqueous layer with careful but vigorous shaking of the mixture for a one **(1)** minute period. Release the built-up pressure after each shaking. Repeat the ~~shaking~~ step five **(5)** times.

4.1.4 Allow the CS_2 and aqueous layers to separate completely. Transfer the CS_2 layer **(bottom layer)** to a 15 ml centrifuge tube, analyze starting with **(4.4.3)**. If analysis cannot be performed immediately, cap and store the tube in a refrigerator. Analyze the CS_2 extract within 24 hours.

~~**4.2 Gas Chromatograph:** Column and Operating Parameters.~~

~~**Column:** 8' x 1/8" O.D. SS column packed with 10% SP-2100 in Supelco port, 100-120 mesh.~~

	~~**Initial**~~	~~**Final**~~
~~**Oven Temperature (^{o}C)**~~	~~**90**~~	~~**240**~~
~~**Time Delay (min)**~~	~~**0**~~	~~**5.0**~~
~~**Program Rate (^{o}C/Min)**~~	~~**5**~~	
~~*** Injector Temperature (^{o}C)**~~	~~**250**~~	
~~**Detector Temperature (^{o}C)**~~	~~**250**~~	
~~**Carrier Gas**~~	~~**He or N_2**~~	
~~**Carrier Gas Flow (cc/min)**~~	~~**22**~~	
~~**Sample Injection Size (µl)**~~	~~**2.0**~~	

4.2 Gas Chromatograph (GC). **(2.1)** The recommended GC operating parameters are:

Initial Oven Temperature (^{o}C)	40
Initial Hold Time (min)	8
Temperature Program Rate (^{o}C/min)	5
Final Temperature (^{o}C)	200
Final Hold Time (min)	5
Injector Temperature	250
Detector Temperature (^{o}C)	250
Carrier Gas	He
Carrier Gas Flow Rate (ml/min)	3
Injection Sample Size (µl)	1

4.2.1 Analytical Column: Any analytical column capable of resolving the compounds of interest is acceptable. The recommended analytical columns for this method are:

4.2.1.1 Primary Column: 30 m x 0.32 mm DB-1 Column, 1.0 µm film thickness (J& W Scientific).

4.2.1.2 Alternate Column: 12’ x 1/8” O.D. SS Column packed with 20% SP 2100 on 100/120 mesh Supelcoport. (Note 2)

Note 2: It is necessary to modify the suggested gas chromatographic parameters if the alternate column is used.

4.3 Preparation of Standard Solutions

4.3.1 **Stock Hydrocarbon Standard Solution.** Accurately weigh 100 mg (0.1 mg) of each of the following saturated aliphatic hydrocarbons in a 15 ml graduated centrifuge tube; n-C_8, n-C_9, n-C_{10}, n-C_{11}, n-C_{12}, n-C_{13}, n-C_{14} and n-C_{15}. Cap the tube and thoroughly mix the solution by use of a Vari Whirl mixer. The stock standard is kept refrigerated and is stable for at least six **(6)** months. (NOTE 3 ~~1~~)

NOTE 3 ~~1~~: If the sample contains hydrocarbons lighter than n-C8, they should be speciated and included in the standard.

4.3.2 **Working Hydrocarbon Standard Solution I.** Accurately weigh ~~10~~ 25 mg **(± 0.1 mg)** of the stock hydrocarbon standard solution in a ~~10~~ 25 ml volumetric flask and dilute to the mark with CS_2**.** This working standard contains ~~100~~ 125 µg of each hydrocarbon per ml. Stopper the flask, and thoroughly mix the solution by inverting the flask several times. This working standard is always prepared fresh prior to use.

4.3.3 **Working Hydrocarbon Standard II.** Accurately transfer 1.0 ml of **(4.3.2)** to 10 ml volumetric flask and dilute to the mark with CS_2. This working standard solution contains ~~10~~ 12.5 µg of each hydrocarbon per ml. Stopper the flask, and thoroughly mix the solution by inverting the flask several times. This working standard is always prepared fresh prior to use.

4.3.4 The CS_2 used for sample extractions and standard preparations must be checked for contamination. Inject 1 µl of the CS_2 into the gas chromatograph as in **Section 4.4**. Record the retention times and peak areas of the compounds, if any are present. Retain the chromatogram. (NOTE 4 ~~2~~)

NOTE 4 ~~2~~: **CS_2 normally contains 5-10 µg/ml of benzene and approximately 1 µg/ml of thiophene. These compounds do not interfere, however, with the critical VOC's determination.**

4.4 Analysis of Sample Extracts.

4.4.1 Set up the gas chromatograph as described in **4.2.**

4.4.2 Inject ~~2~~ 1 µl of the working standard solution II **(4.3.3)** into the gas chromatograph using a 10µl syringe. Record the retention times and peak areas of each compound. Retain the chromatogram.

4.4.3 Inject ~~2~~ 1 µl of the CS_2 sample extract **(4.1.4)** into the gas chromatograph using a 10 µl micro syringe. Record the retention times and peak areas of each compound that elutes through n-C_{15}. Retain the chromatogram. **(NOTE: 5 ~~3~~).**

NOTE 5 ~~3~~: **n-C$_{14}$ is the VOC cut off point for Reg. 8-8-210. The n-C$_{15}$ in the standard is used as a marker compound.**

5) CALCULATIONS

5.1 Compare the chromatograms of **(4.4.2)** and **(4.4.3)** to identify the specific hydrocarbon compounds, by carbon number, in the sample. Quantitate the individual hydrocarbon compounds using the following equations.

5.2 PPM = µg/ml of an individual hydrocarbon in the sample:

$$\text{PPM} = \frac{\text{Conc (Std) ug/ml} \times \text{PA (Extract)} \times \text{10 ml (Extract)}}{\text{PA (Std)} \times \text{50 ml (Sample)}}$$

Where: **PA (Extract) = Peak Area of the individual hydrocarbon found in the CS$_2$ sample extract (4.4.3).**

Conc, (Std) = Concentration in µg/ml of each corresponding hydrocarbon in the working standard (4.3.3).

10 = Volume of CS$_2$ in ml, used in the sample extraction.

PA (Std) = Peak Area of the corresponding hydrocarbon in the standard solution (4.3.3).

50 = Volume in ml of the sample (4.1.1).

5.3 Total PPM (µg/ml) of C$_{14}$ and less hydrocarbon in the wastewater separator is equal to the sum of each compound found and quantified in **(5.2)**.

6) REFERENCES

6.1 **Control Techniques for VOC Emissions from Stationary Sources,** EPA 450/7-78-023, May 1978.

6.2 **Standard Test Method for Boiling Range Distribution of Petroleum Fractions by Gas Chromatography,** ASTM D2887-~~84,~~ 04a, ~~1986 Annual Book of ASTM methods,~~ ~~**Section 5.**~~ Annual Book of ASTM Standards, Vol. 05.01, 2004**.**

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METHOD 41

DETERMINATION OF VOLATILE ORGANIC COMPOUNDS IN SOLVENT BASED COATINGS AND RELATED MATERIALS CONTAINING PARACHLOROBENZOTRIFLUORIDE

REF:	**Regs:**				
		8-3	**8-14**	**8-29**	**8-45**
		8-4	**8-19**	**8-31**	**8-51**
		8-11	**8-20**	**8-32**	
		8-12	**8-23**	**8-38**	
		8-13	**8-26**	**8-43**	

1.1 This method is applicable to the determination of parachlorobenzotrifluoride (PCBTF) in solvent based coatings and related products.

1.2 The concentration of PCBTF ~~parachlorobenzotrifluoride~~ is determined by gas chromatography using ethanol, or any appropriate solvent, as the internal standard.

1.3 For multicomponent coating systems, the components must be mixed first in the appropriate ratio. The exempt solvents, density and total non-volatiles are determined from this mixture. The total non-volatile content is determined by allowing the test speciments to have an induction period of 30 minutes in the aluminum dish prior to oven heating.

1.4 Propylene glycol monomethyl ether acetate (PGMEA) interferes with the analysis of PCBTF ~~parachlorobenzotrifluoride~~. When this solvent is present in the sample, use the alternate column **(2.2.2).**

1.5 This method may not be applicable to all types of coatings or printing inks. ~~Other procedures may be substituted with mutual agreement of the manufacturer, user and the Air Pollution Control Officer~~ **(APCO)**~~.~~

2) APPARATUS

2.1 **Gas Chromatograph.** This unit is fitted with a flame ionization detector (FID), a ~~glass sleeve~~ liquid injection port with glass insert a temperature programmer and a compatible integrator or data station. The suggested operating parameters are as follows:

Initial Oven Temperature (^{o}C)	**60**
Inital Hold time (min)	**5**
Temperature Program Rate (^{o}C/min)	**5**

Final Oven Temperature (^{o}C)	**200**
Final Hold time (^{o}C)	**10**
Injector Temperature (^{o}C)	**250**
Detector Temperature (^{o}C)	**250**
Carrier Gas	**He**
Carrier Gas Flow (cc/min)	**20**
Injection Sample Size (μl)	**1**

2.2 Analytical Column. Any column capable of separating and resolving the compounds of interest is acceptable. The suggested analytical columns for this method are:

2.2.1 Primary Column. A 12' x 1/8" O.D. SS column packed with 20% SP-2100/0.1% Carbowax 1500, 100/120 mesh Supelcoport. The packing material is available from Supelco. ~~Supelco Park, Bellefonte, PA 16823-0048.~~

2.2.2 Alternate column for the analysis of parachlorobenzotrifluoride. A 60M x 0.32mm ID DB-WAX Column, 0.5 μm film thickness (J&W Scientific). ~~This column is available from J & W Scientific, 91 Blue Ravine Road, Folsom, CA 95630-9928~~.

