



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

BOARD OF DIRECTORS
REGULAR MEETING
DECEMBER 7, 2011

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.

Public Comment Procedures

Persons wishing to make public comment must fill out a Public Comment Card indicating their name and the number of the agenda item on which they wish to speak, or that they intend to address the Board on matters not on the Agenda for the meeting.

Public Comment on Non-Agenda Matters, Pursuant to Government Code Section 54954.3 For the first round of public comment on non-agenda matters at the beginning of the agenda, ten persons selected by a drawing by the Clerk of the Boards from among the Public Comment Cards indicating they wish to speak on matters not on the agenda for the meeting will have three minutes each to address the Board on matters not on the agenda. For this first round of public comments on non-agenda matters, all Public Comment Cards must be submitted in person to the Clerk of the Boards at the location of the meeting and prior to commencement of the meeting. The remainder of the speakers wishing to address the Board on non-agenda matters will be heard at the end of the agenda, and each will be allowed three minutes to address the Board at that time.

Members of the Board may engage only in very brief dialogue regarding non-agenda matters, and may refer issues raised to District staff for handling. In addition, the Chairperson may refer issues raised to appropriate Board Committees to be placed on a future agenda for discussion.

Public Comment on Agenda Items After the initial public comment on non-agenda matters, the public may comment on each item on the agenda as the item is taken up. Public Comment Cards for items on the agenda must be submitted in person to the Clerk of the Boards at the location of the meeting and prior to the Board taking up the particular item. Where an item was moved from the Consent Calendar to an Action item, no speaker who has already spoken on that item will be entitled to speak to that item again.

Up to ten (10) speakers may speak for three minutes on each item on the Agenda. If there are more than ten persons interested in speaking on an item on the agenda, the Chairperson or other Board Member presiding at the meeting may limit the public comment for all speakers to fewer than three minutes per speaker, or make other rules to ensure that all speakers have an equal opportunity to be heard. Speakers are permitted to yield their time to one other speaker; however no one speaker shall have more than six minutes. The Chairperson or other Board Member presiding at the meeting may, with the consent of persons representing both sides of an issue, allocate a block of time (not to exceed six minutes) to each side to present their issue.

BOARD OF DIRECTORS REGULAR MEETING AGENDA

WEDNESDAY
DECEMBER 7, 2011
9:45 A.M.

BOARD ROOM
7TH FLOOR

CALL TO ORDER

Opening Comments
Roll Call
Pledge of Allegiance

Chairperson, Tom Bates
Clerk of the Boards

PUBLIC COMMENT ON NON-AGENDA MATTERS

Public Comment on Non-Agenda Items, Pursuant to Government Code Section 54954.3

For the first round of public comment on non-agenda matters at the beginning of the agenda, ten persons selected by a drawing by the Clerk of the Boards from among the Public Comment Cards indicating they wish to speak on matters not on the agenda for the meeting will have three minutes each to address the Board on matters not on the agenda. For this first round of public comments on non-agenda matters, all Public Comment Cards must be submitted in person to the Clerk of the Board at the location of the meeting and prior to commencement of the meeting.

PROCLAMATION(S)/AWARDS

The Board of Directors will recognize employees who have completed milestones of twenty-five (25), thirty (30), and thirty-five (35) years of service with the Air District during this second half of the calendar year.

CONSENT CALENDAR (ITEMS 1 – 7)

Staff/Phone (415) 749-

1. Minutes of the Board of Directors Regular Meeting of November 16, 2011
Clerk of the Boards

2. Board Communications Received from November 16, 2011 through December 6, 2011
J. Broadbent/5052
jbroadbent@baaqmd.gov

A list of communications directed to the Board of Directors received by the Air District from November 16, 2011 through December 6, 2011, if any, will be at each Board Member's place.

3. Air District Personnel on Out-of-State Business Travel
J. Broadbent/5052
jbroadbent@baaqmd.gov

In accordance with Section 5.4 (b) of the Air District's Administrative Code, Fiscal Policies and Procedures Section, the Board is hereby notified that the attached memorandum lists Air District personnel who have traveled on out-of-state business.

4. Proposed Regulatory Agenda for 2012

H. Hilken/4642
hhilken@baaqmd.gov

State law requires each Air District to publish a list of potential regulatory measures for the upcoming year. No regulatory measures can be brought before the Board that is not on the list, with specified exceptions. Consequently, the list contains all regulatory measures that may come before the Board in 2012.

5. Consideration of Authorization for Execution of Purchase Order in Excess of \$70,000 Pursuant to Administrative Code Division II Fiscal Policies and Procedures Section 4.3 Contract Limitations

H. Hilken/4642
hhilken@baaqmd.gov

The Board of Directors will consider authorizing the Executive Officer/APCO to execute a purchase order to TSI in an amount not to exceed \$77,000 for ultrafine particulate matter counter instruments.

6. Adoption of Proposed Amendments to the Air District's Administrative Code Division II Fiscal Policies and Procedures - Section 4.4 Contracts with Minority Business Enterprises and Women's Enterprises and Section 4.6 Contracts

J. Broadbent/5052
jbroadbent@baaqmd.gov

The Board of Directors will consider adopting proposed amendments to the Air District's Administrative Code, Division II Fiscal Policies and Procedures – Section 4.4 Contracts with Minority Business Enterprises and Women's Enterprises and Section 4.6 Contracts.

7. Contractor Selection for the Port Drayage Truck Replacement Program

J. Broadbent/5052
jbroadbent@baaqmd.gov

The Board of Directors will consider selection of a contractor for the engine model year 2004 Port Drayage Truck Replacement Program.

COMMITTEE REPORTS AND RECOMMENDATIONS

8. Report of the **Mobile Source Committee** Meeting of November 28, 2011

CHAIR: S. Haggerty

J. Broadbent/5052
jbroadbent@baaqmd.gov

The Committee recommends Board of Directors approval of the following item(s):

1. *Projects with Proposed Grant Awards over \$100,000*

A) *Approve Carl Moyer projects with proposed grant awards over \$100,000;*

B) *Authorize the Executive Officer/APCO to execute Grant Agreements for the recommended projects.*

2. *Port Drayage Truck Replacement Program for Engine Model Year (MY) 2004 Trucks*

A) *Approve the addition of Policy #32 to the FYE 2012 Transportation Fund for Clean Air (TFCA) Regional Fund Policies to allow the replacement of MY 2004 drayage trucks as an eligible project type;*

- B) *Authorize the expenditure of \$1.04 million in TFCA Regional Fund monies to execute a program to replace MY 2004 port drayage trucks registered in the Bay Area;*
- C) *Authorize the Executive Officer/APCO to enter into all contracts and make all expenditures necessary to allocate the TFCA Regional Fund monies to eligible projects;*
- D) *Allow the CMAs to contribute their TFCA County Program Manager funds to the Air District's program to replace MY 2004 drayage trucks as allowed under Policy #3 of the current TFCA Program Manager Fund Policies; and*
- E) *Authorize the Executive Officer/APCO to accept and allocate funding from additional sources for the MY 2004 Port Drayage Truck Replacement Program.*

PRESENTATION(S)

9. Continuation of the Overview of the Air District's Permit and Enforcement Programs

B. Bateman/4653

bbateman@baaqmd.gov

Staff will continue a presentation of the Air District's Permit and Enforcement Programs which are used to implement and enforce regulatory requirements that apply to stationary sources of air pollution in the Bay Area. The first part of this presentation was presented to the Board of Directors at its meeting on October 5, 2011.

10. Advisory Council Report and Recommendations on Ultrafine Particles

J. Roggenkamp/4646

jroggenkamp@baaqmd.gov

The Advisory Council will present a report and recommendations from the March 9, 2011 meeting on Ultrafine Particles: Health Effects, Measurement and Analysis, the June 8, 2011 meeting on Ultrafine Particles: Sources and Characteristics and the October 12, 2011 meeting on Ultrafine Particles: Characterization of Mobile Source Emissions and Related Health Effects.

PUBLIC COMMENT ON NON-AGENDA MATTERS

Public Comment on Non-Agenda Items, Pursuant to Government Code Section 54954.3

Speakers who did not have the opportunity to address the Board in the first round of comments on non-agenda matters will be allowed three minutes each to address the Board on non-agenda matters.

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)

OTHER BUSINESS

11. Report of the Executive Officer/APCO
12. Chairperson's Report
13. Time and Place of Next Meeting is Wednesday, December 14, 2011 at 10:30 a.m., at 939 Ellis Street, San Francisco, CA 94109
14. Adjournment

CONTACT EXECUTIVE OFFICE - 939 ELLIS STREET SF, CA 94109

(415) 749-5130
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 Executive Office should be given at least 3 working days prior to the date of the meeting so that arrangements can be made accordingly.
- Any writing relating to an open session item on this Agenda that is distributed to all, or a majority of all, members of the body to which this Agenda relates shall be made available at the Air District's headquarters at 939 Ellis Street, San Francisco, CA 94109, at the time such writing is made available to all, or a majority of all, members of that body. Such writing(s) may also be posted on the Air District's website (www.baaqmd.gov) at that time.

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
939 ELLIS STREET, SAN FRANCISCO, CALIFORNIA 94109
(415) 771-6000

EXECUTIVE OFFICE:
MONTHLY CALENDAR OF DISTRICT MEETINGS

DECEMBER 2011

<u>TYPE OF MEETING</u>	<u>DAY</u>	<u>DATE</u>	<u>TIME</u>	<u>ROOM</u>
Board of Directors Regular Meeting <i>(Meets 1st & 3rd Wednesday of each Month)</i>	Wednesday	7	9:45 a.m.	Board Room
Board of Directors Budget & Finance Committee <i>(At the Call of the Chair)</i>	Wednesday	14	9:30 a.m.	Board Room
Board of Directors Special Meeting <i>(Meets 1st & 3rd Wednesday of each Month)</i>	Wednesday	14	10:30 a.m.	Board Room
Board of Directors Executive Committee <i>(At the Call of the Chair)</i>	Monday	19	9:30 a.m.	4 th Floor Conf. Room
Board of Directors Regular Meeting <i>(Meets 1st & 3rd Wednesday of each Month)</i> - CANCELLED	Wednesday	21	9:45 a.m.	Board Room
Board of Directors Mobile Source Committee <i>(Meets 4th Thursday each Month)</i> - CANCELLED	Thursday	22	9:30 a.m.	Board Room

JANUARY 2012

<u>TYPE OF MEETING</u>	<u>DAY</u>	<u>DATE</u>	<u>TIME</u>	<u>ROOM</u>
Board of Directors Regular Meeting <i>(Meets 1st & 3rd Wednesday of each Month)</i> - CANCELLED	Wednesday	4	9:45 a.m.	Board Room
Board of Directors Stationary Source Committee <i>(At the Call of the Chair)</i>	Monday	9	9:30 a.m.	Board Room
Advisory Council Retreat <i>(Meets 2nd Wednesday each Month)</i>	Wednesday	11	9:00 a.m.	Board Room
Board of Directors Executive Committee <i>(At the Call of the Chair)</i>	Thursday	12	9:30 a.m.	4 th Floor Conf. Room
Board of Directors Special Meeting/Retreat <i>(Meets 1st & 3rd Wednesday of each Month)</i>	Wednesday	18	9:45 a.m.	City of San Pablo Maple Hall, Building #4 13831 San Pablo Avenue San Pablo, CA. 94806
Board of Directors Mobile Source Committee <i>(Meets 4th Thursday each Month)</i>	Thursday	26	9:30 a.m.	4 th Floor Conf. Room

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Tom Bates and Members
of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 18, 2011

Re: Board of Directors Draft Meeting Minutes

RECOMMENDED ACTION:

Approve attached draft minutes of the Board of Directors Regular Meeting of November 16, 2011.

DISCUSSION

Attached for your review and approval are the draft minutes of the Board of Directors Regular Meeting of November 16, 2011.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Maricela Martinez
Reviewed by: Jennifer Cooper

Bay Area Air Quality Management District
939 Ellis Street
San Francisco, CA 94109

Board of Directors Regular Meeting
Wednesday, November 16, 2011
9:45 a.m.

DRAFT MINUTES

CALL TO ORDER: Chairperson Tom Bates called the Regular Meeting to order at 9:53 a.m.

Chairperson Bates announced that Roll Call would be taken once a quorum was present.

Pledge of Allegiance: Chairperson Bates led the Pledge of Allegiance.

PUBLIC COMMENT ON NON-AGENDA MATTERS: Chairperson Bates opened the public comment period and the following individual provided public comments regarding air monitoring and cumulative impacts definition, and a proposed Bay Area Environmental Health Collaborative (BAEHC) resolution for consideration by the Board:

Francisco DaCosta, Environmental Justice Advocacy

Roll Call: Present: Chairperson Tom Bates; Vice Chair John Gioia; and Directors John Avalos, Carole Groom, Scott Haggerty, Jennifer Hosterman, Eric Mar, Nate Miley, Johanna Partin, Mark Ross, Jim Spering, Gayle Uilkema, Brad Wagenknecht, Ken Yeager, Shirlee Zane. Secretary Ash Kalra; and Directors Susan Garner and Susan Gorin arrived after the roll call was taken.

Absent: Directors Carol Klatt and Liz Kniss.

PUBLIC COMMENT ON NON-AGENDA MATTERS: Chairperson Bates continued the public comment period and the following individuals provided public comments regarding air monitoring, cumulative impacts definition, and a proposed BAEHC resolution for consideration by the Board:

Leotis Martin, BAEHC
Ken Kloc, BAEHC
Andy Katz, BAEHC
Genese Hughes, BAEHC

Henry Clark, BAEHC
Azibuike Akaba, Regional Asthma Management and Prevention
Wafaa Aborashed, BAEHC
Rosina Roibal, BAEHC

Chair Bates acknowledged the receipt of 1,300 postcards collected by community residents that support BAEHC's demands of the Air District.

Dion Taylor, BAEHC
Tessie Ester, BAEHC
Le Tim Ly, BAEHC

Antonio Diaz, PODER
Vendell White, Mother's Committee

Chair Bates thanked the speakers for testifying and for holding a peaceful demonstration outside the Air District offices.

Board Member Comments:

Chair Bates asked Jack Broadbent, Executive Officer, if the Air District had received a copy of the resolution being presented by BAEHC.

Mr. Broadbent responded yes. Mr. Broadbent requested the opportunity to provide the Board members with a copy of the resolution. The Air District will be speaking to the representatives of the various community groups present at this meeting and will be providing an update to the Board at a future Executive Committee meeting.

Chair Bates closed the comment period at 10:24 a.m.

13. Chairperson's Report

Chair Bates announced a special Board of Directors meeting to be held on December 14, 2011. Due to the holidays, the regular Board of Directors meetings scheduled on December 21, 2011 and January 4, 2012 are cancelled.