2.3 10 μl Syringe.

2.4 Burrell Wrist Action Shaker.

2.5 Desiccator.

2.6 Aluminum Foil Dish. 57 mm diameter x 10 mm high with a flat bottom.

2.7 Forced Draft Oven. Capable of maintaining a temperature of 110^{o} ± 5^{o}C.

2.8 Analytical Balance. Capable of weighing to ± 0.0001 g.

2.9 Top Loading Analytical Balance. Capable of weighing to ± 0.01 g.

2.10 Disposable Transfer Pipets. 3ml capacity with 1 and 2 ml graduations. ~~These are available from Curtin Matheson Company (Catalog #376-970).~~

2.11 Spatula.

2.12 Gardner Weight Per Gallon Cup. 83 cc. This cup is available from Thomas Scientific. ~~P.O. Box 99, Swedesboro, NJ 08085 (Catalog # 8353A01)~~**.**

2.13 Vials with screw caps. 2 dram size.

2.14 Eberbach Shaker for quart or less size containers.

2.15 Red Devil Paint Shaker for gallon size containers.

2.16 Disposable Syringe. 3-5 cc used for coatings with highly volatile solvents.

3) REAGENTS

3.1 Toluene or other suitable solvent. Reagent grade.

3.2 Ethanol, Absolute. 200 proof. **Other suitable anhydrous solvents.** Reagent grade.

3.3 Dimethylformamide (DMF). Spectroquality. Water content must not exceed 0.05% (w/w). **Other suitable solvents**, Reagent grade.

3.4 Helium or Nitrogen, 99.995% or higher.

3.5 Hydrogen.

3.6 Air.

3.7 Parachlorobenzotrifluoride. Reagent grade or highest available quality.

3.8 Propylene Glycol Monomethyl Ether Acetate. Reagent grade**.**

4) ANALYTICAL PROCEDURE

4.1 Determination of Total Volatiles. (NOTE 1)

4.1.1 Mix the coating thoroughly for about 30 minutes, using an Eberbach or Red Devil Paint Shaker. It is essential that the samples be well mixed to obtain valid results. Stirring with a spatula after mixing is also required.

4.1.2 Precondition the aluminum dish **(2.6)** containing a paper clip in the oven for at least 30 minutes at 110^{e} ± 5^{o}C. Cool and store in a desiccator. Weigh accurately the aluminum dish with the paper clip to ± 0.0001 g.

4.1.3 Using a disposable transfer pipette, weigh accurately 0.4 to 0.6 g **(± 0.0001 g)** of the thoroughly mixed coating **(4.1.1)** in the pre-weighed aluminum dish containing a paper clip. Record the total weight of the sample and dish in grams.

4.1.4 Disperse the coating by adding 2 ml of toluene or any appropriate solvent and stir with the paper clip until the sample is evenly dispersed. Dry the sample in the oven at 110^o ± 5^{o}C for 1 hour. Cool the sample in the desiccator and weigh.

4.1.5 Run the analysis in duplicate. Reanalyze the sample if results vary by more than ± 1% (absolute) ~~of~~ from the mean.

NOTE 1: For multicomponent systems, premix the components in the correct proportions. Weigh accurately 0.2 - 0.4 g (± 0.0001 g) of mixture into a tared aluminum dish with paper clip. Disperse the sample in the aluminum dish using the paper clip, without adding any solvent. Allow an induction period of 30 minutes, prior to oven drying. Use the same mixture for the determination of density and PCBTF.

4.2 Calculations for the Determination of Total Volatile and Non-Volatile Contents.

4.2.1 Weight of Coating (g) = (4.1.3) - (4.1.2)

Where: (4.1.3) = Weight of the coating and aluminum pan, g.
(4.1.2) = Weight of the aluminum pan, g.

4.2.2 Weight of Non-Volatile (NV) in g = (4.1.4) - (4.1.2)

Where: (4.1.4) = Weight of the non-volatile and aluminum pan, g.

4.2.3 $$\% \text{ NV (W/W)} = \frac{(4.2.2) \times 100}{(4.2.1)}$$

4.2.4 % Total Volatiles in Coating = 100% - (4.2.3)

4.3 Determination of Density.

4.3.1 Calibrate the volume of the Gardner weight per gallon cup as described in ASTM D 1475-~~90~~ <u>98 (2003).</u>

4.3.2 Accurately weigh the cup **(4.3.1)** to ± 0.01 g.

4.3.3 Completely fill the cup with the thoroughly mixed coating **(4.1.1).** Cap the container, leaving the overflow orifice open. Immediately remove excess overflow sample material by wiping dry with absorbent material. Avoid occluding air bubbles in the container.

4.3.4 Accurately weigh the filled cup to ± 0.01 g.

4.3.5 Run the analysis in duplicate. Reanalyze the sample if the results vary by more than 0.006 g/ml.

4.3.6 Calculation of Density.

$$D\ (\text{g/ml}) = \frac{(4.3.4) - (4.3.2)}{(4.3.1)}$$

Where:

D = Density, g/ml.

(4.3.1) = Volume of the calibrated cup, ml.

(4.3.4) = Weight of the cup filled with coating, g.

(4.3.2) = Weight of the cup, g.

4.4 Determination of PCBTF ~~Parachlorobenzotrifluoride~~ Content of the Coating by Gas Chromatography.

4.4.1 Set up the gas chromatograph as described in **Section 2.1.**

4.4.2 Screen the sample for the presence of peaks interfering with the internal standard.

4.4.2.1 Prepare a solution of ethanol in DMF by weighing approximately 0.2 grams of ethanol into a vial containing 4 ml DMF. (NOTE 2).

NOTE 2: Dimethylformamide is harmful if inhaled or absorbed through the skin. It is suspected to be embryotoxic. Use only with adequate ventilation. Avoid contact with skin, eyes and clothing. If the material to be analyzed is not compatible with DMF, then use a different solvent such as Carbon Disulfide. If Carbon Disulfide is used, change the internal standard to isopropanol or any other appropriate compound. Ethanol is not completely miscible with CS_2.

4.4.2.2 Inject a 1 μl aliquot of the solution **(4.4.2.1)** into the gas chromatograph. Retain the chromatogram.

4.4.2.3 Weigh approximately 0.5 grams of the mixed sample into a vial containing 4 ml of DMF. Mix thoroughly and allow to stand for about 5 minutes. Inject a 1 μl aliquot of the mixture into the gas chromatograph. Compare the sample chromatogram to that obtained in **Section 4.4.2.2**. If there is no peak that interferes with ethanol in the sample chromatogram, then proceed to **Section 4.4.3**.

If an interfering peak is found use 2-propanol or any other appropriate solvent as the internal standard.

4.4.3 Screen the sample for the presence of propylene glycol methyl ether acetate (PGMEA), (NOTE 3).

NOTE 3: It is necessary to screen the sample for PGMEA since this compound coelutes with PCBTF when using the primary column.

4.4.3.1 Prepare a PGMEA ~~Propylene glycol monomethyl ether acetate~~ solution in DMF by weighing approximately 0.2 grams of the compound ~~propylene glycol monomethyl ether acetate~~ into a vial containing 4 ml DMF.

4.4.3.2 Inject a 1 µl aliquot of the solution **(4.4.3.1)** into a gas chromatograph fitted with the alternate column **(2.2.2) (NOTE 4).** Retain the chromatogram.

4.4.3.3 Inject a 1 µl aliquot of the sample prepared in **Section 4.4.2.3** and compare the chromatogram with the one obtained in **Section 4.4.3.2**. If PGMEA ~~propylene glycol monomethyl ether acetate~~ is present, use the alternate column **(2.2.2)** for quantifying the PCBTF p~~arachlorobenzotrifluoride~~ in the sample **(NOTE 4).**

NOTE 4: If the alternate column (2.2.2) is preferred, use only one half of the weights required for the sample, standard and internal standard.

4.4.4 Determination of Response Factor (R_{PCBTF}) for PCBTF. ~~Parachloro-benzotrifluoride.~~

4.4.4.1 Inject 1 µl of the solvent into the gas chromatograph to check for contamination. If contaminated, open a fresh bottle and repeat the step.

4.4.4.2 Weigh accurately 0.2 g **(± 0.0001 g)** of the PCBTF ~~parachlorobenzotrifluoride~~ and 0.2 g of ethanol **(± 0.0001 g)** in a pre-weighed sample vial containing 4 ml of DMF. Cap and shake the vial contents thoroughly for 15 minutes, using the Burrell Wrist Action Shaker. The mixture may be injected into the gas chromatograph immediately after shaking.

4.4.4.3 Using a 10 µl syringe, inject separately 1 µl of the mixture from **(4.4.4.2)** into the gas chromatograph. Integrate and record the peak areas of ethanol and the PCBTF ~~para-chlorobenzotriflouride.~~ Retain the chromatogram. The order of elution is ethanol, DMF and PCBTF ~~parachlorobenzotrifluoride~~.

4.5 Calculation for the Response Factor (R_{PCBTF}) of PCBTF ~~parachlorobenzotrifluoride.~~

4.5.1 The response factor, **R**$_{PCBTF}$ is determined by means of the following equation: **(NOTE: 5)**

4.5.1.1 $$R_{PCBTF} = \frac{Wi \times A_{PCBTF}}{W_{PCBTF} \times Ai}$$

Where: W_i = ~~The~~ Weight of the internal standard, g.
W_{PCBTF} = ~~The~~ Weight of PCBTF, g. ~~parachlorobenzotrifluoride.~~
A_{PCBTF} = ~~The~~ Peak area of PCBTF, ~~parachlorobenzotrifluoride.~~
A_i = ~~The~~ Peak area of the internal standard.