CONSENT CALENDAR (Items 1-5):

1. Minutes of the November 2, 2011 Board Meeting.
2. Board Communications Received from November 2, 2011 through November 15, 2011.
3. Quarterly Report of Executive Office and Division Activities
4. Notice of Proposed Amendments to the Air District's Administrative Code Division II Fiscal Policies and Procedures – Section 4.4 Contracts with Minority Business Enterprises and Women's Enterprises and Section 4.6 Contracts.
5. Notice of Proposed Amendments to the Air District's Administrative Code Division II Fiscal Policies and Procedures – Section 5.6 Receipts and Expenses.

Board Action: Director Haggerty made a motion to approve Consent Calendar Items 1 through 5; Director Wagenknecht seconded the motion; which carried unanimously without objection.

Board Member Comments: In regards to Consent Item #4, Director Miley asked if the Air District has ever had a progress report for the actual funding expended to minority and women owned enterprises. Director Miley does not recall ever seeing such report.

Mr. Broadbent replied that a report can be provided.

Director Miley asked when this Administrative Code was adopted.

Mr. Broadbent will have staff prepare a report and present it to the Budget and Finance Committee.

COMMITTEE REPORTS AND RECOMMENDATIONS

6. Report of the Nominating Committee Meeting of November 2, 2011

Chair: Tom Bates

Chairperson Bates reported that the Nominating Committee met on Wednesday, November 2, 2011 and approved the minutes of November 3, 2010.

The Committee considered the 2012 Board Officers for the 2012 Term of Office.

There were two people nominated for the Secretary seat, Director Nate Miley and Director Carole Groom.

The Committee recommended that the Board of Directors approve the following Board Officers for 2012:

Chairperson John Gioia
Vice Chairperson Ash Kalra
Secretary Nate Miley

Director Hosterman expressed her desire to see a woman become a Board Officer and expressed full support for Director Groom.

Director Haggerty was troubled that a minority has not held a seat as Board Officer in the past 16 years. Director Haggerty stated that the ultimate decision was made based on seniority. He also applauded Director Miley's efforts and hard work in working with his constituents. Director Haggerty supported Director Miley.

Director Zane recommended that Director Groom be the Secretary.

Director Hudson was supportive of both candidates and felt that they are both capable of doing their jobs. Director Hudson was concerned that not all of the counties are being fairly represented.

Director Groom stated that the process was conducted fairly and is comfortable with the results.

Board Action: Director Groom made a motion to approve the report of the Nominating Committee; Director Haggerty seconded the motion; which carried unanimously without objection.

Public Comments: Wafaa Aborashed, BAEHC, expressed her opposition to Director Miley serving as a Board Officer. Ms. Aborashed insisted that she and her group have tried numerous times to meet with Director Miley without any success.

Rosina Roibal, BAEHC, expressed full support for Director Groom. Ms. Roibal did not agree with the Nominating Committee consisting of all males. Ms. Roibal requested that Director Groom be the Chairperson of the Executive Committee.

Director Miley requested that Kamika Dunlap, Aide to Director Miley, meet with Ms. Aborashed at the conclusion of the Board meeting to schedule a meeting with himself and/or his staff. Director Miley clarified that if the item in question is not in his District then he would not agree to a meeting. The issues at hand must fall within his District.

The next meeting of the Nominating Committee is at the call of the chair.

7. Report of the Personnel Committee Meeting of November 14, 2011
Chair: Brad Wagenknecht

Chairperson Wagenknecht reported that the Personnel Committee met on Monday, November 14, 2011 and approved the minutes of September 19, 2011.

The Committee held interviews for 6 candidates for appointment to the Air District's Advisory Council.

The Committee recommends the following individuals to serve on the Air District's Advisory Council for a term of office effective January 1, 2012 through December 31, 2013:

Jessica Range, Community Planning Category
Estes Al Philips, Organized Labor Category
Murray Wood, Public Health Category

The Committee then adjourned to Closed Session to conduct a performance evaluation of the Executive Officer/APCO and District Counsel, pursuant to Government Code Section 54957 and 54957.6.

The Committee reconvened in Open Session, and the Chair announced that no reportable action had been taken in Closed Session.

The next meeting of the Personnel Committee is at the Call of the Chair.

Board Action: Director Wagenknecht made a motion to approve the report of the Personnel Committee; Director Gioia seconded the motion; which carried unanimously without objection.

Board Member Comments: Director Uilkema asked who conducted the performance evaluation of the APCO and District Counsel.

Brian Bunger, District Counsel, stated that an outside consultant, Marilyn Manning conducted the performance evaluation for District Counsel, and that the report went through the Personnel Committee.

CLOSED SESSION

Chair Bates adjourned the meeting into a closed session at 10:40 a.m.

10. EXISTING LITIGATION (Government Code Section 54956.9(a))

Pursuant to Government Code Section 54956.9(a), a need exists to meet in closed session with legal counsel to consider the following case(s):

California Building Industry Association v. Bay Area AQMD, Alameda County Superior Court, Case No. RG-10548693

11. ANTICIPATED LITIGATION

Pursuant to Government Code Section 54956.9(c), a need exists to meet in closed session to discuss one potential litigation matter.

OPEN SESSION

Chair Bates reconvened the meeting at 11:05 a.m. and stated that no reportable action was taken in the closed session meeting.

PRESENTATION(S)

8. Overview of the 2011/2012 Wood Smoke Reduction Program

Chair Bates opened the public comment period. There were no comments from the public.

Eric Stevenson, Director of Technical Services, began the overview of the 2011/2012 Wood Smoke Reduction program and explained that Barbara Coler, Air Quality Program Manager, and Lisa Fasano, Director of Communications and Outreach, would join him.

The presentation included the essential components of the wood smoke program, which are: monitoring and modeling, the enforcement program, compliance assistance, and education and outreach. Program results and future planning will be discussed.

Mr. Stevenson defined PM 2.5 and why it is a health concern. He stated that PM 2.5 is particulate matter that is 2.5 microns or less in size, and identified various sources of PM 2.5. Wood smoke is the major contributor to particulate matter in the Bay Area during peak concentrations.

Tremendous health benefits can be achieved if particulate matter is reduced. Because of this, the Board enacted the Wood Smoke rule on July 9, 2008. Mr. Stevenson provided the Board of Directors with a fact sheet which provided information regarding the rule, statistics on violations and complaints, and statistics on warning notices issued.

Mr. Stevenson discussed the progress of the program. Over the last three years, the number of days that recorded an exceedance has decreased. This is in large part due to the Air District's efforts as well as meteorological conditions which affect PM 2.5 concentrations. While the region is enjoying improved air quality, there are some areas in the Bay Area that experience localized effects. The 2011/2012 Wood Smoke Reduction Program will attempt to address the localized effects.

Barbara Coler, Air Quality Program Manager, continued with the presentation focusing on compliance and enforcement. Ms. Coler's presentation focused on wood smoke patrols, the violation and exemption process, and local solutions.

Ms. Coler acknowledged and thanked several staff members in the compliance and enforcement division for their hard work and efforts in enforcing the rule. The program depends on partnerships with local agencies on local solutions in order to increase this program's success.

The Air District is in the process of developing a new model ordinance. The ordinance can be a tool that cities and counties can consider adopting to address the localized neighborhood impacts. The ordinance will provide a menu of options that cities and counties can select depending on their specific needs.

Lisa Fasano, Director of Communications and Outreach, presented the last part of the presentation. At the request of the Board, the Air District has now developed a local government outreach plan which is ready for implementation. The plan includes talking points, a letter from Jack Broadbent, Executive Officer, to government leaders, instructions for downloading Air District widgets, a fact sheet and a brochure.

The Air District will continue to spread the message about the wood smoke rule and its effects on public health by conducting door-to-door outreach. This year, the targeted cities are Pleasant Hill, Piedmont area of Oakland, possibly Redwood City, Campbell, and Wood Acre. Advertisement will continue to include the Treasure Island banner above the tunnel, movie theatres, "Craig the Bike Guy," fitness centers, billboards, transit shelters, Cable TV, radio, in various language, phone alerts, and press events.

For social media, the Air District will continue to build upon the partnerships with health care organization such as Breathe California, Kaiser Permanente and the American Lung Association to get the health message out to the public. Video and podcasts are being utilized to continue dialogue with the public on social media sites. Videos will be developed for the Air District's You Tube page.

Ms. Fasano concluded the presentation by showing a television commercial which portrays the health impacts from wood smoke in the Bay Area.

Board Member Comments: Director Zane asked if the Air District is also working with local public television stations.

Ms. Fasano replied yes.

Ms. Fasano spoke about the media kickoff which has held in Corte Madera. Mr. Stevenson spoke about conducting a visit to a home with a functioning wood smoke device. During the visit, PM concentrations inside the home were 300 micrograms per cubic meter; the 24 hour standard is 35 micrograms per cubic meter.

Chair Bates asked if this is typical.

Mr. Stevenson stated that it varies widely depending on the type of fireplace and the maintenance given to the fireplace.

Director Zane requested that Air District staff provide information to the Board which identifies which cities and counties have already adopted a wood smoke ordinance.

Director Zane also expressed concern that the Air District's regionwide approach is not sufficiently diverse given different climates.

Jack Broadbent, Executive Officer, responded that currently the program is regionwide. This program has been successful and has brought regional levels down. However, there are pockets with problems. The Air District now has to think about the possibility of calling Spare the Air Alerts county by county.

Director Zane recommended that Spare the Air Alerts be called county by county and inquired about whether the Air District is currently advertising with the bicycle coalition.

Ms. Fasano responded no. The Air District works with “Craig the Bike Guy” who is a contractor for the Air District.

Director Zane suggested that staff contact the bicycle coalition to attempt to obtain volunteers for advertising.

Director Hudson suggested that Spare the Air Alerts should be called prior to reaching the standard for each area.

9. Continuation of the Overview of the Air District’s Permit and Enforcement Programs

Chairperson Bates requested this item be heard at the December 7, 2011 Board of Directors meeting.

PUBLIC COMMENT ON NON-AGENDA MATTERS

No one from the public addressed the Board at this time.

OTHER BUSINESS

12. Report of the Executive Officer/APCO – Mr. Broadbent informed the Board that Director Brown has retired and announced that his recognition will take place at a future meeting.
14. Time and Place of Next Meeting – At 9:45 a.m., Wednesday, December 7, 2011; at 939 Ellis Street, San Francisco, CA 94109.
15. Adjournment – Chair Bates adjourned the meeting at 11:35 a.m.

Maricela Calvo
Executive Secretary

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Tom Bates and Members
of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 18, 2011

Re: Board Communications Received from November 16, 2011 through
December 6, 2011

RECOMMENDED ACTION:

None; receive and file.

DISCUSSION

A list of communications directed to the Board of Directors received by the Air District from November 16, 2011 through December 6, 2011 if any, will be at each Board Member's place at the December 7, 2011 Regular Board meeting.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Vanessa Johnson
Reviewed by: Jennifer Cooper

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Tom Bates and Members
of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 30, 2011

Re: Air District Personnel on Out-of-State Business Travel

RECOMMENDED ACTION

None; receive and file.

BACKGROUND

In accordance with Section 5.4 (b) of the Air District's Administrative Code, Fiscal Policies and Procedures Section, the Board is hereby notified that the following Air District personnel have traveled on out-of-state business:

There was no out-of-state business travel for the period November 1, 2011 through November 30, 2011. Out-of-state travel is reported in the month following travel completion.

DISCUSSION

There were no Air District personnel traveling out of state during this reporting period.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: David Glasser
Reviewed by: Jack M. Colbourn

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Tom Bates and Members
of the Board of Directors

From: Jack P. Broadbent
Executive Officer /APCO

Date: November 16, 2011

Re: 2012 Regulatory Agenda

RECOMMENDED ACTION:

Receive and file.

DISCUSSION

Each year, the Air District is required by Health and Safety Code section 40923 to publish a list of regulatory measures scheduled or tentatively scheduled for consideration during the next calendar year. If a measure is not on this list, it may not be brought before the Board of Directors unless it is necessary to:

1. Satisfy federal requirements,
2. Abate a substantial endangerment to public health or welfare,
3. Comply with state toxic air contaminant requirements,
4. Comply with an ARB requirement that the District adopt contingency measures due to inadequate progress towards attainment,
5. Preserve an existing rule's "original intent," or
6. Allow for alternative compliance under an existing rule.

The attached list includes all measures that may come before the Board in calendar year 2012. Some of the measures may fall within exceptions listed above but are nevertheless included for completeness. There is no expectation that all of the measures on the list will be enacted during the calendar year. Rules are listed in numerical order as they appear in the Air District Rules and Regulations.

All new rules and rule amendments must be adopted at a public hearing conducted by the Board of Directors of the Air District. Public comment is accepted at these hearings. Public notice of hearings is provided as required by law. In addition, the Air District staff conducts public workshops and provides opportunities for oral and written comments before scheduling a rule for public hearing for the Board's consideration. Information on workshops, hearings, and other rule development issues may be obtained from the Air District website at <http://www.baaqmd.gov/Divisions/Planning-and-Research/Rule-Development.aspx> or by calling the Planning, Rules and Research Division at (415) 749-4664.

BUDGET CONSIDERATION/FINANCIAL IMPACTS:

None.