NOTE 5: It is necessary to determine the response factor for PCBTF ~~parachlorobenzotrifluoride~~ with each series of eterminations.

4.6 Gas Chromatographic Determination of the PCBTF ~~Parachlorobenzotrifluoride~~ Content of the Coating.

4.6.1 Weigh accurately 0.4 to 0.6 g **(± 0.0001 g)** of the mixed coating **(4.1.1)** and 0.2 g **(± 0.0001 g)** of ethanol in a tared vial containing 4 ml of DMF. Immediately cap the vial **(NOTE 6).**

NOTE 6: **If the amount of PCBTF in the sample is more than 60% by weight, rerun the analysis using a smaller sample weight (0.2 to 0.4 grams).**

4.6.2 Shake the mixture on a Burrell Wrist Action Shaker for 15 minutes. It is essential that the sample be thoroughly mixed. Allow the sample to stand undisturbed for about 5 minutes prior to injection. This is to allow the solids to settle at the bottom of the vial.

4.6.3 Inject a 1 µl aliquot of the supernatant liquid from **(4.6.2)** into the gas chromatograph. The area of the PCBTF ~~parachlorobenzotrifluoride~~ and the ethanol peaks are integrated and recorded. Retain the chromatogram **(See Figures I and II).**

4.6.4 It is a good practice to confirm the presence and concentration of the PCBTF ~~parachlorobenzotrifluoride~~, using the alternate column **(2.2.2)**.

4.7 Calculation for % PCBTF ~~Parachlorobenzotrifluoride~~ in the Coating.

4.7.1 Using the data obtained in **(4.6.3)**, calculate the weight % of PCBTF ~~parachlorobenzotrifluoride~~ in the sample, as follows:

4.7.1.1 $$\%\ \text{PCBTF (W/W)} = \frac{A_{PCBTF} \times W_I}{A_I \times W_S \times R_{PCBTF}} \text{X}100$$

Where: A_{PCBTF} = Area of the PCBTF peak.
A_i = Area of the internal standard peak.
W_i = Weight of the internal standard, g.
W_s = Weight of the coating, g.
R_{PCBTF} = Response factor for PCBTF.

4.8 Run the analysis in duplicate. Reanalyze the sample if the results vary by more than ±1% (absolute) from ~~of~~ the mean.

5) CALCULATION FOR COMPLIANCE OF COATING CONTAINING PCBTF. ~~PARACHLOROBENZOTRIFLUORIDE~~

5.1 Weight (g) of Total Volatiles /l of Coating = 1000 ml/l x (4.3.6) x (4.2.4) X 10^{-2}

Where: (4.3.6) = Density of Coating, g/ml.
(4.2.4) = % Total Volatiles in the Coating (W/W).

5.2 Weight (g) of PCBTF /l of Coating ~~of PCBTF~~ = 1000 ml/l x (4.3.6) x (4.7.1.1)x10^{-2}

Where: (4.7.1.1) = % PCBTF (W/W).

5.3 Volume (ml) of PCBTF /l of Coating = $\frac{(5.2)}{D_{PCBTF}}$

Where: D_{PCBTF} = 1.353 g/ml.

5.4 g VOC/l of Coating (less PCBTF) = $\frac{[(5.1) - (5.2)] \times 1000 \text{ ml/l}}{[1000 \text{ ml/l} - (5.3)]}$

5.5 lb VOC/gal of Coating (less PCBTF) = (5.4) x 8.34 x 10^{-3}

Where: $$8.34 \times 10^{-3} = \frac{3.785\ \text{l/gal}}{454\ \text{g/lb}}$$

5.6 For low solids materials, where PCBTF is considered part of the coating:

5.6.1 g VOC/l of Coating = [5.1) - (5.2)]

5.6.2 lb VOC/gal of Coating = (5.6.1) x 8.34×10^{-3}

6) REFERENCES

6.1 Hollis, O.L., **"Separation of Gaseous Mixtures Using Porous Aromatic Polymer Beads",** Anal, Chem. 38, 309, 1966.

6.2 **~~“Volatile Content of Paint"~~ “Standard Test Method for Volatile Content of Coatings",** ASTM ~~Designation~~ D2369-~~95~~ 04, ~~Book of ASTM Standards~~ Annual Book of ASTM Standards, Vol. 06.01, 2004.

6.3 **~~"Density of Paint, Varnish, Lacquer and Related Products"~~ “Standard Test Method for Density of Liquid Coatings, Inks, and Related Products”,** ASTM ~~Designation~~ D1475-~~90~~ 98 (2003), Annual Book of ASTM Standards, Vol. 06.01, 2004. ~~1990~~.

6.4 **"Standard Test Method for ~~Determination~~ ~~of~~ Water Content of ~~Water Reducible Paints~~ Coatings by Direct Injection into a Gas Chromatograph"**, ASTM Method D3792-~~91~~ 99, ~~Book of ASTM Standards,~~ Annual Book of ASTM Standards, Vol. 06.01, 2004.

6.5 **"Standard Test Method for Determination of Dichloromethane and 1,1,1-Trichloroethane in Paints and Coatings by Direct Injection into a Gas Chromatograph",** ASTM ~~Method~~ D4457-~~85(1991)~~ 02, ~~Book of ASTM Standards~~. Annual Book of ASTM Standards, Vol. 06.01, 2004.

6.6 **BAAQMD Manual of Procedures,”** Vol.3, Method 22.

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3/16/2005

Analytical Column: 12' x 1/8" O.D. SS Column packed with 20% SP2100/0.1% Carbowax 1500 on 100/120 mesh Supelcoport

GC parameters:

	Initial	Final
Oven Temperature (°C)	60	200
Time Delay (Min)	5	10
Temperature Program Rate (°C/min)	5	
*Injector Temperature (°C)	250	
Detector Temperature (°C)	250	
Carrier Gas	He	
Carrier Gas Flow (cc/min)	20	
Injection Sample Size (µl)	1	

*Glass Sleeve insert is used in the injection port.

```
C-R4A CHROMATOPAC    CH=2    REPORT No.=55    CHROMATOGRAM=2:LA9/12.C12      00/00/06  03:44:05

Analysis File : 2:SP21CA.R15

SHIMADZU GC -14-A FID
SP2100 CARBOWAX 1500
```

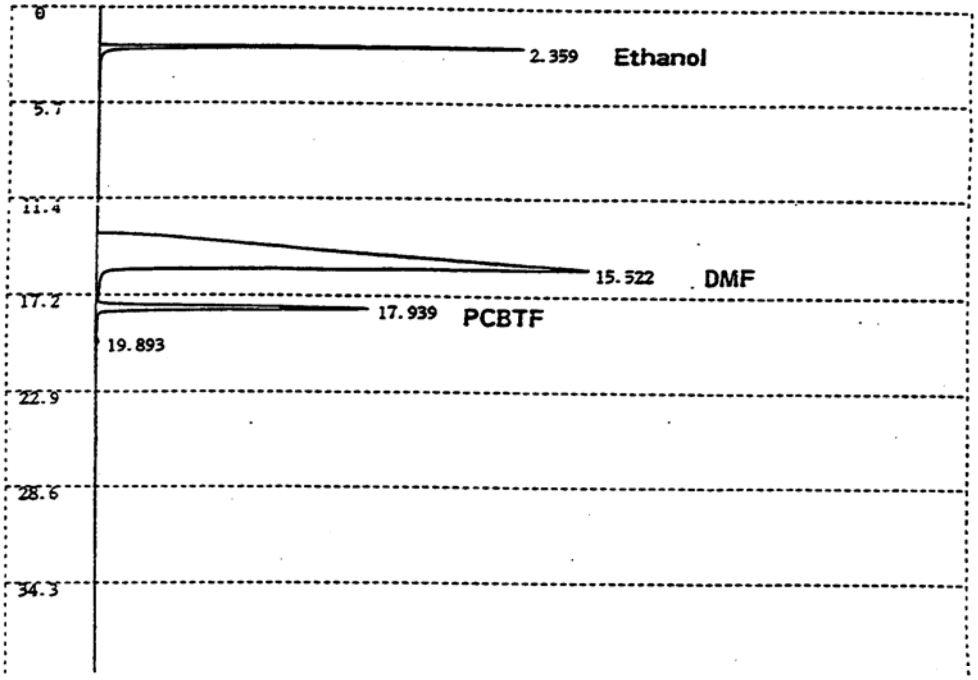

FIGURE I

A Typical Chromatogram Using the Primary Column (2.2.1)

Analytical Column: 60m x 0.25 mm ID, 0.5 m FT DB-WAX

GC Parameters:

	Step 1	Step 2	Step 3
Oven Temperature (^{o}C)	**70**	**120**	**200**
Time (Delay)	**0**	**0**	**10**
Temperature Program Rate (^{o}C/min)	**3**	**30**	
***Injector temperature (^{o}C)**	**250**		
Detector Temperature (^{o}C)	**250**		
Carrier Gas	**He**		
Carrier Gas Linear Velocity	**25**		
Injection Sample Size	**1**		