Respectfully submitted,

Jack P. Broadbent
Executive Officer / APCO

Prepared by: Daniel Belik
Approved by: Henry Hilken

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
2012 REGULATORY MEASURES LIST

Regulation, Rule	Title	Objectives¹
Reg. 1	General Provisions and Definitions	Clarify and enhance District policies
Reg. 2, Rule 1	General Requirements (Permits)	EPA, CARB policy; State law, clarifications
Reg. 2, Rule 2	New Source Review	EPA policy, incorporate PM2.5 and GHG, State law
Reg. 2, Rule 4	Emissions Banking	Clarifications
Reg. 2, Rule 5	New Source Review for Toxic Air Contaminants	Clarifications, reduce emissions
Reg. 2, Rule 6	Major Facility Review (Title V)	EPA policy, clarifications
Reg. 2, Rule 9	Interchangeable Emission Reduction Credits	Clarifications
Reg. 3	Fees	Cost recovery
Reg. 4	Air Pollution Episode Plan	Reduce emissions
Reg. 5	Open Burning	Reduce emissions
Reg. 6, Rule 1	Particulate Matter, General Limitations	Reduce emissions
Reg. 6, Rule 2	Commercial Cooking Devices	Reduce emissions
Reg. 6, Rule 3	Wood Burning Devices	Clarifications, reduce emissions
Reg. 7	Odorous Substances	Clarifications, reduce emissions
Reg. 8, All	General Provisions	Applicability, VOC definition
Reg. 8, Rule 2	Miscellaneous Operations	Clarifications
Reg. 8, Rule 3	Architectural Coatings	Clarifications, flexibility
Reg. 8, Rule 4	General Solvent and Surface Coating Operations	Reduce emissions
Reg. 8, Rule 6	Organic Liquid Bulk Terminals and Bulk Plants	Clarifications
Reg. 8, Rule 7	Gasoline Dispensing Facilities	Reduce emissions
Reg. 8, Rule 16	Solvent Cleaning Operations	Clarifications, reduce emissions
Reg. 8, Rule 18	Equipment Leaks	Reduce emissions
Reg. 8, Rule 20	Graphic Arts Operations	Clarifications, reduce emissions, EPA policy
Reg. 8, Rule 22	Valves and Flanges at Chemical Plants	Clarifications
Reg. 8, Rule 28	Episodic Releases from Pressure Relief Devices at Petroleum Refineries and Chemical Plants	Clarifications, flexibility
Reg. 8, Rule 30	Semiconductor Manufacturing Operations	Reduce emissions
Reg. 8, Rule 32	Wood Products Coatings	Clarifications, flexibility
Reg. 8, Rule 33	Gasoline Bulk Terminals and Gasoline Delivery Vehicles	Clarifications
Reg. 8, Rule 34	Solid Waste Disposal Sites	Reduce emissions
Reg. 8, Rule 37	Natural Gas and Crude Oil Production Facilities	Reduce emissions
Reg. 8, Rule 39	Gasoline Bulk Plants and Gasoline Delivery Vehicles	Clarifications

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
2012 REGULATORY MEASURES LIST

Regulation, Rule	Title	Objectives¹
Reg. 8, Rule 40	Aeration of Contaminated Soil and Removal of Underground Storage Tanks	Clarifications
Reg. 8, Rule 45	Motor Vehicle and Mobile Equipment Coating Operations	Clarifications, flexibility
Reg. 8, Rule 49	Aerosol Paint Products	Consistency with ARB standards
Reg. 8, Rule 51	Adhesive and Sealant Products	Reduce emissions
Reg. 8, Rule 52	Polystyrene, Polypropylene and Polyethylene Foam Product Mfg Ops.	Clarifications
Reg. 8, Rule 53	Vacuum Truck Operations	Reduce emissions
Reg. 8, Rule TBD	Composting Operations	Reduce emissions
Reg. 8, Rule TBD	Livestock Waste	Reduce emissions
Reg. 8, Rule TBD	Digital Printing	Reduce emissions
Reg. 8, Rule TBD	Natural Gas Transmission and Distribution	Reduce emissions
Reg. 8, Rule TBD	Cooling Towers	Reduce emissions
Reg. 8, Rule TBD	Wastewater from Coke Cutting	Reduce emissions
Reg. 8, Rule TBD	Wineries	Reduce emissions
Reg. 8, Rule TBD	Vanishing Oils and Rust Inhibitors	Reduce emissions
Reg. 8, Rule TBD	LPG, Propane, Butane, and other Pressurized Gases	Reduce emissions
Reg. 9, Rule 1	Sulfur Dioxide	Monitoring, recording requirements
Reg. 9, Rule 2	Hydrogen Sulfide	Monitoring, recording requirements
Reg. 9, Rule 4	NOx from Fan Type Residential Central Furnaces	Reduce emissions
Reg. 9, Rule 6	NOx from Natural Gas-Fired Water Heaters	Clarifications
Reg. 9, Rule 7	NOx and CO from Boilers, Steam Generators and Process Heaters	Clarifications
Reg. 9, Rule 8	Stationary IC Engines	Reduce emissions from backup generators
Reg. 9, Rule 10	NOx and CO From Boilers, Steam Generators And Process Heaters in Petroleum Refineries	Clarifications, reduce emissions
Reg. 9, Rule 12	NOx from Glass Melting Furnaces	Reduce emissions
Reg. 9, Rule 13	NOx from Cement Plants	Reduce emissions
Reg. 9, Rule TBD	NOx from Kilns, Ovens and Furnaces	Reduce emissions
Reg. 9, Rule TBD	Plants NOx from Large Residential and Commercial Space Heating	Reduce emissions
Reg. 9, Rule TBD	SOx from Petroleum Coke Calcining	Reduce emissions
Reg. 11	Hazardous Air Pollutants	Reference federal standards
Reg. 11, Rule 1	Lead	Clarifications, reference federal standards
Reg. 11, Rule 2	Asbestos Demolition, Renovation and Manufacturing	Clarifications
Reg. 11, Rule 14	Asbestos-Containing Serpentine	Clarifications
Reg. 11, Rule TBD	Air Toxics Hot Spots Mitigation	Reduce emissions
Reg. 12, Rule 13	Metal Melting and Processing Operations	Reduce emissions

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
2012 REGULATORY MEASURES LIST

Regulation, Rule	Title	Objectives ¹
Reg. and Rule TBD	Indirect Source Mitigation	Reduce emissions
Reg. and Rule TBD	Episodic Controls	Reduce emissions
Reg. and Rule TBD	Sulfur Hexafluoride	Reduce emissions
Reg. and Rule TBD	Refrigeration Management	Reduce emissions
Reg. and Rule TBD	Magnet Source Rule	Reduce emissions
MOP, Volume I	Enforcement Procedures	Clarification, improve data submittals
MOP, Volume II	Engineering Permitting Procedures	Consistency with EPA requirements, clarifications
MOP, Volume III	Laboratory Methods	New and improved analytical procedures
MOP, Volume IV	Source Test Methods	New and improved analytical procedures
MOP, Volume V	Continuous Emission Monitoring	New and improved analytical procedures
MOP, Volume VI	Ground Level Monitoring	Consistency with EPA requirements

¹ Objectives are listed for information only and are subject to change. Rule development efforts for a rule are not limited to listed objectives.

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Tom Bates and Members
of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 22, 2011

Re: Approval of Purchase Order in Excess of \$70,000 for Ultrafine Particulate Matter
(UFP) Counter Instruments

RECOMMENDED ACTION:

Authorize the Executive Officer to issue a Purchase Order to TSI Incorporated (TSI, Inc.) in an amount not to exceed \$77,000 for three UFP counter instruments.

BACKGROUND

As part of the District's increasing focus on fine particulate matter pollution, staff is examining ultrafine particles (UFP). Ultrafine particles are extremely small, less than 0.1 microns in diameter and can penetrate deep into the respiratory system. This research effort includes development of an UFP emission inventory, measurements of UFP in outdoor air, modeling and data analysis to characterize UFP creation and transport, and research on health effects. The Advisory Council has been examining UFP and will present recommendations to the Board of Directors.

Currently, the District has no continuous measurements of UFPs in the Bay Area. Although UFP measurements have been made elsewhere, they do not necessarily translate to the Bay Area with its unique mix of sources and climate. Monitoring UFPs will provide information on the scope of UFP pollution in the Bay Area. Initial UFP measurements will help establish a baseline to inform our particulate matter planning. The resulting data is also needed for modeling and estimating the health impacts of UFPs in the Bay Area. This UFP measurement study will be implemented by staff from the Technical Services and Planning Divisions. Continuous measurements will be made at three air monitoring stations.

DISCUSSION

The measurement of UFPs is highly complex and requires a special instrument. Staff evaluated instruments from several manufacturers and found that TSI, Inc. is the only manufacturer that provides instruments ready to operate at air monitoring stations. Other monitoring equipment investigated requires extensive labor and work in a laboratory environment. TSI's instrument has the highest overall value to the Air District based on initial and operational costs as well as reliability, accuracy and low maintenance.

Staff recommends purchasing the proposed UFP counter instruments from TSI, Inc. because this represents the best overall value to the Air District.

Division II, Section 4.3 of the Administrative Code requires that the Board authorize all expenditures over \$70,000. Staff requests that the Board approve the issuance of a Purchase Order to TSI, Inc. in the amount not to exceed \$77,000 to purchase three UFP counter instruments.

BUDGET CONSIDERATION/FINANCIAL IMPACT:

Funds for this purchase will be covered from professional services of Program 603 of the FY 2011-2012 Budget.

Respectfully Submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Saffet Tanrikulu
Reviewed by: Henry Hilken

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Tom Bates and Members
of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 29, 2011

Re: Adoption of Proposed Amendments to the Air District's Administrative Code
Division II Fiscal Policies and Procedures - Section 4.4 Contracts with Minority
Business Enterprises and Women's Enterprises and Section 4.6 Contracts

RECOMMENDED ACTION:

The Board of Directors will consider adoption of Proposed Amendments to the Air District's Administrative Code, Division II Fiscal Policies and Procedures - Section 4.4 Contracts with Minority Business Enterprises and Women's Enterprises and Section 4.6 Contracts.

BACKGROUND AND DISCUSSION

In accordance with provisions of the Administrative Code, Division I Operating Policies and Procedures, Section 14 Amendments to Administrative Code, notice was given at the Board of Directors regular meeting of November 16, 2011 that the Board of Directors was considering amendments to the Administrative Code, Division II Fiscal Policies and Procedures - Section 4.4 Contracts with Minority Business Enterprises and Women's Enterprises and Section 4.6 Contracts.

On September 19, 2011, Personnel Committee was provided with a summary of the human resources audit report which included a revised Equal Employment Opportunity Plan. The Personnel Committee recommended that the Air District review its policy regarding equal opportunity for contractors and consultants. As a result, the Air District has proposed revising its policy regarding "contracts with minority business enterprises and women's enterprises" by adding the phrase "to the extent allowable by law."

The current policy was last revised in October 2003. Prior to the passage of Proposition 209 in 1996, the District considered a variety of factors in awarding contracts, including whether a business was minority and/or women owned, consistent with the law at that time. Since the Passage of California Proposition 209, including after the 2003 revision, the District has been in compliance with applicable laws, including Proposition 209. The proposed amendments to the District's Administrative Code are intended to make the Code consistent with District practices.

BUDGET CONSIDERATION/FINANCIAL IMPACT:

None.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Satnam Hundel, Jason Jimenez

Reviewed by: Jack M. Colbourn

Attachment: Proposed Amendments to Division II Fiscal Policies and Procedures - Section 4.4 Contracts with Minority Business Enterprises and Women's Enterprises and Section 4.6 Contracts

PROPOSED ADMINISTRATIVE CODE AMENDMENTS

Proposed Amendment to Division II, II Fiscal Policies and Procedures - Section 4.4
Contracts with Minority Business Enterprises and Women's Enterprises and Section 4.6
Contracts as follows:

4.4 CONTRACTS WITH MINORITY BUSINESS ENTERPRISES AND WOMEN'S BUSINESS ENTERPRISES.

It is the policy of the Board of Directors of the Bay Area Air Quality Management District that the District comply with its DBE Program where lawful and appropriate and to encourage minority, veteran, and women owned businesses bid on contracts with the District to the extent allowable by law.

4.6 CONTRACTS.

(a) PURCHASING POLICY.

(1) Methods of Purchasing:

- (A) FORMAL BID - A bid obtained under sealed bid procedures and which is publicly opened and read.
- (B) INFORMAL BID - A written bid solicited from a vendor when the cost of the equipment or services/supplies is so low as to not justify the costs of the formal bidding procedures.
- (C) TELEPHONE BID - Telephone bids may be utilized by the Business Manager/designee when, in the judgment of the APCO or Director of Administrative Services, the best interest of the District may be served due to the need for immediate delivery or for other valid reasons.
- (D) MONOPOLY/SINGLE SOURCE BID - An award may be made without a formal bid when the item to be purchased can be obtained from only one source and the item/service is one which does not lend itself to substitution. Said bids must be confirmed in writing.
- (E) PRIOR BID/LAST PRICE - An award may be made on the basis of a prior bid or on the basis of a last price, if the conditions of a previous purchase are the same.
- (F) LETTER QUOTATION - Letter quotation is an informal, written offer made to the District by a vendor.

(2) Formal bidding shall be used by the District when economies of scale can be achieved or when there are equal or competitive products and also when discounts are applicable

(3) Where federal money will fund all or part of the goods/services that will be purchased the proposals, bids or other documents prepared, shall include the following information: 1) the percentage of the total costs of the goods or services which will be financed with federal funds; 2) the dollar amount of federal funds for the goods or services; and 3) the percentage and dollar amount of the total costs of the goods or services that will be financed by non-governmental sources (per Public Notification Requirement Appropriation Laws).

- (4) In all cases in which written specifications are prepared and submitted for public bid and a trade name is specified, the specifications shall contain the phrase "or equivalent" and the bidder shall be allowed to bid upon such. The Director of Administrative Services shall determine whether the proposed alternative is equivalent.
- (5) The District reserves the right to accept one part of a bid and reject another, and to waive technical defects, if to do so best serves the interests of the District.
- (6) Subject to other provisions of District policy, a bid will be awarded to the bidders offering the best value for quality goods and services. The following may be considered in determining the bid that provides the best value: bid price, proven cost-effectiveness, extended warranty, extended quality discount, esthetic value, expedient delivery of goods or services or other features of sufficient value.
- (7) The preparation of detail specifications may be waived by the APCO if any of the following circumstances are present:
 - (A) Public health or property may be endangered by delay.
 - (B) Cost of labor will exceed savings.
 - (C) Required dates cannot be met.
 - (D) Monopoly/single source items are required.
 - (E) Prior experience has proven that a particular material, type of equipment, supplies or service is more economical to the District.
 - (F) The cost to prepare detailed plans/specifications or bids will exceed possible savings that could be derived from such plans/specifications or bids.
 - (G) Emergency purchases.
 - (H) Value of contract is less than \$25,000.

(b) SERVICES OF CONSULTANTS.

- (1) Consultant Selection Policy
 - (A) Due to the nature of the work to be performed or the level of staffing required, it may, from time to time, be necessary to utilize the services of outside consultants who are not employees of the District.
 - (B) It is the policy of the District in the selection of any required outside consultants to encourage participation of minority, women and/or disadvantaged business enterprises in the bidding process in accordance with Section II-4.4 to the extent allowable by law.
 - (C) Prior to release of a request for consulting services, the following shall be prepared:
 - (i) A statement of the work to be performed,
 - (ii) A statement of the qualifications of persons necessary to perform the requested work, which can include a specification of experience/education/training in general or specific fields; and
 - (iii) An assessment of the resources needed to carry out the project, i.e. capital equipment or supplies.
 - (D) Determination of Provider Services

Based on an evaluation of the information prepared according to Section II-4.6 (b)(1)(C), and any other information gathered, the APCO or designee shall evaluate the ability of staff to perform all

or part of the work. If it is determined that all or part of the work should be performed by an outside consultant, the APCO shall determine if the work should be performed by sole source or whether it should be performed after a bid solicitation and award.

- (E) Contracts for temporary employment services or consultant services shall meet the requirement of the District Purchasing Policy.

(c) BID SOLICITATION.

- (1) For all contracts for goods or services with a value of \$70,000 or greater, the following documents shall be prepared as required by the person(s) designated by the APCO.
 - (A) Instructions to Bidders (for written bids)
 - (B) Proposal Submittal Requirements
 - (C) Draft contract, including all terms and conditions of the work to be performed, and
 - (D) A list of potential bidders
- (2) The following steps will be followed to identify potential bidders for all contracts for goods or services with a value of \$40,000 or more, but less than \$70,000.
 - (A) All qualified suppliers of the required goods or services with outlets in the Bay Area shall be contacted (in the case of informal or telephone bids); or
 - (B) At least one supplier of the required goods or services in each of the Bay Area counties shall be contacted (in the case of informal or telephone bids); or
 - (C) The steps listed in Section (3) shall be followed.
- (3) The following steps will be followed to identify potential bidders for all contracts for goods or services with a value of \$70,000 or more.
 - (i) Bids shall be solicited by any method as allowed in Section 4.6 (a) on purchases of services, materials or supplies excluding scientific and technical equipment and services uniquely available from a sole source. Where all sources of such services, materials or supplies in the Bay Area are known, bids may be requested from such sources by all means when it is deemed by the APCO or designee to be in the best interest of the District.
- (4) The APCO may waive the provisions of this section or award a sole-source bid if:
 - (A) The cost of labor for preparation of the documents exceeds the possible savings that could be derived from such detailed documents; or
 - (B) Public health or property may be endangered by delay; or
 - (C) Prior experience has shown that the desired services are only available from the sole-source; or
 - (D) Other circumstances exist which require such waiver in the satisfactory interests of the District.

(d) BID AWARD.

- (1) Prior to accepting a bid that is not the lowest of three qualified and responsive bids, other qualified and responsive bidders will be provided

with an opportunity to match the additional features provided in the bid of highest value. These bidders will be provided with a list of the features, but not the price.

- (2) The requesting staff person shall present to the APCO their evaluation of the bids and a recommendation for the award. Upon approval of the recommendation, staff shall negotiate an agreement and prepare it for the APCO's signature.
- (3) If the APCO determines that no bidder could satisfactorily serve the interests of the District, the APCO may decline to make an award.
- (4) The District reserves the right to have an Evaluation Panel comprised of District employees to review and analyze the bids and offer a recommendation of acceptance of a bid to the Director of Administrative Services. Upon review of the recommendation of the panel, the Director may accept or reject the recommendation of the panel. If accepted, the Director will recommend award of the bid to the APCO for his review/approval. If the recommendation of the panel is rejected by the Director of Administrative Services, the panel will reconvene to review the bids further.
- (5) Further renewal of any contract that has been awarded for two consecutive years without competitive bid shall require APCO or Board approval depending upon authorization of the contract to be extended. Service contracts with the original manufacturer of equipment or software are exempt from this requirement.
- (6) The District shall rebid a contract for financial auditing services every three years.

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
 Memorandum

To: Chairperson Tom Bates and Members
 of the Board of Directors

From: Jack P. Broadbent
 Executive Officer/APCO

Date: December 1, 2011

Re: Contractor Selection for the Drayage Truck Replacement Program

RECOMMENDATION:

Recommend the Board of Directors:

1. Approve the selection of Cascade Sierra Solutions as contractor for the engine model year (MY) 2004 drayage truck replacement program.
2. Authorize the Executive Officer/ APCO to enter into agreements with Cascade Sierra Solutions for the implementation of the program.

BACKGROUND

In December of 2007, the California Air Resources Board (ARB) approved a regulation to reduce emissions from drayage trucks operating at California’s ports and intermodal rail yards. The first phase of the regulation went into effect on December 31, 2009, and Phase 2 of the regulation goes into effect on December 31, 2013. A summary of the regulation’s compliance requirements is shown in Table 1:

Table 1: ARB Drayage Truck Regulation Compliance Schedule

Phase	Date	Engine Model Years (MY)	Regulation requirement
Phase 1	12/31/09	1993 and older	Prohibited from operation as a drayage truck
		1994 – 2003	Install a Level 3 retrofit device
	12/31/11	2004	Install a Level 3 retrofit device
	12/31/12	2005 and 2006	Install a Level 3 retrofit device
Phase 2	12/31/13	1994 – 2006	Meet 2007 * engine emissions standards

* Trucks with 2007-2009 model year engines are compliant through 2022. Trucks with 2010 and newer engines are fully compliant

In 2008, the Air District accepted applications for drayage truck retrofit and replacement projects as part of its port truck upgrade program. Through this program the Air District received and awarded a total of \$25.8 million [\$13.8 million in California Goods Movement Bond (I-Bond) funding, \$2 million in US Environmental Protection Agency

(EPA) diesel emissions reduction act (DERA) funds, \$5 million from the Port of Oakland (Port), and \$5 million in Air District TFCA funding]. These monies were used to assist with the upgrade of 1,522 trucks (1,319 truck retrofits and 203 truck replacements) operating at the Port.

Table 2 below contains data from ARB’s Drayage Truck Registry database, and describes the population of vehicles calling on Northern California ports by engine model year. Table 2 also identifies which groups of trucks received grant funds from the original Air District Drayage Truck Program.

Table 2: Drayage Truck Population As of July 2011

Engine MY	Compliant until	# of Drayage trucks in Northern CA*	# of trucks that received grant funds	Grant funds expended **
MY 1994-2003 (w/ retrofits)	12/31/13	1,700	1,319	\$15,586,534
MY 2004	12/31/11	700	0	\$0
MY 2005 & 2006	12/31/12	2,150	0	\$0
MY 2007 – 2009	2022	1,350	203	\$10,150,000
MY 2010 +	Fully compliant	400		
Total		6,300	1,522	\$25,736,534

* Number of trucks registered in the ARB Drayage Truck Registry (DTR) with zip codes North of Fresno.

** Funding sources for the Air District’s Year 1 port truck funding program: TFCA (\$5 million), Port (\$5 million), ARB Prop 1B (\$13,835,133), and DERA (~\$2 million)

As the next set of compliance deadlines approach for this regulation the Air District must consider how to best assist the trucker population at Bay Area ports with early compliance.

DISCUSSION

Staff analysis determined that of the 700 Northern California drayage trucks required to meet the 12/31/11 deadline listed in Table 2, only 247 are registered within the boundaries of the Air District (see Table 3 below).

Table 3: Analysis of MY 2004 Northern California Drayage Trucks

Location	Trucks	Companies	% of total trucks
Alameda	143	74	20.55%
Contra Costa	26	20	3.74%
Santa Clara	25	14	3.59%
San Francisco	15	9	2.16%
San Mateo	12	9	1.72%
Sonoma	12	5	1.72%
Solano	7	4	1.01%

Napa	6	2	0.86%
Marin	1	1	0.14%
Inside Bay Area	247	138	35.49%
Outside Bay Area	449	207	64.51%
TOTAL	696	345	

In order to support Bay Area drayage truck drivers that are looking to upgrade their MY 2004 trucks, staff is proposing the allocation and expenditure of \$1.04 million in TFCA Regional Fund monies to provide grants for truck replacement projects.

That grant funding would provide approximately \$10,000 for each eligible Bay Area truck owner towards the cost of a truck with a compliant MY 2007 engine. The program would also allow the engine MY 2004 truck owner to trade their current vehicle in for its worth. In order to ensure that this trade-in and replacement is done in such a manner that benefits air quality, the MY 2004 trucks surrendered cannot return to service in California for 10 years.

Request for Proposals

On November 15, 2011 a Request for Proposals (RFP) was issued to identify a contractor to assist with program implementation. Public comments/questions on the RFP were accepted until 3:00 pm on November 22, 2011 and responses to all questions received by the deadline were posted on November 23, 2011 (see Attachment 1). The RFP closed on November 28, 2011.

Two (2) bids were submitted, one by Cascade Sierra Solutions, and one by Fitzgerald Truck Sales. These proposals were evaluated by a team made up of Air District staff from the Strategic Incentives Division and Administration Division, and a staff member from the Alameda County Transportation Commission. The evaluation team reviewed and scored both bids according to the criteria shown in Table 4.

Table 4: RFP Evaluation Criteria and Scoring

CRITERIA (POINTS)	Cascade Sierra Solutions	Fitzgerald Truck Sales
<i>Technical expertise and past experience (30)</i>	27	16
<i>Responsiveness of Proposal (20)</i>	16	11
<i>Cost of the replacement trucks (40)</i>	35	31
<i>References/ Local /Green Business (10)</i>	4	6
Total Points (100)	82	64

Based on the results of the evaluation and ranking shown in Table 4, staff is recommending the Board of Directors award a program administration contract to the top-scoring applicant, Cascade Sierra Solutions. As part of the contract administration Cascade Sierra Solutions would:

- Provide up to 247 replacement trucks at an individual truck cost of between \$59,000 and \$68,400.
- Provide the trade-in value of between \$8,000 and \$15,000 on the MY 2004 truck being traded in (dependent on condition).
- Coordinate the out-of-state sale of the replaced MY 2004 truck.
- Provide financing assistance in order to ensure that local truckers with poor credit scores can receive loan guarantees under an ARB program being run concurrently.
- Assist truckers in availing themselves of the program and meet all Air District administrative requirements.

BUDGET CONSIDERATION / FINANCIAL IMPACT:

None. The TFCA Regional Fund program provides funding to the Air District for administration.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Damian Breen
Reviewed by: Jean Roggenkamp

Attachment 1: Air District responses to questions on the RFP

Attachment 1:

Air District responses to
questions on the RFP

2004 Drayage Truck Replacement Program

1. *The prices we have on the trucks did not include the sales tax or the GPS equipment. From reading the RFP it looks like they want trucks to include all sales taxes?*

All costs associated with the purchase of the trucks should be itemized and included in the costs analysis section of the bid.

2. *What if we only have access to trucks with FEL engines?*

The original emissions analysis done for this program (which led to the proposed grant award amount) was not based on FEL engines with higher emissions than the 2007 emissions standard.

If you only have access to FEL engines that are higher than the 2007 emissions standard, please submit the emissions details for the trucks that you are proposing to supply, and explain why FEL engines higher than the 2007 standard are being proposed. If possible submit the CARB Executive Order(s) for the truck engines. At its sole discretion, the Air District will consider if it will allow FEL engines greater than the 2007 emissions standard to be eligible for participation.

You may also submit a costs analyses, inventories, and truck specs for multiple truck/engine (FEL non-FEL) combinations.

3. *The RFP requires model year 2004 owners be able to document annual mileage greater than 20,000 miles per year, over the past two years. Please advise us on the ways in which local truckers will be allowed (or expected) to document mileage.*

Truck owners will be required to provide documentation such as maintenance records, or work logs that show odometer readings over the previous two years. The details of the documentation requirements for the project applications will be developed when the applications are created.

4. *RFP specifies trucks to be traded in as MY 2004 trucks in some places, and as engine year 2004 trucks in other places. Can you please confirm that ENGINE year 2004 trucks are those intended to be traded in through this program?*

Engine MY 2004 drayage trucks are the focus of this program.

5. *The RFP specifies the trucks to replace those turned in as engine year 2007 trucks. Does this actually mean 2007 or newer engine year trucks?*

Eligible replacement trucks are those that have engines that meet or exceed the 2007 emissions standards as described in the RFP. These engines and trucks could have model years newer than 2007.

6. *The RFP specifies that replacement trucks must have a minimum of 300,000 miles. Does this mean BAAQMD will reject vehicles with under 300,000 miles as replacement trucks?*

The mileage values specified in the RFP were intended to ensure there would be useful life left in the Replacement vehicles funded as part of the program. Replacement vehicles with less than 300,000 miles will be accepted.

7. *RFP specifies trade in value of trucks should be \$8,000 to \$15,000. Trucks come in many conditions and the market will be flooded with these trucks. Is BAAQMD flexible on the trade in value of these trucks to accommodate for vehicle condition and market factors?*

This price range for trade-in value was set to give truck owners an idea of what to expect when participating in this program. If this range cannot be met, please provide a proposed new range with your bid.

8. *RFP specifies a maximum fixed sales price of \$60,000 for replacement trucks with up to 600,000 miles, and maximum of \$52,000 for trucks with up to 800,000 miles. Is this price exclusive of taxes, transfer fees, financing and other acquisition costs that are part of the transfer but not part of the cost of the vehicle itself?*

The costs for the trucks should be detailed, and itemized to breakdown all of the costs associated with the purchase of the truck. The cost reflects that total cost of the vehicle, taxes, fees, etc.

9. *Does BAAQMD really need to know engine family number on old truck?*

Yes

10. *Will BAAQMD and the Port of Oakland allow owners of 2004 engine model trucks who have completed project applications through this grant to continue serving the Port of Oakland with those trucks until such time as they take receipt of their new vehicles under this program?*

Grant recipients will continue to be subject to the ARB drayage truck regulation compliance timeline. The drayage truck regulation is a state rule, and any modifications to the compliance schedule must be made by the CA Air Resources Board (ARB).

11. *The requirement to report on the whereabouts and use of the trade-in trucks for 10 years is an onerous one and will be a difficult one to fulfill. If a contractor can sell those vehicles to foreign countries not bordering the United States, can the requirement to report on them for the next ten years be waived?*

An important component to realizing the emissions benefits of this program involves the engine MY 2004 trucks being sold out of state and remaining out of state for at least 10 years. If the contractor proposes an alternative method for ensuring the engine MY 2004 truck is removed from service, their proposal must include a detailed description of this methodology. At its sole discretion, the Air District may consider alternative proposals as long as they meet the intent of the original requirement.

12. *The RFP specifies that BAAQMD may pay Contractor up to 45 days after its verification that the project has been completed, including final invoice submitted. Does BAAQMD expect the contractor to in essence make a loan of over \$2 million, waiting for BAAQMD to make payment? This puts any contractor in a tight financial position.*

Grant payments will be made on a reimbursement basis. The contractor will be expected to work out the terms of delivery and payment with its truck supplier(s).

13. *The RFP asks the contractor to verify annual miles traveled by the trade-in truck to be at least 20,000/year for the past two years. Will BAAQMD accept a letter confirming these miles traveled from the owner or the owner's licensed motor carrier to verify this travel?*

Mileage documentation should be in the form of maintenance records, work logs, or other documentation that shows odometer readings over a 2 year period. A letter stating the mileage operated would not meet the requirement.