***Glass Sleeve insert is used in the injection port.**

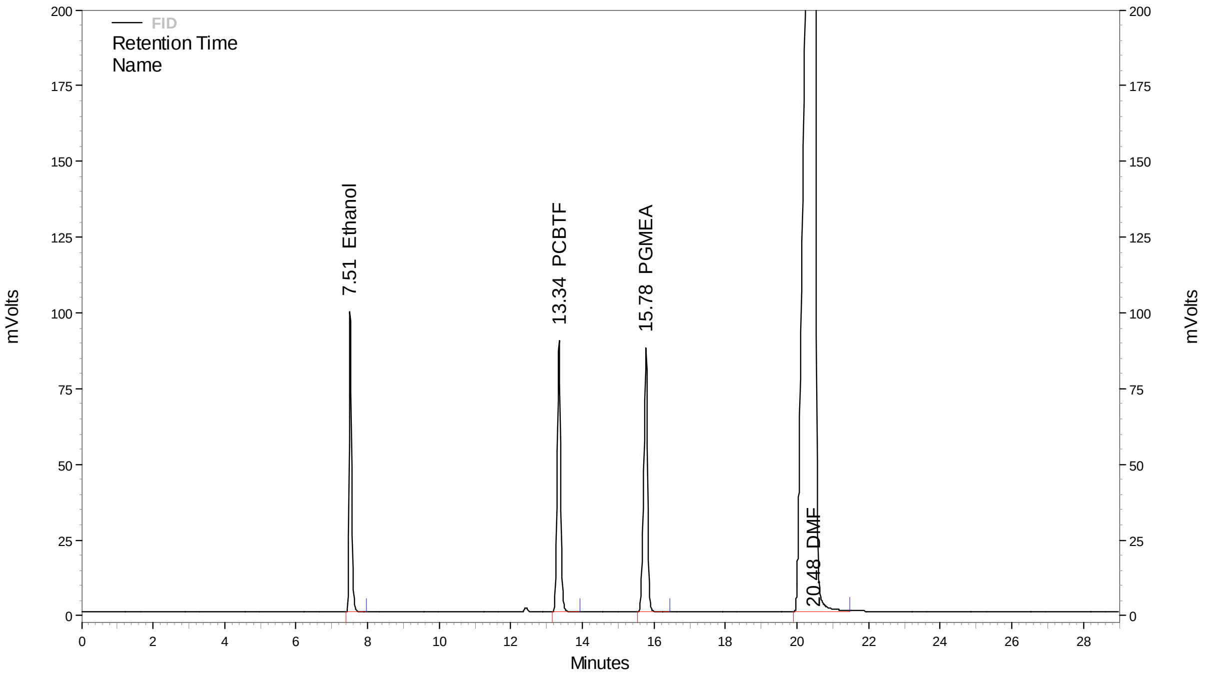

FIGURE II

A Typical Chromatogram
Using the Alternate Column (2.2.2)

METHOD 43

DETERMINATION OF VOLATILE METHYLSILOXANES IN SOLVENT BASED COATINGS, INKS AND RELATED MATERIALS

REF: Regs: 8-3 8-19 8-32
8-4 8-20 8-38
8-11 8-23 8-43
8-12 8-26 8-45
8-13 8-29 8-51
8-14 8-31

1) PRINCIPLE

~~**1.1** The U. S. Environmental Protection Agency has excluded **volatile methysiloxanes (VMS**) from the list of Volatile Organic Compounds.~~

1.1 This method is applicable to the determination of the following volatile methylsiloxanes (VMS) in solvent based coatings, inks and related products:

hexamethyldisiloxane
octamethyltrisiloxane
decamethyltetrasiloxane
decamethylcyclopentasiloxane
octamethylcyclotetrasiloxane

1.2 The concentration of the VMS is determined by gas chromatography using n-octane, or any appropriate compound, as the internal standard.

1.3 The established concentration range for this method is 10% to 65%. There is no reason to believe that it will not work outside this range. The upper limit of the range can be extended by lowering the sample weight.

1.4 Aliphatic hydrocarbons may interfere in the analysis of the VMS compounds.

1.5 This method may not be applicable to all types of coatings, inks or related materials.

2) APPARATUS

2.1 Gas Chromatograph. This unit is fitted with a flame ionization detector (FID), a ~~glass-sleeve~~ liquid injection port with glass insert, a temperature programmer and a compatible integrator or data station. The recommended operating parameters are as follows:

	Initial	**Final**
Oven Temperature (^{o}C)	**50**	**210**
Time Delay (Min)	**5**	**5**
Temperature Program Rate (^{o}C/min)	**6**	
Injector Temperature (^{o}C)	**250**	
Detector Temperature (^{o}C)	**250**	
Carrier Gas	**He**	
Carrier Gas Flow (cm/sec)	**30**	
Injection Sample Size (μl)	**1**	

2.2 Analytical Column. Any analytical column capable of separating and resolving the compounds of interest is acceptable. The recommended analytical column is:

2.2.1 A 60 m x 0.32mm I.D., 1.0 micron film thickness, DB-1 Column (J & W Scientific). ~~This column is available from J& W Scientific, 91 Blue Ravine Road, Folsom, CA 95630-9928~~.

2.3 Micro Syringe, 10 μl.

2.4 Burrell Wrist Action Shaker

2.5 Analytical Balance. Capable of weighing to ± 0.0001 g

2.6 Disposable Transfer Pipets. ~~**Beral Pipettes.**~~ 3ml with 1 and 2 ml graduations. ~~These are available from Curtin Matheson, Company~~ ~~**(Catalog #376-970).**~~

2.7 Spatula.

2.8 Vials with screw caps. 3 dram size.

6.1 Eberbach Shaker.

2.10 Red Devil Paint Shaker for gallon size containers.

2.11 **Disposable Syringe.** 3-5 cc used for coatings with highly volatile solvents.

3) REAGENTS

3.1 **Carbon Disulfide (CS_2), low benzene (<1ppm) or other suitable solvent,** reagent grade.

3.2 **n-Octane, or other suitable internal standard,** Reagent grade, 99 + % purity.

3.3 **Volatile Methylsiloxanes (VMS) as listed in Section 1.2,** Reagent Grade or highest available purity.

3.4 **Helium or Nitrogen Cylinder, 99.995% Purity or Higher.**

3.5 **Hydrogen Cylinder or Hydrogen Generator.**

4) ANALYTICAL PROCEDURE

4.1 Determination of % Total Volatiles of the Coating.

4.1.1 Mix the coating thoroughly for about 30 minutes, using an Eberbach or Red Devil Paint Shaker. It is essential that the samples be well mixed to obtain valid results. Stirring with a spatula may also be required.

4.1.2 To determine the % total volatiles, refer to **Method 22, Sections 4.1 and 4.2.**

4.2 **Determination of Density of the Coating.** To determine the density, refer to **Method 22, Section 4.3.**

4.3 Determination of VMS ~~Volatile Methylsiloxane~~ Content of the Coating by Gas Chromatography.

4.3.1 Set up the gas chromatograph as described in **Section 2.1.**

4.3.2 **Screen the sample for the presence of peaks interfering with the internal standard.**

4.3.2.1 Prepare a solution of n-octane in CS_2 by weighing 0.1 g (±0.0001 g) of n-octane into a pre-weighed sample vial. Add 8 ml of CS_2, cap the vial and mix the solution thoroughly. **(Note 1)**

NOTE 1: **CS_2 is flammable. It is harmful if inhaled or absorbed through the skin. It is a possible mutagen/teratogen. Use only with adequate ventilation. Avoid contact with skin, eyes and clothing. If the material to be analyzed is not compatible with CS_2, use a different solvent such as dimethylformamide or tetrahydrofuran.**

4.3.2.2 Injct a 1 μl aliquot of the solution **(4.3.2.1)** into the gas chromatograph. Retain the chromatogram.

4.3.2.3 Weigh 0.3 g (± 0.0001 g) of the mixed coating **(4.1.1)** into a pre-weighed sample vial. Add 8 ml of CS_2. Cap the vial, mix thoroughly and allow to stand for about 5 minutes. Inject a 1 μl aliquot of the mixture into the gas chromatograph. Compare the sample chromatogram to that obtained in **Section 4.3.2.2**. If there is no peak that interferes with octane in the sample chromatogram, then proceed to **Section 4.3.3**. If an interfering peak is found use another appropriate solvent as internal standard.

4.3.3 Determination of Response Factor (R_{vms}) for the Volatile Methylsiloxane.

4.3.3.1 Inject 1 μl of CS_2 into the gas chromatograph to check for contamination. If it is contaminated, open a fresh bottle and repeat the step.

4.3.3.2 Weigh accurately 0.1 g (± 0.0001 g) of the VMS and 0.1 g (± 0.0001 g) of n-octane a pre-weighed sample vial. Add 8 ml of CS_2. Cap and shake the vial contents thoroughly for 15 minutes, using the Burrell Wrist Action Shaker.

4.3.3.3 Using a 10 μl syringe, inject separately 1 μl of the mixture **(4.3.3.2)** into the gas chromatograph. Integrate and record the peak areas of n-octane and the VMS. Retain the chromatogram. The order of elution is ~~carbon disulfide~~ CS_2, n-octane and VMS. **(See Figure 1).**

4.4 Calculation for the Response Factor, R_{VMS}, of the Individual VMS ~~Volatile Methylsiloxane.~~

4.4.1 Calculate the response factor, $\mathbf{R}_{VMS}$ of each VMS to the internal standard by means of the following equation: **(NOTE 2)**

4.4.1.1

$$R_{VMS} = \frac{W_i \times A_{VMS}}{W_{VMS} \times A_i}$$

Where:

W_i = ~~The~~ Weight of the internal standard, g.

W_{VMS} = ~~The~~ Weight of VMS, g.

A_{VMS} = ~~The~~ Peak area of VMS.

A_i = ~~The~~ Peak area of the internal standard.

NOTE 2

4.5 Gas Chromatographic Determination of the VMS ~~Volatile Methylsiloxane~~ Content of the Coating.

4.5.1 Weigh accurately 0.2 to 0.5 g (± 0.0001 g) of the mixed coating **(4.1.1)** and 0.1 g of n-octane in a pre-weighed sample vial. Add 8 ml of CS_2. Immediately cap the vial**.**

4.5.2 Shake the mixture on a Burrell Wrist Action Shaker for 15 minutes. It is essential that the sample be thoroughly mixed. Allow the sample to stand undisturbed for about 5 minutes prior to injection. This is to allow the solids to settle at the bottom of the vial.