14. *Page 7 of the RFP lists May/June of 2012 as time of delivery of replacement trucks and payments made by the Air District. Page 8 asks for replacement trucks to be able to be delivered by March 2012. Can you please clarify which of these time periods is correct?*

The Air District expects trucks to be delivered in March 2012, but realizes the tight schedule may push this schedule to May/ June. Please submit the estimated delivery dates for the Replacement vehicles as part of the proposal.

15. *In different parts of the RFP, a drayage truck is defined as a class 8 vehicle with GVWR of 30,000 lbs or greater and in other areas, 30,001 lbs or greater. Is the intent here actually that the vehicle be 30,001 lbs or greater?*

Class 8 trucks w/ GVWR of 33,001 lbs or greater are eligible for funding.

16. *In 2014, vehicles with engine model year 2004 will not be allowed to operate in California without a diesel particulate filter, which, by that time will in all likelihood cost more than the truck. If a truck is sold to an owner in a state not adjacent to CA, for an application that is local or regional and does not include travel to California, will the Air District waive the reporting requirement as the reporting burden is so great and the likelihood of the vehicle returning to California so small?*

An important component to realizing the emissions benefits of this program involves the engine MY 2004 trucks being sold out of state and remaining out of state for at least 10 years. At its discretion, the Air District may consider alternative proposals as long as they meet the intent of the original requirement. The Air District will not waive this requirement.

17. *Must trade-in vehicles be identified by VIN by Dec. 30, 2011?*

According to the tentative proposed timeline for the program, all project applications for funding must be completed, and submitted by truck owners by December 30, 2011. The schedule for application acceptance is subject to change.

18. *The RFP specifies a list of eligible truck owner participants in the program that will be provided to contractor. What kind of contact information is available? Phone? Email? Mailing address? Anything else?*

The Air District will assist the contractor with outreach. Some of the truck owner contact information may be considered confidential, in which case the outreach would have to be conducted through the Air District.

19. *Is the District looking for 1 contractor or multiple contractors to administer this program?*

The Air District is looking for at least one contractor to administer the program. If for some reason the demand for the program cannot be met by one contractor, multiple contractors may be selected.

20. *If a trucker has already purchased a replacement truck, are they eligible for funding?*

No, truck owners cannot order the replacement truck until they have a fully-executed contract/ Grant Agreement with the Air District for the project. Funding will not be awarded retroactively.

21. Given that the RFP specifies delivery of replacement trucks in 2012, after the deadline by which 2004 engine trucks are out of compliance with ARB Truck and Bus rule regulations for ports, what provisions or allowances will be made for program participants? Will they under certain circumstances be allowed to continue driving in ports and rail yards for a time after the Jan 1, 2012 deadline?

Grant recipients will continue to be subject to the ARB drayage truck regulation compliance timeline. The drayage truck regulation is a state rule, and any modifications to the compliance schedule must be made by the CA Air Resources Board (ARB).

22. Can we setup a meeting with District staff to discuss the details of the RFP and potential modifications to the document and requirements?

As stated in the RFP document, the deadline for questions on the RFP was 3:00 pm on 11/22/11. District staff will respond to all questions received by this deadline. Due to the 11/28/11 RFP closing date, and in order to maintain a fair and equitable process, District staff will not be meeting with individuals to discuss the details of the RFP until the RFP submittal and evaluation process has concluded.

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Tom Bates and Members
of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 29, 2011

Re: Report of the Mobile Source Committee Meeting of November 28, 2011

RECOMMENDED ACTIONS:

The Committee recommends Board of Directors' approval for the following items:

A) Projects with Proposed Grant Awards over \$100,000

- 1) *Approve Carl Moyer Program projects with proposed grant awards over \$100,000.*
- 2) *Authorize the Executive Officer/APCO to enter into agreements for the recommended Carl Moyer Program projects.*

B) Port Drayage Truck Replacement Program for Engine Model Year (MY) 2004 Trucks

- 1) *Approve the addition of Policy #32 to the FYI 2012 Transportation Fund for Clean Air (TFCA) Regional Fund Policies to allow the replacement of MY 2004 drayage trucks as an eligible project type.*
- 2) *Authorize the expenditure of \$1.04 million in TFCA Regional Fund monies to execute a program to replace MY 2004 port drayage trucks registered in the Bay Area.*
- 3) *Authorize the Executive Officer/APCO to enter into all contracts and make all expenditures necessary to allocate the TFCA Regional Fund monies to eligible projects.*
- 4) *Allow the CMAs to contribute their TFCA County Program Manager funds to the Air District's program to replace MY 2004 drayage trucks as allowed under Policy #3 of the current TFCA Program Manager Fund Policies.*
- 5) *Authorize the Executive Officer/APCO to accept and allocate funding from additional sources for the MY 2004 Drayage Truck Replacement Program.*

BACKGROUND

The Mobile Source Committee met on Monday, November 28, 2011. The Committee received and considered the following reports and recommendations:

- A) Consideration of Projects with Proposed Grant Awards over \$100,000,
- B) Fiscal Year Ending (FYE) 2011 Transportation Fund for Clean Air (TFCA) Report on Regional Fund Expenditures and Effectiveness; and
- C) Port Drayage Truck Replacement Program for Engine Model Year (MY) 2004 Trucks

Attached are the staff reports presented in the Mobile Source Committee packet.

Chairperson, Scott Haggerty will give an oral report of the meeting.

BUDGET CONSIDERATION/FINANCIAL IMPACT:

- A) None. Through the Carl Moyer Program, Mobile Source Incentive Fund and Transportation Fund for Clean Air, the Air District distributes “pass-through” funds to public agencies and private entities on a reimbursement basis. Administrative costs for both programs are provided by each funding source.
- B) None.
- C) None. The Transportation Fund for Clean Air Regional Fund program provides funding to the Air District for administration.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Vanessa Johnson
Reviewed by: Jennifer C. Cooper

Attachment(s)

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Haggerty and Members
of the Mobile Source Committee

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 21, 2011

Re: Consideration of Projects with Proposed Grant Awards over \$100,000

RECOMMENDATIONS:

Recommend Board of Directors:

1. Approve Carl Moyer Program projects with proposed grant awards over \$100,000.
2. Authorize the Executive Officer/APCO to enter into agreements for the recommended Carl Moyer Program projects.

BACKGROUND

The Bay Area Air Quality Management District (Air District) has participated in the Carl Moyer Program (CMP), in cooperation with the California Air Resources Board (ARB), since the program began in fiscal year 1998/1999. The CMP provides grants to public and private entities to reduce emissions of oxides of nitrogen (NOx), reactive organic gases (ROG) and particulate matter (PM) from existing heavy-duty engines by either replacing or retrofitting them. Eligible heavy-duty diesel engine applications include on-road trucks and buses, off-road equipment, marine vessels, locomotives, stationary agricultural pump engines and forklifts.

Assembly Bill 923 (AB 923 - Firebaugh), enacted in 2004 (codified as Health and Safety Code Section 44225), authorized local air districts to increase their motor vehicle registration surcharge up to an additional \$2 per vehicle. The revenues from the additional \$2 surcharge are deposited in the Air District's Mobile Source Incentive Fund (MSIF). AB 923 stipulates that air districts may use the revenues generated by the additional \$2 surcharge for projects eligible for grants under the CMP.

Since 1991, the Transportation Fund for Clean Air (TFCA) program has funded projects that achieve surplus emission reductions from on-road motor vehicles. Sixty percent (60%) of TFCA funds are awarded directly by the Air District through a grant program known as the Regional Fund that is allocated on a competitive basis to eligible projects proposed by project sponsors. Funding for this program is provided by a \$4 surcharge on motor vehicles registered within the San Francisco Bay Area as authorized by the California State Legislature. The statutory authority

for the TFCA and requirements of the program are set forth in California Health and Safety Code Sections 44241 and 44242.

On February 2, 2011, the Board of Directors authorized Air District participation in Year 13 of the CMP, and authorized the Executive Officer/APCO to execute Grant Agreements and amendments for projects funded with CMP funds or MSIF revenues, with individual grant award amounts up to \$100,000. On November 18, 2009, the Air District Board of Directors authorized the Executive Officer/APCO to execute Grant Agreements and amendments for projects funded with TFCA funds, with individual grant award amounts up to \$100,000.

CMP and TFCA projects with grant award amounts over \$100,000 are brought to the Committee for consideration at least on a quarterly basis. Staff reviews and evaluates the grant applications based upon the respective governing policies and guidelines established by the ARB and/or the Air District's Board of Directors.

DISCUSSION

Carl Moyer Program:

The Air District started accepting applications for CMP Year 13 projects on August 8, 2011. The Air District has approximately \$14 million available for CMP projects from a combination of MSIF and CMP funds. Project applications are being accepted and evaluated on a first-come, first-served basis.

As of November 9, 2011, the Air District had received 22 project applications. Of the applications that have been evaluated between August 8, 2011, and November 9, 2011, four eligible projects have proposed individual grant awards over \$100,000. These projects will replace 14 pieces of off-road equipment, which will result in the reduction of 5 tons of NOx, ROG and PM per year. Staff recommends allocating \$716,775 to these projects from a combination of CMP funds and MSIF revenues. Attachment 1 to this staff report provides additional information on these projects.

Attachment 2 lists all of the eligible projects that have been received by the Air District as of November 9, 2011, and summarizes the allocation of funding by equipment category (Figure 1), and county (Figure 2). This list also includes the Voucher Incentive Program (VIP) on-road replacement projects awarded since the last committee update. Approximately 54% of the funds have been awarded to projects that reduce emissions in highly impacted Bay Area communities.

TFCA:

No TFCA applications requesting individual grant awards over \$100,000 received as of November 9, 2011 are being forwarded for approval at this time.

BUDGET CONSIDERATION / FINANCIAL IMPACT:

None. Through the CMP, MSIF and TFCA, the Air District distributes “pass-through” funds to public agencies and private entities on a reimbursement basis. Administrative costs for both programs are provided by each funding source.

Respectfully submitted,

Jack P. Broadbent
Executive Director/APCO

Prepared by: Anthony Fournier
Reviewed by: Damian Breen

- Attachment 1: BAAQMD Year 13 Carl Moyer Program/MSIF projects with grant awards greater than \$100,000 (evaluated between 8/8/11 and 11/9/11)
- Attachment 2: Summary of all CMP Year 13/MSIF and VIP approved/eligible projects (as of 11/9/11)

Attachment 1:

BAAQMD Year 13 Carl Moyer Program/ MSIF projects with grant awards greater than \$100k
(Evaluated between 8/8/2011 and 11/9/2011)

Project #	Applicant name	Equipment category		Proposed contract award	NOx (TPY)	ROG (TPY)	PM (TPY)	County
13MOY4	Humberto Castaneda (farmer)	Off-road	The replacement of two (2) off-road diesel powered tractors.	\$ 122,000.00	1.076	0.142	0.037	Sonoma
13MOY10	GreenWaste Recovery, Inc.	Off-road	The replacement of ten (10) off-road, diesel powered loaders.	\$ 379,700.00	2.095	0.456	0.115	Santa Clara
13MOY12	Deniz Dairy	Off-road	The replacement of one (1) off-road, diesel powered loader.	\$ 110,132.00	0.541	0.066	0.025	Sonoma
13MOY13	Renati Dairy	Off-road	The replacement of one (1) off-road, diesel powered loader.	\$ 104,943.00	0.375	0.070	0.025	Sonoma
				\$ 716,775.00	4.087	0.734	0.202	

Attachment 2

Summary of all CMP Yr 13/ MSIF and VIP approved/ eligible projects (As of 11/9/11)

Project #	Equipment category	Project type	# of engines	Proposed contract award	Applicant name	NOx (TPY)	ROG (TPY)	PM (TPY)	Board approval date	County
13MOY4	Off-road	Tractor replacement	2	\$ 122,000.00	Humberto Castaneda (farmer)	1.076	0.142	0.037	TBD	Sonoma
13MOY6	Off-road	Tractor replacement	2	\$ 50,861.00	Ronald Palmer (Vineyard)	0.308	0.059	0.017	APCO	Sonoma
13MOY9	Off-road	Tractor replacement	1	\$ 23,576.00	Joesph Pinheiro (Dairy)	0.159	0.028	0.008	APCO	Sonoma
13MOY15	Off-road	Tractor replacement	1	\$ 23,576.00	David Evans dba Marin Sun Farms, Inc.	0.299	0.050	0.016	APCO	Marin
13MOY10	Off-road	Loader replacement	10	\$ 379,700.00	GreenWaste Recovery, Inc.	2.095	0.456	0.115	TBD	Santa Clara
13MOY12	Off-road	Loader replacement	1	\$ 110,132.00	Deniz Dairy	0.541	0.066	0.025	TBD	Sonoma
13MOY17	Off-road	Tractor replacement	1	\$ 36,163.00	Neil Mclsaac & Son Dairy	0.158	0.029	0.013	APCO	Marin
13MOY19	Off-road	Tractor replacement	1	\$ 24,577.00	Foley Family Wines dba Sebastiani Vineyards	0.151	0.033	0.008	APCO	Sonoma
13MOY13	Off-road	Loader replacement	1	\$ 104,943.00	Renati Dairy	0.375	0.070	0.025	TBD	Sonoma
VIP41	VIP	Truck replacement	1	\$ 40,000.00	James Bell	0.550	0.017	0.036	APCO	Santa Clara
VIP42	VIP	Truck replacement	1	\$ 40,000.00	Robert E. Poole	0.547	0.002	0.036	APCO	Marin
VIP43	VIP	Truck replacement	1	\$ 45,000.00	Thomas Garcia	0.970	0.019	0.022	APCO	San Mateo
VIP44	VIP	Truck replacement	1	\$ 20,000.00	Clark's Rock	0.280	0.010	0.019	APCO	Napa
VIP45	VIP	Truck replacement	1	\$ 45,000.00	Nanak Singh	0.970	0.019	0.022	APCO	Contra Costa
VIP48	VIP	Truck replacement	1	\$ 20,000.00	Jill Lee	0.282	0.009	0.019	APCO	Contra Costa
VIP49	VIP	Truck replacement	1	\$ 35,000.00	Domingo Rodriguez III	0.649	0.016	0.022	APCO	Alameda
VIP50	VIP	Truck replacement	1	\$ 15,000.00	Kon Chen	0.464	0.009	0.000	APCO	Alameda
VIP51	VIP	Truck replacement	1	\$ 10,000.00	Kon Chen	0.314	0.006	0.000	APCO	Alameda
VIP52	VIP	Truck replacement	1	\$ 10,000.00	Kon Chen	0.314	0.006	0.000	APCO	Alameda
VIP53	VIP	Truck replacement	1	\$ 10,000.00	Kon Chen	0.314	0.006	0.000	APCO	Alameda
VIP54	VIP	Truck replacement	1	\$ 45,000.00	Richard Renfro	0.452	0.000	0.048	APCO	Alameda
21 Projects			32	\$ 1,210,528.00		11.268	1.051	0.488		