4.5.3 Inject a 1 µl aliquot of the supernatant liquid from **(4.5.2)** into the gas chromatograph. The areas of the VMS and the octane peaks are integrated and recorded. Retain the chromatogram**.**

4.6 Calculation for % VMS ~~Volatile Methylsiloxane~~ in the Coating.

4.6.1 Using the data obtained in **(4.5.3)**, calculate the weight % of each VMS in the sample, as follows:

4.6.1.1

$$\%\ \text{VMS (w/w)} = \frac{A_{VMS} \times W_i}{A_i \times W_s \times R_{VMS}} \times 100$$

Where: A_{VMS} = Area of the VMS peak.
A_i = Area of the internal standard peak.
W_i = Weight of the internal standard, g.
W_s = Weight of the coating sample, g.
R_{VMS} = ~~The~~ Response factor for VMS.

4.6.2 Run the analysis in duplicate. Reanalyze the sample if the results vary by more than ± 1 % (absolute) from the mean.

5) CALCULATION FOR COMPLIANCE OF COATING CONTAINING VMS ~~VOLATILE METHYLSILOXANES~~

5.1 Weight (g) of Total Volatiles /l of Coating = 1000 ml/l x D x TV X 10^{-2}

Where: D = Density of Coating (4.2), g/ml.
TV = % Total Volatiles in the Coating (4.1.2), w/w.

5.2 Weight (g) of VMS /l of Coating = 1000 ml/l x D x (4.6.1.1) x 10^{-2}

Where: D = Density of Coating, g/ml.
(4.6.1.1) = % VMS (W/W) in the Coating

5.3 Total Weight (g) of VMS ~~per liter~~ /l of Coating = Sum of the Individual Weights in grams of VMS in 1 liter of Coating (5.2).

5.4 Volume (ml) of VMS/l Coating = $\frac{(5.2)}{D_{VMS}}$

Where: D_{VMS} = 0.760 for hexamethydisiloxane
0.810 for octamethyltrisiloxane
0.850 for decamethyltetrasiloxane
0.950 for octamethylcyclotetrasiloxane
0.950 for decamethylcyclopentasiloxane

5.5 Total Volume of VMS /l of Coating = Sum of the Individual Volumes (ml) of VMS in 1 liter of Coating (5.4).

5.6 Grams VOC/l Coating (less VMS) = $\frac{[\,(5.1)\ -\ (5.3)\,]}{}$ x 1000 ml/l

$$\begin{array}{lcl} & & [\,1000\ \text{ml/l} \ - \ (5.5)] \\ \textbf{5.7} \quad \text{lb VOC/gal Coating (less VMS)} & = & (5.6) \ \times \ 8.34 \ \times \ 10^{-3} \end{array}$$

Where: $8.34 \times 10^{-3} = \dfrac{3.785 \text{ l/gal}}{454 \text{ g/lb}}$

5.8 For low solid materials, where VMS is considered part of the coating.

5.8.1 Grams VOC/l Coating = [(5.1) - (5.3)]

5.8.2 lb VOC/gal Coating = (5.8.1) x 8.34 x 10^{-3}

6) REFERENCES

~~6.1 Hollis, O.L.,~~ ~~**"Separation of Gaseous Mixtures using Porous Aromatic Polymer Beads",**~~ ~~Anal, Chem. 38, 309, 1966.~~

6.1 ~~**“Volatile Content of Paint"**~~ **“Standard Test Method for Volatile Content of Coatings",** ASTM ~~Designation~~ D2369-~~93~~ 95, ~~Book of ASTM Standards~~ Annual Book of ASTM Standards, Vol. 06.01,1995.

6.2 ~~**Density of Paint, Varnish, Lacquer and Related Products"**~~ **“Standard Test Method for Density of Liquid Coatings, Inks, and Related Products”,** ASTM ~~Designation~~ D1475-90, Annual Book of ASTM Standards, Vol. 06.01, 1993.

~~**6.3 "Determination of Water Content of Water Reducible Paints by Direct Injection into a Gas Chromatography"**~~~~, ASTM Method D3792-91, Book of ASTM Standards~~

6.3 "Standard Test Method for Determination of Dichloromethane and 1,1,1-Trichloroethane in Paints and Coatings by Direct Injection into a Gas Chromatograph", ASTM ~~Method~~ D4457-85 (Reapproved 1991), ~~Book of ASTM Standards~~. Annual Book of ASTM Standards, Vol. 06.01,1993.

6.4 “BAAQMD Manual of Procedures,” Vol.3, Method 22.

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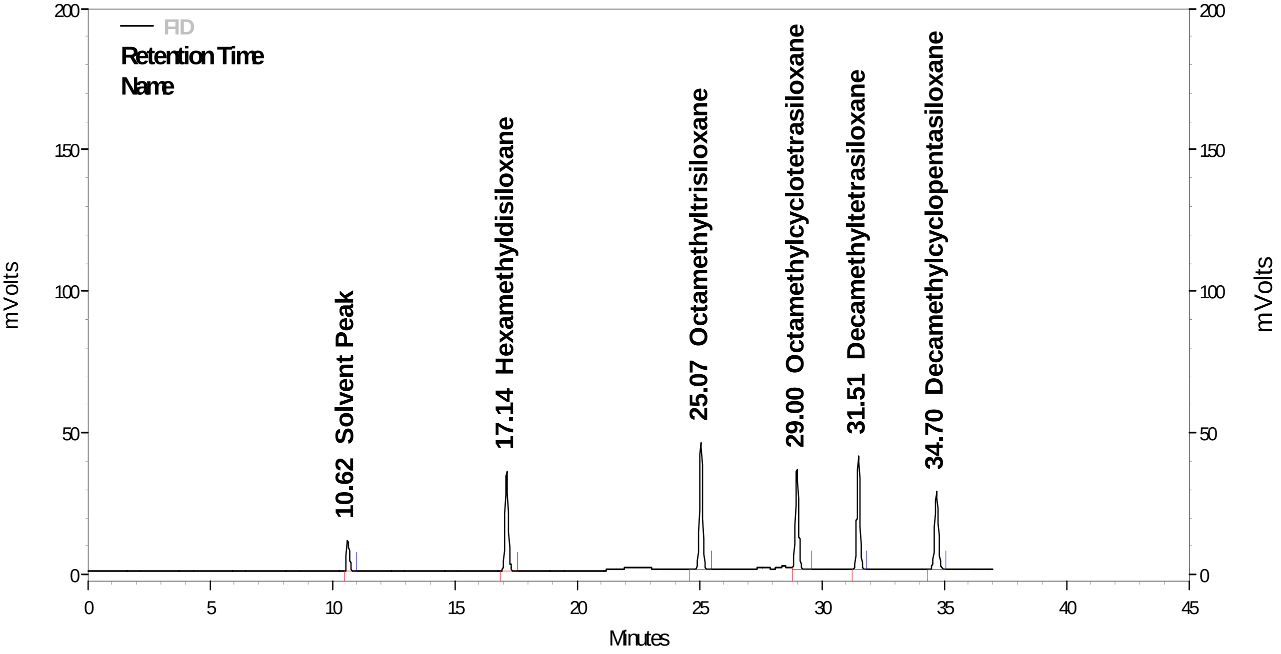

FIGURE I

A TYPICAL CHROMATOGRAM SHOWING THE VOLATILE METHYSILOXANE PEAKS

METHOD 45

DETERMINATION OF BUTANES AND PENTANES IN POLYMERIC MATERIALS

REF: Reg. 8-52

1. PRINCIPLE

1.1 The butanes and pentanes are solubilized in toluene or any appropriate solvent, and the mixture is injected into a gas chromatograph equipped with a liquid injection port, a flame ionization detector (GC-FID) and a compatible integrator or a data station.

1.2 The concentrations of the organic compounds are calculated based on a standard made in the laboratory using the same matrix.

1.3 The limit of detection of this method is 0.05% (w/w).

2. APPARATUS

2.1 Gas Chromatograph. This unit is fitted with a liquid injection port, a flame ionization detector, a temperature programmer and a compatible integrator or data station. The recommended GC operating parameters are:

Initial Oven Temperature (^oC)	40
Initial Hold Time (min)	8
Temperature Program Rate (^oC/min)	5
Final Temperature (^oC)	200
Final Hold Time (min)	5
Injector Temperature	250
Detector Temperature (^oC)	250
Carrier Gas	He
Carrier Gas Flow Rate (ml/min)	3
Injection Sample Size (μl)	1

2.2 Analytical Column: Any analytical column capable of resolving the compounds of interest is acceptable. The recommended analytical columns for this method are:

2.2.1 Primary Column: 30 m x 0.32 mm DB-1 Column, 1.0 μm film thickness (J & W Scientific).

2.2.2 Alternate Column: 12' x 1/8" O.D. SS Column packed with 20% SP 2100/0.1% Carbowax 1500 on 100/120 mesh Supelcoport. **(**Note 1**)**

Note 1: It is necessary to modify the suggested gas chromatographic parameters if the alternate column is used.

2.3 Analytical balance, capable of weighing to ±0.0001 g.

2.4 Syringes, various sizes as needed.

2.5 Micro syringe, 10 µl capacity.

2.6 Vials, crimp top, clear glass, 30 ml and 120 ml capacity.

2.7 Seals, tear–away, to fit vials.

2.8 Septa-jars, I-Chem, short wide mouth jars, with caps/septa (Teflon/silicone septa are bonded into the open top caps), 125 ml capacity.