Figure 1: CMP/ MSIF Funding Distribution by Equipment Category as of 11/9/11

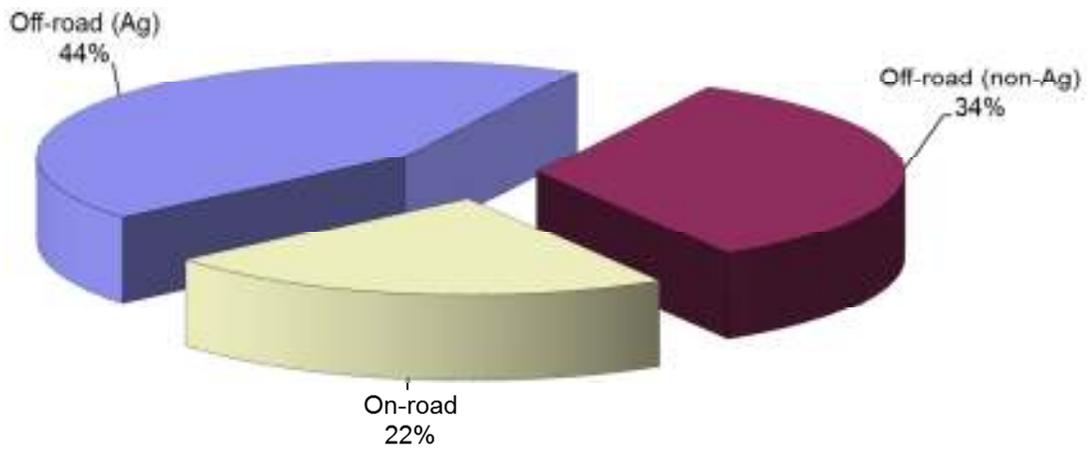
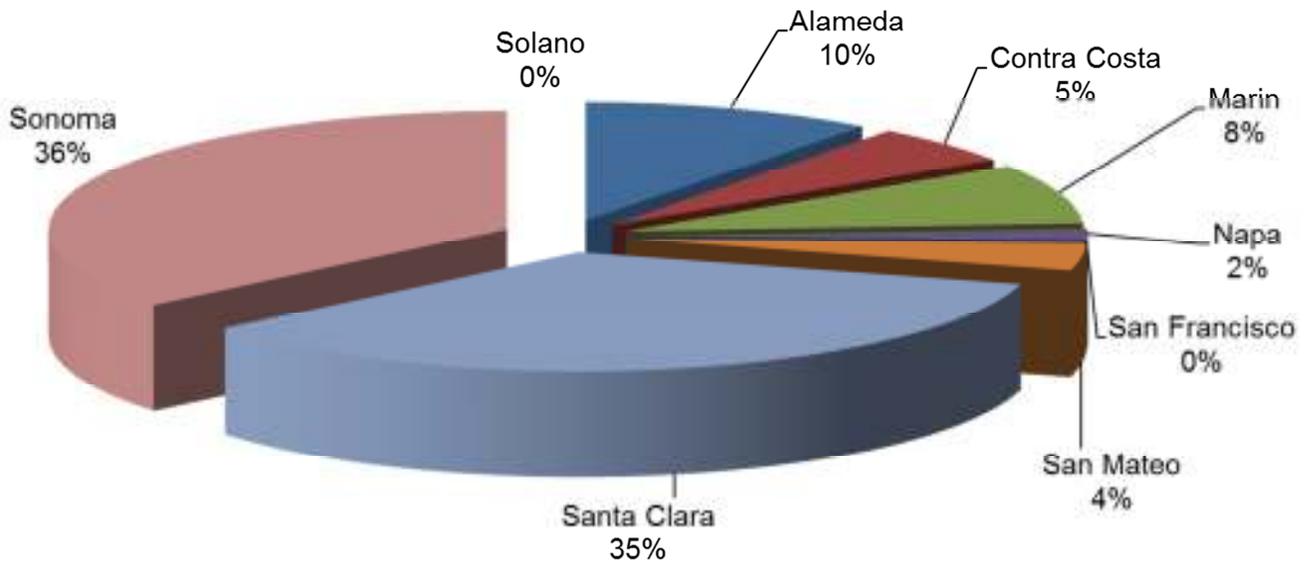


Figure 2: CMP/ MSIF Funding Distribution by County as of 11/9/11



BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Haggerty and Members
of the Mobile Source Committee

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 14, 2011

Re: Fiscal Year Ending (FYE) 2011 Transportation Fund for Clean Air (TFCA)
Report on Regional Fund Expenditures and Effectiveness

RECOMMENDED ACTION:

None. Receive and file the Fiscal Year Ending (FYE) 2011 Transportation Fund for Clean Air (TFCA) Report on Regional Fund Expenditures and Effectiveness (Attachment A).

BACKGROUND

In 1991, the California State Legislature authorized the Bay Area Air Quality Management District (Air District) to impose a \$4 surcharge on motor vehicles registered within the San Francisco Bay Area to fund projects that reduce on-road motor vehicle emissions. The Air District has allocated these funds to eligible projects through the Transportation Fund for Clean Air (TFCA). The statutory authority for the TFCA and requirements of the program are set forth in California Health and Safety Code Sections 44241 and 44242.

Sixty percent (60%) of TFCA funds are awarded directly by the Air District through a grant program known as the Regional Fund. The remaining forty percent (40%) of TFCA funds are forwarded to the designated agency within each Bay Area county and distributed by these agencies through the Program Manager Fund. Portions of the TFCA Regional Fund are allocated to eligible programs implemented directly by the Air District, including the Smoking Vehicle Program and the Spare the Air Program. The balance is allocated on a competitive basis to eligible projects proposed by project sponsors.

State law requires that the Air District's Board of Directors hold an annual public hearing to review the expenditure of TFCA funds to determine their effectiveness in improving air quality.

DISCUSSION

The report, provided in Attachment A, summarizes TFCA Regional Fund expenditures on projects and programs that concluded during FYE 2011, and the effectiveness of these projects and programs. Key findings of the report include the following:

- TFCA funds were allocated to eligible projects and programs, consistent with the legislation that authorizes the TFCA program.

- The TFCA Regional Fund expenditures for projects and programs that concluded in FYE 2011 totaled \$6.72 million: \$4.04 million for projects by other entities, \$1.48 million for Air District programs, and \$1.19 million in administrative costs.
- These projects and programs reduced criteria pollutant emissions over their lifetimes by an estimated 227.7 tons, including 29.2 tons of reactive organic gases (ROG), 185.9 tons of nitrogen oxides (NO_x), and 12.6 tons of particulate matter (PM₁₀). The lifetime reduction of carbon dioxide (CO₂), a greenhouse gas, was approximately 68,654 tons.

BUDGET CONSIDERATION/FINANCIAL IMPACT:

None.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Geraldina Grünbaum
Reviewed by: Damian Breen

Attachment A: Fiscal Year Ending (FYE) 2011 Transportation Fund for Clean Air (TFCA)
Report on Regional Fund Expenditures and Effectiveness



Bay Area Air Quality Management District

FISCAL YEAR ENDING 2011

**TRANSPORTATION FUND
FOR
CLEAN AIR (TFCA)**

**REPORT ON REGIONAL FUND
EXPENDITURES AND EFFECTIVENESS**

939 Ellis Street, San Francisco, CA 94109
www.baaqmd.gov

November 2011

Background

This Report summarizes expenditures for TFCA Regional Fund projects that concluded during fiscal year ending 2011 (FYE 2011).

Highlights of the Report

- ◆ **TFCA funds were allocated to eligible recipients for eligible projects and programs, consistent with the legislation that authorizes the TFCA.**
- ◆ **The TFCA Regional Fund expenditures for projects and programs that concluded in FYE 2011 totaled \$6.72 million, including \$4.04 million for projects, \$1.48 million for Air District programs, and \$1.19 million in administrative costs and indirect costs.**
- ◆ **The lifetime emission reductions achieved by these projects and programs are estimated to be 29.2 tons of reactive organic gases (ROG), 185.9 tons of oxides of nitrogen (NO_x), and 12.6 tons of particulate matter (PM₁₀). Combined lifetime emission reductions for the three pollutants total 227.7 tons.**
- ◆ **The lifetime reduction in carbon dioxide (CO₂, a greenhouse gas) from these projects is approximately 68,653 tons.**

Introduction

On-road motor vehicles, including cars, trucks, and buses, constitute the most significant source of air pollution in the San Francisco Bay Area. Vehicle emissions contribute to unhealthy levels of ozone (summertime "smog") and particulate matter.

The TFCA

In 1991, the California State Legislature authorized the Air District to impose a \$4 surcharge on motor vehicles registered within the San Francisco Bay Area to fund projects that reduce on-road motor vehicle emissions. The Air District has allocated these funds to its Transportation Fund for Clean Air (TFCA) to fund eligible projects. The statutory authority for the TFCA and requirements of the program are set forth in California Health and Safety Code Sections 44241 and 44242.

Sixty percent (60%) of TFCA funds are awarded directly by the Air District through a grant program known as the Regional Fund. The remaining forty percent (40%) of TFCA funds are forwarded to the designated agency within each Bay Area county and distributed by these agencies through the Program Manager Fund. Portions of the TFCA Regional Fund are allocated to eligible programs implemented directly by the Air District, including the Smoking Vehicle Program and the Spare the Air Program. The balance is allocated on a competitive basis to eligible projects proposed by project sponsors.

The Air District Board of Directors has adopted criteria for the evaluation and ranking of project applications for TFCA Regional Funds. Cost-effectiveness, expressed in terms of TFCA dollars per ton of reduced emissions, is the most important criterion for ranking projects.

TFCA-funded projects have many benefits, including the following:

- ♦ Reducing air pollution, including toxic particulate matter;
- ♦ Conserving energy and helping to reduce emissions of carbon dioxide, a greenhouse gas;
- ♦ Reducing traffic congestion; and
- ♦ Improving water quality by decreasing contaminated runoff from roadways.

State legislation restricts TFCA funding to the following types of projects:

- ♦ **Implementation of ridesharing programs**
- ♦ **Clean fuel school and transit bus purchases or leases**
- ♦ **Feeder bus or shuttle service to rail and ferry stations and to airports**
- ♦ **Arterial traffic management**
- ♦ **Rail-bus integration and regional transit information systems**
- ♦ **Demonstrations in congestion pricing of highways, bridges and public transit**
- ♦ **Low-emission vehicle projects**
- ♦ **Smoking vehicles program**
- ♦ **Vehicle buy-back scrappage program**
- ♦ **Bicycle facility improvement projects**
- ♦ **Physical improvements that support "smart growth" projects**

Expenditures

This Report covers Regional Fund projects and programs with expenditures that concluded during FYE 2011.

The TFCA Regional Fund expenditures for projects and programs that concluded in FYE 2011 totaled \$6.72 million. This total includes \$1.48 million for programs administered by the Air District and \$4.04 million in grants to other organizations for projects. Based on TFCA Regional Fund revenues of \$12.70 million for FYE 2011 (total TFCA revenues, including Program Manager, were \$21.17 million), the Air District expended \$1.19 million in administrative and audit costs. Appendix A lists expenditure details.

Effectiveness

Air District staff calculates the emissions reduced over the life of projects that receive TFCA funding.

Projects and programs concluding in FYE 2011 reduced criteria pollutant emissions over their lifetimes by an estimated total of 227.7 tons. This total is the sum of ozone precursors (29.2 tons of ROG and 185.9 tons of NO_x) and particulate matter (12.6 tons of PM₁₀). The lifetime reduction of carbon dioxide (CO₂), a greenhouse gas, was approximately 68,654 tons. It should be noted that for seven of the projects listed in Appendix A, totaling \$335,245, the emissions reduced could not be accurately determined. These projects were under the Bicycle Facility Program, which does not require monitoring.

The cost-effectiveness of TFCA projects is calculated by dividing the TFCA funds allocated to projects by the lifetime criteria pollutant emissions reductions (ROG, NO_x, and weighted PM₁₀ combined). The result is TFCA dollars per ton of reduced emissions.

A summary of expenditures, emission reductions, and cost-effectiveness values is provided in Table 1.

Table 1: Results of Projects with Calculated Emission Reductions

<i>Category</i>	<i># of Projects</i>	<i>TFCA \$ Expended</i>	<i>% of TFCA \$ Expended</i>	<i>Emission Reduction (tons)⁽¹⁾</i>	<i>% of Emission Reductions</i>	<i>Cost Effectiveness (\$/ton)⁽²⁾</i>
Heavy-Duty Vehicles	5	\$1,365,947	24.7%	40.99	18.0%	\$33,321
Shuttle/Feeder Bus & Rideshare	5	\$1,149,539	20.8%	15.32	6.7%	\$13,192
Diesel Repowers & Retrofits	6	\$843,940	15.3%	12.90	5.7%	\$33,825
Spare the Air	1	\$788,229	14.3%	12.40	5.4%	\$13,414
Smoking Vehicle	1	\$693,730	12.6%	139.41	61.2%	\$2,841
Bicycle Facilities	9	\$553,624	10.0%	4.05	1.8%	\$10,811
Light-Duty Vehicles	<u>1</u>	<u>\$128,333</u>	<u>2.3%</u>	<u>2.66</u>	<u>1.2%</u>	<u>\$48,173</u>
TOTAL⁽³⁾	28	\$5,523,343	100%	227.74	100%	

(1) Lifetime emission reductions of ROG, NO_x, and PM₁₀ combined.

(2) Consistent with the current California Air Resources Board methodology to calculate cost-effectiveness for the Carl Moyer Program, PM emissions were weighted by a factor of 20 to account for their harmful impacts on human health.

(3) Totals may vary due to rounding.