2.9 Plastic bags with seals.

2.10 Refrigerator.

2.11 Rubber gloves.

3. REAGENT

3.1 n-Butane, 99+% Purity.

3.2 Isobutane, 99+% Purity.

3.3 n-Pentane, Reagent Grade, 99+% Purity.

3.4 Isopentane, Reagent Grade, 99+% Purity.

3.5 Cyclopentane, Reagent Grade, 99+% Purity.

3.6 n-Hexane, Reagent Grade, 99+ % Purity.

3.7 Toluene, Reagent Grade, 99+% Purity.

3.8 Toluene/n-Hexane Solution. ~~Toluene/n-Hexane Solution~~. To 1000 ml of toluene, add 2 ml n-hexane. N-hexane is the internal standard used in this method.

Note 2: Before preparing this solution, follow the screening procedure in Note (6). If n-hexane or a co-eluting compound is present in the screening sample, use a different internal standard such as n-heptane.

3.9 Acetone, pentane/hexane free.

3.10 Compressed Air. (Note 3)

3.11 Carrier Gas, helium or nitrogen, 99.99% or higher purity. (Note 3)

3.12 Fuel Gas, hydrogen, 99.9% or higher purity. (Note 3)

Note 3: The carrier and fuel gases are compressed under high pressure. Hydrogen is an extremely flammable gas. Compressed air supports combustion. Read the precautionary labels before handling these materials.

4. SAMPLING PROCEDURE

4.1 Preparation of Vial Sets **(2.6 and 2.7)**

4.1.1 Use dry, clean gloves to handle the vials and samples in order to minimize contamination.

4.1.2 Rinse the vials, septa and seals at least three times with pentane-free acetone. Air dry for about two hours under a clean hood.

4.1.3 Place the septa in a desiccator.

4.1.4 Dry the vials and seals in an oven at 105^0C for one hour.

4.1.5 After the oven drying, keep the vials and seals in the desiccator until ready for use.

4.1.6 When ready to use, take one vial set (one vial, one septum and one seal) from the desiccator and weigh them. Record the weight.

4.1.7 Immediately place the tared vial set in a plastic bag. Seal the bag and give it to the person who will obtain the expandable polystyrene sample.

4.2 Preparation of Septa-jar sets **(2.8)**

4.2.1 Use dry clean gloves to handle the jars and samples in order to minimize contamination.

4.2.2 Rinse the jars and caps/septa at least three times with pentane-free acetone. Air dry for about two hours under a clean hood.

4.2.3 Place the caps/septa in a desiccator.

4.2.4 Dry the jars in an oven at 105^0C for one hour.

4.2.5 After the oven drying, keep the jars in the desiccator until ready for use.

4.2.6 When ready to use, take Septa-jar set (one jar, one cap/septum from the desiccator, and weigh them. Record the weight.

4.2.7 Immediately place the tared Septa-jar sets in a plastic bag. Seal the bag and give it to the person who will obtain the expandable polystyrene sample.

4.3 Sample Collection

4.3.1 Remove the vial sets **(4.1)** or Septa-jar sets **(4.2)** from the plastic bag and collect the samples as follows: **(Note 4)**

Note 4: When sampling, use dry, clean gloves or scoops to avoid contamination. <u>Take an additional sample for preliminary screening to check for peaks that co-elute with the internal standard (n-hexane).</u>

4.3.1.1 For unexpanded, prepuff and molded part samples, fill the vial to the top with samples. Use the Septa-jar if the sample size is too large to fit in the mouth of the vial.

4.3.1.2 Take bead samples within 5 minutes after opening a carton and from at least 6 inches beneath the surface of the beads. **(Note 5)**

Note 5: <u>Follow manufacturer's directions if, due to safety reasons, the manufacturer recommends a different sampling time after opening a carton.</u>

4.3.1.3 Select representative sections of the molded part for the sample. Avoid edges and sections of poor fusion.

4.3.1.4 Do not take samples from edges that have been hot wire cut.

4.3.1.5 Immediately set a septum over the top of the vial with the Teflon side toward the sample, place a seal over it and crimp tightly. If using Septa-jars, immediately cap the jars tightly.

4.3.1.6 Keep the samples in a container at about 4^0C, if possible, or under ice and transport to the laboratory as soon as possible.

5. PREPARATION OF SAMPLES

5.1 Set up the gas chromatograph as described in **(2.1)** **<u>and (2.2).</u>**

5.2 Using a 10 µl syringe, inject 1 µl of the solvent into the gas chromatograph to check for contamination. If the solvent is contaminated, discard it and open a fresh bottle of solvent. The solvent for the preparation of samples and standards must be free of contamination.

5.3 Take the samples out of the refrigerated container. Wipe the outside surfaces of the vial dry and allow to equilibrate in a desiccator for at least one hour.

5.4 For unexpanded beads, weigh 1 to 1.5 grams (to ±0.0001 gram) aliquot of the sample from **(5.3)** (Ws), into a clean 30 ml vial with crimp top Teflon septum, cap and seal.

5.5 Immediately add 25 ml of toluene/n-hexane solution (3.8) through the septum using a syringe. Mix to dissolve the sample **(Notes 6 and 7).**

Note 6: Mixtures containing butanes must be kept in a refrigerator.

Note 7: Add 25 ml of toluene (without the internal standard to the screening sample. Follow step **(7.1).** If n- hexane is present in the sample, use a different internal standard such as n-heptane).

5.6 For prepuff and molded part samples:

5.6.1 Weigh out sample from **(5.3).**

5.6.2 Subtract the tare weight obtained in **(4.1.6)** or **(4.2.6)** from that obtained in **(5.6.1).** The resulting value is the sample weight (Ws).

5.6.3 ~~Repeat~~ Follow **(5.5).**

6. STANDARD PREPARATION

6.1 Using a 5 ml syringe, inject 1ml each of iso-pentane, n-pentane cyclopentane and n-hexane (internal standard) into a tared 5 ml vial with a septum. Determine and record the weight of each compound after it was added into the vial. **(Note 8)**

Note 8: If n-hexane, neohexane or other hydrocarbons are present in the sample, add the appropriate amount of the standard in the standard mixture. Use a compound that is not present in the sample as internal standard.

6.2 Using a calibrated syringe, add exactly 50 ml of toluene through the septum of an empty, capped 120 ml vial. Place in a refrigerator (4 ^{o}C) for at least one hour to cool. **(Note 9)**

Note 9: If butanes are not present in the sample, it is not necessary to add them to the calibration standard and the solvent does not have to be cooled.

6.3 To the vial prepared in **(6.2)**, add the following compounds:

6.3.1 Inject exactly 25 ml of isobutane directly into the toluene solvent. Determine and record the weight of the compound added to the vial.

6.3.2 Inject exactly 25 ml of n-butane directly into the toluene solvent. Determine and record the weight of the compound added to the vial.

6.3.3 Add 400 μl of the hydrocarbon mixture **(6.1).**

6.3.4 The calibration standard contains approximately:
59 mg isobutane, 59 mg n-butane, 62 mg iso-pentane,
63 mg n-pentane, 75 mg cyclopentane and 66 mg n-hexane
(internal standard). **(Note 8)**

6.4 The calibration standard **(6.3)** should be kept in a refrigerator and is stable for three days. If the sample does not contain isobutane or n-butane, they do not have to be added to the standard. This extends the stability of the standard to seven days.

7. ANALYTICAL PROCEDURE.

7.1 Using a 10 μl syringe, inject 1 μl of the standard **(6.3)** into the gas chromatograph. Integrate and record the retention times and peak areas of the hydrocarbon compounds in the standard. Retain the chromatogram. The order of elution is isobutane, n-butane, isopentane, n-pentane, cyclopentane and n-hexane. **(See Figure 1)**

7.2 Inject, separately, 1 μl of each of the samples from **(5.5 and 5.6)** into the gas chromatograph and record the retention times and peak areas of the hydrocarbons found. Retain the chromatograms.

7.3 Run the analysis in duplicate. Reanalyze the sample if the results on the butanes vary by more than 12% relative and/or the pentanes by more than 10% relative.

8. CALCULATION FOR COMPLIANCE

8.1 Compare the chromatograms obtained in **(7.1)** and **(7.2)** to confirm the identity of the compounds in the sample. Quantitate the concentration of the compounds using the following equations:

8.1.1 Calculate the response factors for each component using the following formula:

$$RF = \frac{Wi \times Ast}{Wst \times Ai}$$

Where:
Wi = weight of the internal standard in grams.
Wst = weight of the standard in grams.
Ai = ~~weight~~ area of the internal standard.
Ast = area of the standard.

8.1.2 Calculate the concentration of each component present in the sample by the following:

$$\text{Concentration (\%w/w)} = \frac{As \times Wis \times 100}{Ais \times Ws \times RF}$$

Where:

Wis = weight of the internal standard in the sample in grams.
Ws = weight of the sample in grams.
Ais = area of the internal standard in the sample.
As = area of the component in the sample.

8.1.3 Calculate the Total VOC of the sample by the following:

Total %VOC (w/w) = Sum of the concentration (% w/w) of each component in the sample

9. REFERENCE

9.1 "SCAQMD Laboratory Methods of Methods Analysis for Enforcement Samples," SCAQMD 306.

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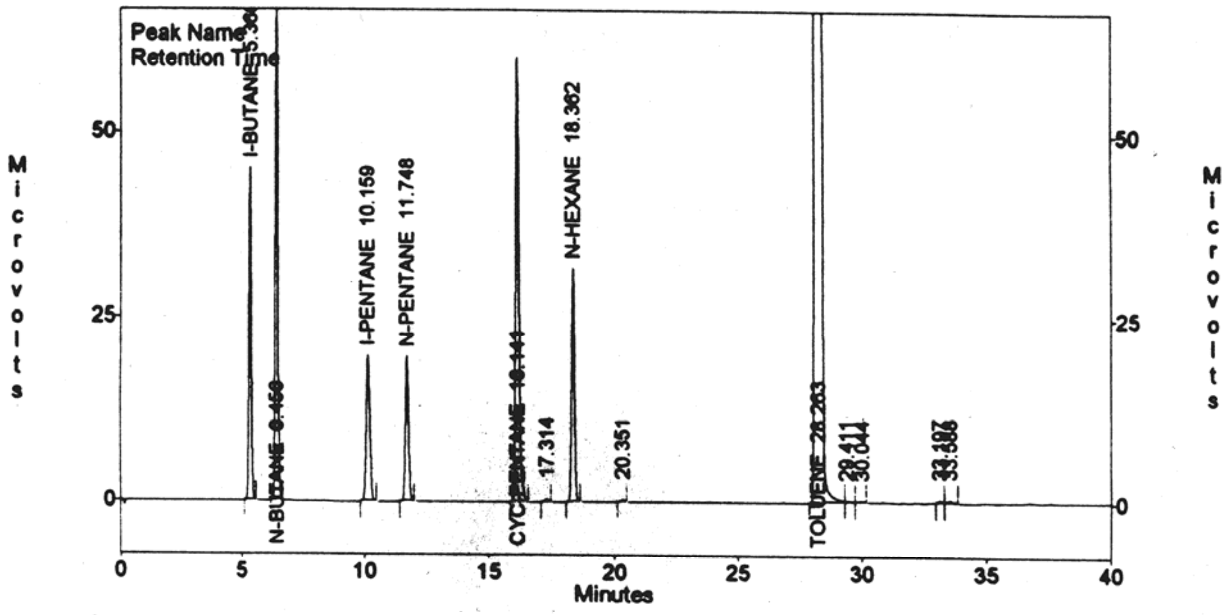

Figure 45-1

A Typical Chromatogram Using the Recommended Primary Analytical Column (60m X 0.32 mm ID DB-1 Column, 5.0µ Film Thickness)

METHOD 46

DETERMINATION OF THE COMPOSITE PARTIAL PRESSURE OF VOLATILE ORGANIC COMPOUNDS IN CLEANING PRODUCTS

REF: Reg. 8-20-309

1. PRINCIPLE

1.1 The volatile organic compounds (VOC) in the cleaning product are identified and quantified using a gas chromatograph equipped with a photoionization-flame ionization detector system connected in series (PID/FID).

1.2 Identification of the compounds in the cleaning product ~~are~~ is based mainly on the retention times of the compounds.

1.3 The weight percent of each VOC component of the material is determined by the internal standard method. This percentage is converted to mole fraction, which is then used to determine the partial pressure of the individual VOC.

1.4 The VOC composite partial pressure of the cleaning product is calculated by taking the sum of the individual partial pressures of the VOC components.

1.5 The limit of detection of this method is ~~0.05% (weight)~~ 0.1 mm Hg VOC composite partial pressure at 20 °C.

2. APPARATUS

2.1 Gas Chromatograph. This unit is equipped with a liquid injection port lined with a glass sleeve, a flame ionization detector, a photoionization detector, a temperature programmer and a compatible integrator or data station.

2.1.1 For hydrocarbon based cleaning products, the recommended GC parameters are:

	Initial	Final
Oven Temperature (°C)	40	200
Iso Time (min)	5	10
Temperature Program Rate (°/min)	2	
Injector Temperature (°C)	250	
Detector Temperature (°C)	250	
Carrier Gas	N_2 or He	
Carrier Gas Flow (ml/min)	3	
Injection Sample Size (μl)	1	

2.1.1.1 Analytical Column: Any analytical column capable of separating and resolving the compounds of interest is acceptable. The recommended analytical columns for this method are:

2.1.1.1.1 Primary Column:

60m x 0.25 mm ID ~~Z~~DB-Wax Column, 0.5 μm Film Thickness. (Available from J & W Scientific)

2.1.1.1.2 Alternate Column:

60 m x 0.32 mm ID, DB-1 Column, 1.0 μm FilmThickness. (Available from J&W Scientific)

2.1.2 For water based cleaning products, the recommended GC parameters are:

	Initial	Final
Oven Temperature (^{o}C)	60	200
Iso Time (min)	5	10
Temperature Program Rate (^{o}/min)	5	
Injector Temperature (^{o}C)	250	
Detector Temperature (^{o}C)	250	
Carrier Gas	N_2 or He	
Carrier Gas Flow (ml/min)	20	
Injection Sample Size (μl)	~~2~~ 1	

2.1.2.1 Any analytical column capable of separating and resolving the compounds of interest is acceptable. The recommended column for this procedure is:

A 12” X 1/8” O.D. SS Column packed with 20% SP 2100/0.15% Carbowax 1500 on Supelcoport, 100/120 mesh.

2.2 Burrell Wrist Action Shaker or equivalent.

2.3 Analytical Balance, capable of weighing to 0.0001 g.

2.4 Syringes, various sizes as needed.

2.5 Micro Syringe, 10 μl capacity.

2.6 Volumetric Flask, various sizes as needed.

2.7 Graduated Cylinder, various sizes as needed.

2.8 Pipette, various sizes as needed.

~~2.9 Vials with screw caps, 2 dram capacity.~~

2.9 Refrigerator.

2.10 Disposable Beral pipettes.

3. REAGENTS

3.1 Compressed Air. (Note 1)

3.2 Carrier Gas, helium or nitrogen, 99.99% or higher purity. (Note 1)

3.3 Fuel Gas, hydrogen, 99.9% or higher purity. (Note 1)

Note 1: The carrier and fuel gases are compressed under high pressure. Hydrogen is an extremely flammable gas. Compressed air supports combustion. Read the precautionary labels before handling these materials.

3.4 Paraffin Hydrocarbon Standards, C_7 through $C_{17,}$ reagent grade, minimum purity of 99+ %.

3.5 Oxygenated Hydrocarbon Standards, reagent grade, minimum purity of 99+ %.

3.6 Aromatic Hydrocarbon Standards, reagent grade, minimum purity of 99+%.

3.7 Carbon Disulfide (CS_2), low Benzene (<1 ppm) or other suitable solvent, Reagent Grade.

4. ANALYTICAL PROCEDURE

4.1 Sample Preparation and Analysis:

4.1.1 Determination of Total Volatiles.

4.1.1.1 Determine the % Volatile (w/w) of the sample by following BAAQMD Method 21 or Method 22.

4.1.2 Determination of Water and Exempt Compounds.

4.1.2.1 Determine the exempt compounds and water in the cleaning product by ASTM D-6133-02, BAAQMD Method 21, BAAQMD Method 22 or any appropriate method in the BAAQMD Manual of Procedures. Express these concentrations in grams (W_w or W_e, respectively) per 100 grams of sample.

4.1.3 Set up the gas chromatograph as described in Section 2.1.

4.1.4 Depending on the type of cleaning product (solvent based or aqueous), use the appropriate analytical column as recommended in Sections 2.1.1 and 2.1.2.

4.1.5 Mix the sample thoroughly. It is essential that the sample is mixed well in order to get valid results.

4.1.6 Screen the sample in order to determine the internal standard to be used in the analysis and the types of compounds present for standard preparation. N-octane or any other compound can be used as internal standard if there are no interfering peaks present in the area where the compound elutes. (Note 2)

Note 2: The internal standard must be a compound which is not in the sample matrix and does not coelute with any other volatile component in the cleaning product. It must perform on the analytical systems in a manner similar to that of the compounds being measured.

4.1.7 Weigh and record approximately 2.5 g (W_s) of the well mixed sample and 0.025 g (W_{is}) of the internal standard (to 0.0001g) in a tared 25 ml volumetric flask.

4.1.8 Add diluent (3.7) to the mark. (Note 3)

Note 3: Carbon Disulfide is flammable. It is harmful if inhaled or absorbed through the skin. It is a possible mutagen/teratogen. Use only with adequate ventilation. Avoid contact with skin, eyes and clothing. If the material to be analyzed is not compatible with CS2, use a different solvent such as dimethylformamide, tetrahydrofuran or dimethyl sulfoxide. The diluent must be chosen such that the sample is miscible with it and the peak does not interfere with those of the analytes. The sample may be diluted further or made more concentrated to attain optimum peak areas.

4.1.9 Invert the flask (4.1.8) several times to mix its content thoroughly. Allow the vial to stand for ten to fifteen minutes undisturbed to allow the sample to reach equilibrium.

4.1.10 Inject 1 μl of the sample (4.1.9) into the gas chromatograph. Record the peak areas and retention times of the compounds and retain the chromatogram.

4.1.11 Run the analysis in duplicate. ~~Reanalyze the sample if the results vary by more than 5% relative.~~ Calculate the relative difference between the two results by using the following equation:

$$\%RD = \frac{(PPc1 - PPc2) \times 100}{AVGPPc12}$$

Where: %RD = Relative Difference between twp results
PPc1 = VOC composite partial pressure result of run 1 (mm Hg at 20°C)
PPc2 = VOC composite partial pressure result of run 2 (mm Hg

at 20 ^oC)
AVGPPc12= Average of PPc1 and PPc2 or (PPc1 + PPc2)/2

4.1.12 Reanalyze the sample if the relative difference (%RD) between the two results is more than 5%.

4.2 Standard Preparation and Determination of the Response Factor (Rf)

4.2.1 In a 25 ml volumetric flask, weigh approximately 0.025 g (W_{std}) of standard for each of the compounds present in the sample (to 0.0001g).