APPENDIX A: TFCA Regional Fund Projects Concluding in FYE 2011

Project #	Sponsor	Project Title	TFCA \$ Expended
04R27	City of Suisun City	Class 1 Bicycle Path: Central County Bikeway (0.6 mi.)	\$130,000.00
06R18	San Francisco MTA	North Point Street Bicycle Lanes between The Embarcadero and Van Ness Avenue	\$88,378.39
07BFP15	City of Santa Rosa	Mendocino Avenue Bicycle Lanes - Gap Closure Project	\$33,000.00
07BFP16	City of Half Moon Bay	Highway 1 Trail Project Phase 3	\$34,784.90
07BFP18	City of Union City	Alvarado-Niles Road - Union City Blvd. Gap Closure Connector	\$23,494.79
07BFP25	Marin County Public Works Department	Alameda Del Prado Class II Project	\$42,500.00
07R42	San Francisco International Airport	Retrofit 24 Diesel Buses - Level 3 Devices	\$425,894.88
07R61	Sonoma County Transit	Replace 10 CNG Buses	\$720,379.06
08BFP01	City of Daly City	King Drive Bicycle Lanes	\$15,327.42
08BFP06	Marin County DPW	Build-Out of Marin County Bicycle Network	\$163,480.00
08BFP09	City of Hayward	Bikeways Class II and III	\$22,658.00
08R19	City of San Francisco	Purchase 98 gasoline-electric hybrid light duty vehicles	\$128,333.33
08R39	MAG Trucking	Retrofit 1 Heavy Duty Trucks Diesel - Level 3 Device	\$23,495.00
08R42	Pacific Rim Recycling	Retrofit 4 Heavy Duty Diesel Vehicles - Level 3 Device	\$38,885.16
08R56	Cooper Crane & Rigging	Repower 3 heavy-duty vehicles	\$176,896.74
08R59	Pacific Water Trucks	Repower 3 heavy-duty vehicles	\$115,118.20
08R62	West County Transportation Agency	Repower 2 School buses	\$63,650.04

08R63	Specialty Solid Waste and Recycling	Purchase 4 heavy-duty compressed natural gas vehicles	\$269,002.36
08R65	Presidio Trust	Purchase 1 heavy-duty bus	\$28,500.00
09R05	Santa Clara Valley Transportation Authority	ACE Shuttle Bus Program	\$945,649.17
09R06	San Joaquin Regional Rail Commission	ACE Shuttle - Route 54	\$38,022.31
09R09	Livermore Amador Valley Transit Authority	Route 1A/B BART Shuttle	\$46,623.74
09R10	Associated Students, San Jose State University	SJSU Ridesharing and Trip Reduction	\$105,123.19
09R12	City of Redwood City	Redwood City Commuter Shuttle	\$14,120.95
09R17	Santa Clara Valley Industries, LLC	(11) CNG Refuse Trucks	\$275,000.00
09R19	Livermore Sanitation	(3) CNG Refuse Trucks	\$73,065.87
Subtotal Projects			\$4,041,383.50

	BAAQMD	Smoking Vehicle Program	\$693,729.68
	BAAQMD	Spare the Air	\$788,229.45
Subtotal Air District Programs			\$1,481,959.13

	BAAQMD	Administration	\$1,193,575.19
Grand Total			\$6,716,917.82

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Haggerty and Members
of the Mobile Source Committee

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 21, 2011

Re: Port Drayage Truck Replacement Program for Engine Model Year (MY)
2004 Trucks

RECOMMENDATION:

Recommend Board of Directors:

1. Approve the addition of Policy #32 to the FYE 2012 Transportation Fund for Clean Air (TFCA) Regional Fund Policies to allow the replacement of MY 2004 drayage trucks as an eligible project type.
2. Authorize the expenditure of \$1.04 million in TFCA Regional Fund monies to execute a program to replace MY 2004 port drayage trucks registered in the Bay Area.
3. Authorize the Executive Officer/APCO to enter into all contracts and make all expenditures necessary to allocate the TFCA Regional Fund monies to eligible projects.
4. Allow the CMAs to contribute their TFCA County Program Manager funds to the Air District's program to replace MY 2004 drayage trucks as allowed under Policy #3 of the current TFCA Program Manager Fund Policies.
5. Authorize the Executive Officer/APCO to accept and allocate funding from additional sources for the MY 2004 Drayage Truck Replacement Program.

BACKGROUND

In December of 2007, the California Air Resources Board (ARB) approved a regulation to reduce emissions from drayage trucks operating at California's ports and intermodal rail yards. The first phase of the regulation went into effect on December 31, 2009, and Phase 2 of the regulation goes into effect on December 31, 2013. A summary of the regulation's compliance requirements is shown in Table 1:

Table 1: ARB Drayage truck regulation compliance schedule

Phase	Date	Engine Model Years (MY)	Regulation requirement
Phase 1	12/31/09	1993 and older	Prohibited from operation as a drayage truck
		1994 – 2003	Install a Level 3 retrofit device
	12/31/11	2004	Install a Level 3 retrofit device
	12/31/12	2005 and 2006	Install a Level 3 retrofit device
Phase 2	12/31/13	1994 – 2006	Meet 2007 * engine emissions standards

* Trucks with 2007-2009 model year engines are compliant through 2022. Trucks with 2010 and newer engines are fully compliant

In 2008, the Air District accepted applications for drayage truck retrofit and replacement projects as part of its port truck upgrade program. Through this program the Air District received and awarded a total of \$25.8 million [\$13.8 million in California Goods Movement Bond (I-Bond) funding, \$2 million in US Environmental Protection Agency (EPA) diesel emissions reduction act (DERA) funds, \$5 million from the Port of Oakland (Port), and \$5 million in Air District TFCA funding]. These monies were used to assist with the upgrade of 1,522 trucks (1,319 truck retrofits and 203 truck replacements) operating at the Port.

As the next set of compliance deadlines approach for this regulation the Air District must consider how to best assist the trucker population at Bay Area ports with early compliance.

DISCUSSION

Table 2 below contains data from ARB’s Drayage Truck Registry database, and describes the population of vehicles calling on Northern California ports by engine model year. Table 2 also identifies which groups of trucks received grant funds from the original Air District Drayage Truck Program.

Table 2: Drayage truck population as of July 2011

Engine MY	Compliant until	# of Drayage trucks in Northern CA*	# of trucks that received grant funds	Grant funds expended **
MY 1994-2003 (w/ retrofits)	12/31/13	1,700	1,319	\$15,586,534
MY 2004	12/31/11	700	0	\$0
MY 2005 & 2006	12/31/12	2,150	0	\$0
MY 2007 – 2009	2022	1,350	203	\$10,150,000
MY 2010 +	Fully compliant	400		
Total		6,300	1,522	\$25,736,534

* Number of trucks registered in the ARB Drayage Truck Registry (DTR) with zip codes North of Fresno.

** Funding sources for the Air District's Year 1 port truck funding program: TFCA (\$5 million), Port (\$5 million), ARB Prop 1B (\$13,835,133), and DERA (~\$2 million)

Air District Efforts

Staff analysis determined that of the 700 Northern California drayage trucks required to meet the 12/31/11 deadline listed in Table 2, only 247 are registered within the boundaries of the Air District (Table 3).

Table 3: Analysis of MY 2004 Northern California Drayage Trucks

Location	Trucks	Companies	% of total trucks
Alameda	143	74	20.55%
Contra Costa	26	20	3.74%
Santa Clara	25	14	3.59%
San Francisco	15	9	2.16%
San Mateo	12	9	1.72%
Sonoma	12	5	1.72%
Solano	7	4	1.01%
Napa	6	2	0.86%
Marin	1	1	0.14%
Inside Bay Area	247	138	35.49%
Outside Bay Area	449	207	64.51%
TOTAL	696	345	

Staff is proposing to amend the current FYE 2012 TFCA Regional Fund policies to add Policy #32 to allow drayage truck replacement projects as an eligible project type. Attachment 1 to this staff report contains the proposed amended policies. Staff sent out the proposed language for public comment on November 14, 2011. A summary of the comments received can be found in Attachment 2 to the staff report.

In order to support Bay Area drayage truck drivers that are looking to upgrade their engine MY 2004 trucks, staff is proposing the allocation and expenditure of \$1.04 million in TFCA Regional Fund monies to provide grants for truck replacement projects. Staff is requesting the Committee recommend the Board authorize the Executive Officer/APCO to enter into all contracts and make all expenditures necessary to allocate this funding to eligible projects.

The grant funding would provide approximately \$10,000 for each eligible Bay Area truck owner towards the cost of a truck with a compliant MY 2007 engine. The program would allow the engine MY 2004 truck owner to trade their current vehicle in for its worth. In order to ensure that this trade-in and replacement is done in such a manner that the engine MY 2004 trucks surrendered do not return to service in California for 10 years, the Air District is currently seeking a contractor (s) to administer the trade-in

program. The request for proposals (RFP) for the contractor(s) for this program requires the following:

- Truck costs cannot exceed \$60,000. The contractor(s) with the lowest prices on replacement vehicles will receive additional points in RFP scoring.
- The contractor(s) must provide the trade-in value of between \$8,000 and \$15,000 on the engine MY 2004 truck being traded in (dependent on condition).
- The contractor(s) must be a "CalCap" qualified lender in order to ensure that truckers with local and poor credit scores can receive loan guarantees under an ARB program being run concurrently.
- The contractor(s) must assist truckers in availing themselves of the program and meet all Air District administrative requirements.
-

The RFP was posted on November 15, 2011 and closes on November 28, 2011. With Committee approval, staff will present the results of the RFP to the Air District Board of Directors (Board) on December 7, 2011. Should the Board choose to select a contractor(s) at that time, Air District staff plans to open a call for projects for the proposed program on December 8, 2011 to run through the end of the calendar year. It is envisioned that applications will be processed in January 2012 with contracts being issued in February of 2012, and trucks delivered in March 2012.

Additional Funding

The requested allocation of \$1.04 million in TFCA Regional funds only covers the replacement of 104 drayage trucks and is not a comprehensive solution for the 247, Bay Area engine MY 2004 trucks needing to be replaced. However, Alameda County's congestion management agency (CMA) has expressed interest in participating in the program but this will require action by its Commission on December 2, 2011.

In order to ensure that every source of funding is being looked at for this program, staff is working with the CMAs of other Bay Area counties to determine if they can provide additional funding for this program. The Air District is also requesting funding support for this program from the Port of Oakland (Port). It is envisioned that additional funding from these sources has the potential to cover an additional 143 trucks for a comprehensive solution for engine MY 2004 trucks registered in the Bay Area. Such funding would need to be allocated based on the counties from which the monies came and will require further work on behalf of staff to devise an equitable distribution plan. In order to allow the CMAs to contribute funding to the Air District in support of the drayage truck replacement program, staff is proposing the approval of drayage truck replacement projects, under TFCA County Program Manager Policy #3 (*Eligible Projects, and Case-by-Case Approval*) of the current TFCA County Program Manager policies.

Due to the tight timeline for this program staff requests the Committee recommend the Board of Directors authorize the Executive Officer/APCO to accept and allocate other funds for this program as they are awarded from non-District funding sources (e.g. CMA, Port, etc.). Upon commitment of additional funding to this program, staff will present a comprehensive funding distribution plan to the Committee as part of a future update on the program.

BUDGET CONSIDERATION / FINANCIAL IMPACT:

None. The TFCA Regional Fund program provides funding to the Air District for administration.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Damian Breen
Reviewed by: Jean Roggenkamp

- Attachment 1: Proposed amendments to BAAQMD TFCA Regional Fund Policies
- Attachment 2: Summary of public comments received on the proposed modifications to the TFCA Regional Fund Policies

Attachment 1:
Proposed amendments to BAAQMD TFCA
Regional Fund Policies

TFCA REGIONAL FUND POLICIES AND EVALUATION CRITERIA FOR FYE 2012

The following policies apply to the Transportation Fund for Clean Air (TFCA) Regional Fund.

BASIC ELIGIBILITY

1. **Eligible Projects:** Only projects that result in the reduction of motor vehicle emissions within the Air District’s jurisdiction are eligible.

Projects must conform to the provisions of the California Health and Safety Code (HSC) sections 44220 et seq. and Air District Board of Directors adopted TFCA Regional Fund Policies and Evaluation Criteria for FYE 2012.

Projects must achieve surplus emission reductions, that is, beyond what is currently required through regulations, contracts, or other legally binding obligations at the time the Air District Board of Directors approves a funding allocation and at the time of the execution of a funding agreement.

2. **TFCA Cost-Effectiveness:** Unless otherwise noted below, projects must meet a cost-effectiveness (C-E) of \$90,000 per ton. Cost-effectiveness is based on the ratio of TFCA funds awarded divided by the sum total tons of reactive organic gases (ROG), oxides of nitrogen (NO_x), and weighted particulate matter 10 microns in diameter and smaller (PM₁₀) reduced (\$/ton).

Certain project categories further specify the eligible funding amount per item (for example, \$/vehicle) which is based on the cost-effectiveness levels below.

Project Type	Policy #	C-E Level Maximum (\$/weighted ton)
Reserved	21	Reserved
Reserved	22	Reserved
Reserved	23	Reserved
Reserved	24	Reserved
Reserved	25	Reserved
Reserved	26	Reserved
Shuttle/Feeder Bus Service—Existing	27	\$90,000
Shuttle/Feeder Bus Service—Pilot	28	\$125,000
Regional Ridesharing	29	\$90,000
Reserved	30	Reserved
Reserved	31	Reserved
<u>2004 Drayage Truck Replacement Projects</u>	<u>32</u>	<u>\$90,000</u>

3. **Consistent with Existing Plans and Programs:** All project categories must comply with the transportation control measures and mobile source measures included in the Air District's most recently approved strategy(ies) for achieving and maintaining State and national ozone standards, those plans and programs established pursuant to California Health & Safety Code (HSC) sections 40233, 40717 and 40919, and, when applicable, with other adopted State, regional, and local plans and programs.
4. **Eligible Recipients and Authority to Apply:** Grant recipients must be responsible for the implementation of the project, have the authority and capability to complete the project, and be an applicant in good standing with the Air District.
 - a. **Eligible Recipients:**
 - i. **Public agencies** are eligible to apply for all project categories.

ii. **Non-public entities** are only eligible to apply for new alternative-fuel (light, medium, and heavy-duty) vehicle projects, and advanced technology demonstrations that are permitted pursuant to HSC section 44241(b)(7).

b. **Authority to Apply:** Applications must include either: 1) a signed letter of commitment from an individual with authority to enter into a funding agreement and carry out the project (e.g., Chief Executive or Financial Officer, Executive Director, City Manager, etc.), or 2) a signed resolution from the governing body (e.g., City Council, Board of Supervisors, Board of Directors, etc.) authorizing the submittal of the application and identifying the individual authorized to submit and carry out the project.

5. **Viable Project and Matching Funds:** Unless otherwise specified in the project category policies below, applications must provide matching funds from a non-Air District source, which equal or exceed at least 10% of the total project cost.

Applications must identify sufficient resources to complete the respective project. The project sponsor shall not enter into a TFCA Regional Fund funding agreement until all non-Air District funding has been approved and secured.

6. **Minimum Grant Amount:** \$10,000 per project.

7. **Maximum Grant Amount:** Maximum award per calendar year:

a. **Each public agency** may be awarded up to \$1,500,000, and

b. **Each non-public entity** may be awarded up to \$500,000.