4.2.2 Add diluent (3.7) to the mark. (Note 3) (Note 4)

Note4: The standard can alternatively be prepared by initially mixing a stock solution of the compounds of interest and the internal standard. A working standard is prepared by diluting the stock in the chosen solvent such that optimum areas are attained.

4.2.3 Invert the flask (4.2.2) several times to mix its contents thoroughly. Allow the vial to stand for ten to fifteen minutes undisturbed to allow the sample to reach equilibrium.

4.2.4 Inject 1 µl of the sample (4.2.3) into the gas chromatograph. Record the peak areas and retention times of the compounds and retain the chromatogram.

4.2.5 Calculate the response factor of each of the compounds in the Standard. (Note ~~4~~ 5)

$$R_f = \frac{W_{is} \times A_{std}}{W_{std} \times A_{is}}$$

Where:

R_f = Response factor of the standard
W_{is} = Weight of the internal standard, in grams
A_{is} = Area of the internal standard
W_{std} = Weight of the standard, in grams
A_{std} = Area of the standard

Note ~~4~~ 5: It is necessary to determine the response factor for each of the standards with each series of determinations.

5. CALCULATIONS

5.1 Calculate the concentration of the “i”th VOC component of the cleaning product using the following equation:

5.1.1 % “i”th VOC (w/w) $= \dfrac{(A_{ith}) \times (W_{is}) \times 100}{(A_{is}) \times (W_s) \times R_f}$

Where:

A_{ith} = Peak Area of the “i”th VOC component of the cleaning product
W_{is} = Weight of the internal standard, in grams
A_{is} = Peak Area of the internal standard
W_s = Weight of the sample, in grams
R_f = Response factor of the internal standard to “i”th component of the cleaning product (from 4.2.5)
100 = Factor to express the weight of the “i”th VOC component of the product as % (w/w).

5.2 Calculate the composite partial pressure of the VOC in the cleaning product using the following equation:

$$PPc = \frac{\sum_{i=1}^{n} [(W_i)(VP_i)/(MW_i)]}{(W_w/MW_w) + (W_e/MW_e) + \sum_{i=1}^{n} (W_i/MW_i)}$$

Where:

PPc = VOC composite partial pressure at 20°C, in mm Hg
VP_i = Vapor pressure of the “i”th VOC compound at 20 °C, in mm Hg
W_i = Weight of the “i”th VOC compound, in grams per 100 grams cleaning product (% “I”th VOC)
W_w = Weight of water, in grams per 100 grams cleaning product (from Method 21)
W_e = Weight of exempt compounds, in grams per 100 grams cleaning product (from Method 22)
MW_w = Molecular weight of water, in grams per gram-mole
MW_e = Molecular weight of exempt compound, in grams per gram-mole
MW_i = Molecular weight of the “i”th VOC compound, in grams per gram-mole

6. REFERENCES

6.1 “Volatile Content of Paint,” ASTM Designation D2369-92, Book of ASTM Standards, Vol. 6.01, 1993.

6.2 “Determination of Water Content of Water Reducible Paints by Direct Injection into a Gas Chromatograph,” ASTM Designation D3792-91, Book of ASTM Standards, Vol. 6.01, 1993.

6.3 “BAAQMD Manual of Procedures,” Vol.3, Method 22.

6.3 “BAAQMD Manual of Procedures,” Vol.3, Method 21.

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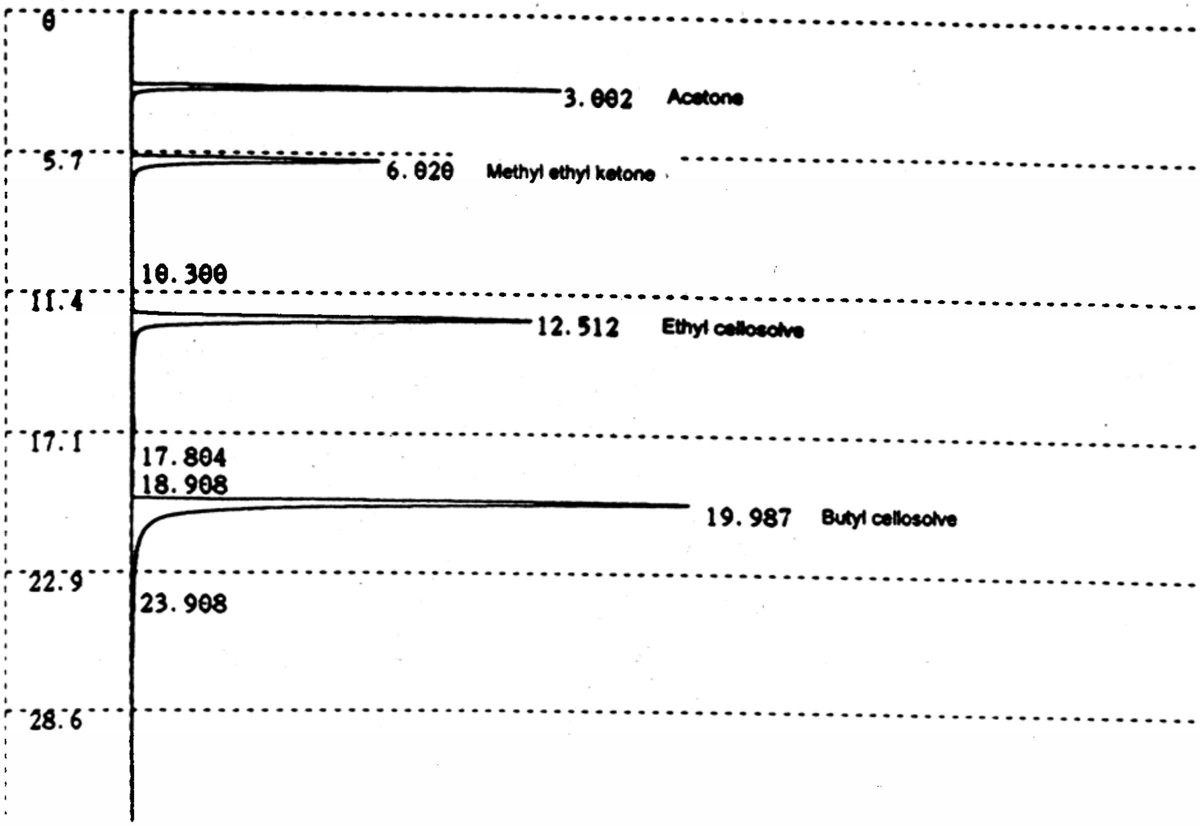

FIGURE 46-1

A Typical Chromatogram Using the Recommended Analytical Column for Water Based Cleaning Solvents (12 “ X 1/8 “ O.D. SS Column Packed With 20% SP2100 / 0.1% Carbowax 1500 on Supelcoport, 100/120 mesh)

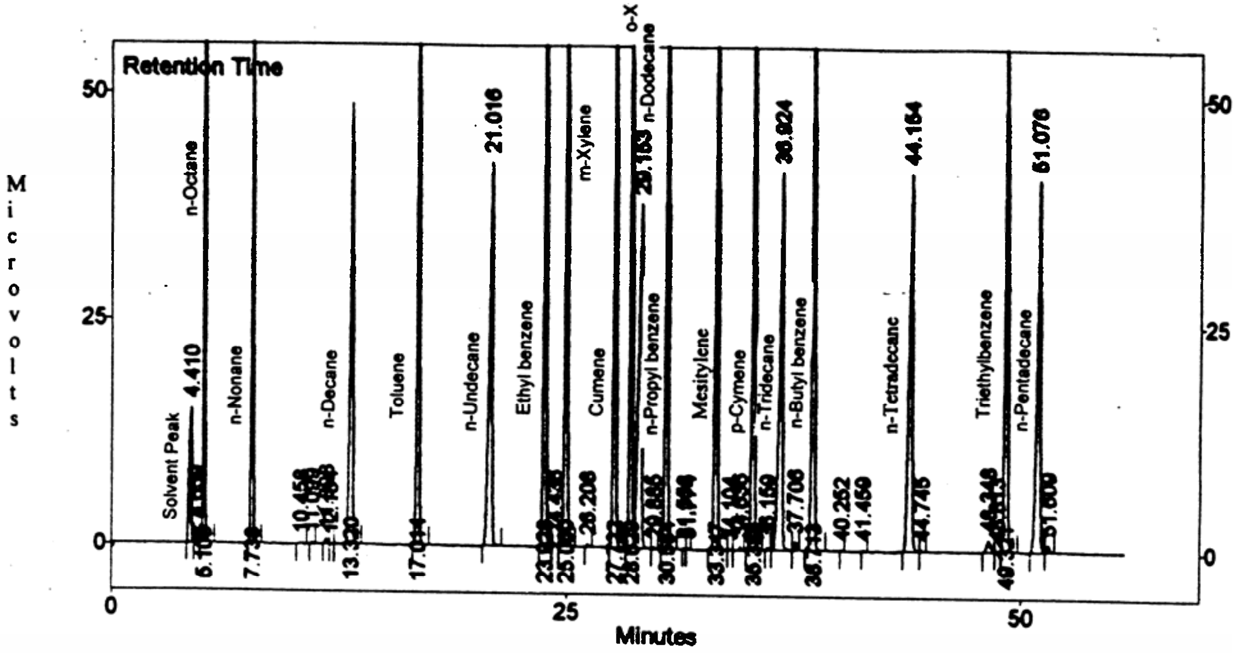

FIGURE 46-2

A Typical Chromatogram Using the Recommended Primary Analytical Column for Hydrocarbon Based Cleaning Solvents (60 m X 0.32 mm ID ZB-Wax Column, 0.5 μFilm Thickness)