8. **Readiness:** Projects must commence in calendar year 2012 or sooner. "Commence" includes any preparatory actions in connection with the project's operation or implementation. For purposes of this policy, "commence" can mean the issuance of a purchase order to secure project vehicles and equipment the delivery of the award letter for a service contract; or the delivery of the award letter for a construction contract.

9. **Maximum Two Years Operating Costs:** Service-based projects such as shuttle/feeder bus and ridesharing programs, may receive funding for up to two (2) years of operation or implementation. Projects that request up to \$100,000 annually in TFCA Regional Funds are eligible to apply for two years of funding. Projects that request more than \$100,000 annually in TFCA Regional Fund are eligible for only one year of funding and must apply each year for subsequent funding.

10. **Project Revisions:** Project revisions initiated by the project sponsor which significantly change the project before the allocation of funds by the Air District Board of Directors may not be accepted. Following Air District Board of Directors allocation of funds for a project, an applicant may request revisions to that project that the applicant deems necessary or advisable to carry out the purposes of the project, based on information the applicant received after the Board's allocation of funding. The Air District will consider only requests that are based on new information, are within the same eligible project category, and meet the same cost-effectiveness.

APPLICANT IN GOOD STANDING

11. **In Compliance with Agreement Requirements:** Project sponsors who have failed to meet project implementation milestones or who have failed to fulfill monitoring and reporting requirements for any project funded by the Air District may not be considered eligible for new funding until such time as all of the unfulfilled obligations are met.

12. **Independent Air District Audit Findings and Determinations:** Project sponsors who have failed either a fiscal audit or a performance audit for a prior Air District funded project will be excluded from future

funding for five (5) years from the date of the Air District's final determination in accordance with HSC section 44242. Additionally, project sponsors with open projects will not be reimbursed for those projects until all audit recommendations and remedies have been satisfactorily implemented.

A failed fiscal audit means an uncorrected audit finding that confirms an ineligible expenditure of funds. A failed performance audit means that a project was not implemented as set forth in the project funding agreement.

Reimbursement is required where it has been determined that funds were expended in a manner contrary to the TFCA Regional Program's requirements and requirements of HSC Code section 44220 et seq.; the project did not result in a reduction of air pollution from the mobile sources or transportation control measures pursuant to the applicable plan; the funds were not spent for reduction of air pollution pursuant to a plan or program to be implemented by the TFCA Program, or otherwise failed to comply with the approved project scope as set forth in the project funding agreement.

13. **Signed Funding Agreement:** Only a fully executed funding agreement (i.e., signed by both the project sponsor and the Air District) constitutes the Air District's award of funds for a project. Approval of an application for the project by the Air District Board of Directors does not constitute a final obligation on the part of the Air District to fund a project.

Project sponsors must sign a funding agreement within 60 days from the date it has been transmitted to them in order to remain eligible for award of TFCA funds. The Air District may authorize an extension of up to a total period of 120 days from the transmittal because of circumstances beyond project sponsor's reasonable control and at the Air District's discretion.

14. **Insurance:** Each project sponsor must maintain general liability insurance and such additional insurance that is appropriate for specific projects, with coverage amounts specified in the respective funding agreements throughout the life of the project.

INELIGIBLE PROJECTS

15. **Planning Activities:** Feasibility studies and other planning studies are not eligible for funding by the Air District. Funding may not be used for any planning activities that are not directly related to the implementation of a specific project or program. In addition, land-use projects (i.e., Smart Growth, Traffic Calming, and Arterial Management) that have not completed the Preliminary Design phase are not eligible.
16. **Cost of Developing Proposals and Grant Applications:** The costs to develop proposals or prepare grant applications are not eligible for TFCA funding.
17. **Duplication:** Projects that have previously received TFCA funds and therefore do not achieve additional emission reductions are not eligible.

Combining TFCA County Program Manager Funds with TFCA Regional Funds to achieve greater emission reductions for a single project is not considered project duplication.

USE OF TFCA FUNDS

18. **Combined Funds:** TFCA County Program Manager Funds may be combined with TFCA Regional Funds to fund a project that is eligible and meets the criteria for funding under both Funds. For the purpose of calculating the TFCA cost-effectiveness, the combined sum of TFCA County Program Manager Funds and TFCA Regional Funds shall be used to calculate the TFCA cost of the project.
19. **Administrative Costs:** Administrative costs (i.e., the costs associated with administering a TFCA grant) are limited to a maximum of five percent (5%) of total TFCA funds expended on a project. To be eligible for reimbursement, administrative costs must be clearly identified in the application project budget and in the funding agreement between the Air District and the project sponsor.

20. **Expend Funds within Two Years:** Project sponsors must expend the awarded funds within two (2) years of the effective date of the funding agreement, unless a longer period is formally (i.e., in writing) approved in advance by the Air District in a funding agreement or as an amendment to the funding agreement.

ELIGIBLE PROJECT CATEGORIES:

CLEAN AIR VEHICLE PROJECTS

- 21. **Reserved.**
- 22. **Reserved.**
- 23. **Reserved.**
- 24. **Reserved.**
- 25. **Reserved.**
- 26. **Reserved.**

SHUTTLE/FEEDER BUS SERVICE PROJECTS

27. **Shuttle/Feeder Bus Service:** Projects that significantly lower single-occupancy vehicle trips while minimizing emissions created by the shuttle vehicle are eligible for funding. The project's route must operate to or from a rail station, airport, or ferry terminal and must coordinate with connecting rail or ferry schedules. Projects cannot replace a local bus service or serve the same route as a local bus service, but rather must connect transit facilities to local commercial, employment and residential areas.

Shuttle/feeder bus service applicants must be:

- a. A public transit agency or transit district that directly operates the shuttle/feeder bus service;
- b. A city, county, or any other public agency.

Unless the applicant is the transit agency or transit district that directly implements this project, the project applicant must submit documentation from the General Manager of the transit district or transit agency that provides service in the area of the proposed route, which demonstrates that the proposed service does not duplicate or conflict with existing service.

Applicants are strongly encouraged to use the cleanest vehicle powered with the best-available technology (e.g., electric, hydrogen) to provide the shuttle/feeder bus service. Eligible vehicle types include:

- a. A zero-emission vehicle (e.g. electric, hydrogen)
- b. An alternative fuel vehicle (e.g. compressed natural gas, liquefied natural gas, propane);
- c. A hybrid-electric vehicle;
- d. A post-1997 diesel vehicle with a CARB Verified Diesel Emission Control Strategy (e.g., retrofit); or
- e. A post-1989 gasoline-fueled vehicle.

28. **Pilot Shuttle/Feeder Bus Service:** Pilot projects are defined as new routes that are at least 70% unique and have not been in operation in the past five years. In addition to meeting the requirements listed in Policy 27 for Shuttle/Feeder Bus Service, pilot shuttle/feeder project applicants must also provide data supporting the demand for the service, including letters of support from potential users and providers, and plans for financing the service in the future. Pilot projects must meet and maintain a minimum cost-effectiveness of \$125,000/ton during the first year of operation and a minimum cost-effectiveness of \$90,000 by the end of the second year of operation (see Policy #2). Projects may only receive a maximum

of two years of funding under the Pilot designation. Applicants must apply for subsequent funding under the Shuttle/Feeder Bus designation, described above.

REGIONAL RIDESHARING

29. **Regional Ridesharing Projects:** For TFCA Regional Fund eligibility, ridesharing projects must be comprised of riders from at least five Bay Area counties, with no one county accounting for more than 80% of all riders, as verified by documentation submitted with the application. Ride matching services must be coordinated with the Metropolitan Transportation Commission's regional ridesharing program. Applications for projects that provide a direct or indirect financial transit or rideshare subsidy exclusively to employees of the project sponsor are not eligible.

BICYCLE FACILITY PROJECTS

30. **Reserved**

31. **Reserved**

2004 DRAYAGE TRUCK REPLACEMENT PROJECTS

- ~~31-32.~~ 2004 Drayage Truck Replacement Projects: Projects that replace Class 8 (33,001 lb GVWR or greater) drayage trucks with engine Model Year (MY) 2004, with trucks that have engines certified to 2007 California Air Resources Board (CARB) emissions standards or cleaner are eligible for funding. The existing trucks with the 2004 engines must be registered with the California Department of Motor Vehicles (DMV) and with the CARB drayage truck registry to a Bay Area address, and must be taken out of service after replacement.

REGIONAL FUND EVALUATION CRITERIA

TFCA projects will be evaluated on a first-come-first-serve basis. In order to address Air District priorities, funding available will be reserved as follows:

1. **For Shuttle/Feeder Bus Services and Ridesharing Projects:** 60% of funding available in this category will be reserved for projects that fall within one or more of the following categories:
 - a. Projects in Highly Impacted Communities as defined in the Air District Community Air Risk Reduction plans;
 - b. Priority Development Areas; and
 - c. Projects that reduce greenhouse gasses (GHG).
2. **Reserved.**

Attachment 2:

Summary of public comments received
on the proposed modifications to the
TFCA Regional Fund Policies

Attachment 2: Summary of public comments received on the proposed modifications to the TFCA Regional Fund Policies

Committer and Agency/ organization	Comment	Staff Response
<p>Carl Dolk, Controller</p> <p>Devine Intermodal</p> <p>West Sacramento, CA 95691</p> <p>Submitted on: 11/14 and 11/15</p>	<p>Policy 32: We don't support the TFCA modification as proposed. Based on ARB statistics, the majority of freight that goes to or from the Port of Oakland are from trucks that originate or terminate outside the District boundaries. All trucks that travel within the District should be given equal opportunity to apply for a grant. The desired result is to reduce the emissions in the District based on the mileage traveled in the District. This is consistent with the TFCA objective stated on the District's website:</p> <p><i>TFCA provides grants to projects that implement the most cost-effective projects in the Bay Area that will decrease motor vehicle emissions, and thereby improve air quality. Projects must be consistent with the 1988 California Clean Air Act and the Bay Area Ozone Strategy.</i></p> <p>Accordingly, we respectfully request that a change be made to the Proposal to allow '04 engine model year trucks' the ability to participate regardless of address. This will be consistent with BAAQMD policy and provide transparency so that the most cost-effective projects are selected.</p> <p>Section 44241 (b)(2) of the Code reaffirms what I mentioned yesterday [above] about the District's website. The Code says. <i>"the bay district shall adopt cost-effectiveness criteria for fee revenue generated under this chapter that projects and programs are required to meet. The cost-effectiveness criteria shall maximize emissions reductions and public health benefits."</i></p>	<p>Staff is proposing to evaluate all drayage truck replacement projects in accordance with the \$90,000/ weighted ton of emission reduction TFCA cost-effectiveness limit. Projects that do not meet this limit will not be eligible for funding.</p> <p>Staff believes that by targeting the limited funds available for this project category to Bay Area registered vehicles would be in line with the District's emphasis on funding projects that reduce emissions in highly impacted areas. It may be true that an individual project for a truck registered outside the District could show higher cost effectiveness purely on a dollars per ton basis, but it is likely that this would be because additional miles would be driven in getting to the Bay Area. By requiring local registration, the program would be more likely to fund trucks that spend most of their time in the Bay Area, thereby maximizing Bay Area public health benefits. Staff is not recommending a change to the proposed policy language.</p>

<p>Ron Light, Executive Director</p> <p>West State Alliance</p> <p>Oakland, CA 94623</p> <p>Submitted on: 11/17/11</p>	<p>Policy 32: This note is in regard to your request for a response from WSA to the TFCA Fund Policies under consideration for adoption by the Air District. WSA fully endorses #32, the adoption of a policy to fund 2007 or newer emissions compliant truck replacements for 2004 model year trucks. This policy will assist up to 247 Bay Area truckers by providing necessary financial support for truck replacement, thus enabling small trucking businesses at the Port to remain in operation beyond the ban on 2004 model year trucks.</p> <p>With respect to actual wording and intent of the proposed policy: (1) We understand the intent is to allow trade-ins of existing 2004 model year equipment that may be sold out of state, thus providing a fair liquidation value and return of equity back to the trucker; (2) 2004 model year trucks are required to be registered with the California DMV; and (3) they also must be registered in the CARB Drayage Truck Registry with a Bay Area address.</p> <p>We very much appreciate the time, attention and good will of BAAQMD board and staff in causing this program to become a reality for Bay Area truckers.</p>	<p>Comment noted. Staff has issued an RFP for a drayage truck contractor that would be responsible for providing the compliant replacement trucks, and assisting with the trade-in of the existing engine MY 2004 drayage trucks.</p>
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BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Bates and Members
of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 21, 2011

Re: Continuation of the Overview of the Air District's Permit and Enforcement
Programs

RECOMMENDED ACTION:

None; receive and file.

BACKGROUND

Chairperson Bates requested that staff provide a number of informational presentations throughout the year describing various operations and duties of the Air District. The first presentation in this series was held on March 16, 2011, and covered the composition of the air we breathe, how pollutants affect our health, ambient air quality standards, air quality trends, and the Air District's air monitoring network. The second presentation was held on June 1, 2011, and covered the legal framework, in which the Air District operates, and the legal authorities granted and obligations imposed by that framework. At the October 5, 2011 Board meeting, staff began the third presentation in this series, which is an overview of the Air District's permit and enforcement programs. Due to time constraints, the completion of the presentation was postponed to a subsequent Board meeting.

DISCUSSION

Staff will complete the overview of the Air District's permit and enforcement programs at the Board of Directors' meeting scheduled for December 7, 2011.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Brian Bateman
Reviewed by: Jeff McKay

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Tom Bates and Members
of the Board of Directors

From: Jack P. Broadbent
Executive Officer / APCO

Date: November 30, 2011

Re: Report and Recommendations of the Advisory Council from the March 9, 2011 meeting on Ultrafine Particles: Health Effects, Measurement and Analysis, the June 8, 2011 meeting on Ultrafine Particles: Sources and Characteristics, and the October 12, 2011 meeting on Ultrafine Particles: Characterization of Mobile Source Emissions and Related Health Effects

RECOMMENDED ACTION:

Receive and File.

MARCH 9, 2011 ADVISORY COUNCIL MEETING

The following presentations were made at the March 9, 2011 Advisory Council Meeting on Ultrafine Particles: Health Effects, Measurement and Analysis:

1. ***Ultrafine Particle Measurement: historical perspectives and recent developments*** by Susanne V. Hering, Ph.D., President, Aerosol Dynamics. Dr. Hering is the founder and President of Aerosol Dynamics, Inc. and has over thirty years of experience in the field of atmospheric aerosols. Her primary interest is the in-situ, automated characterization of the size and chemical composition of atmospheric particles. Dr. Hering holds a Ph.D. in Physics from the University of Washington, with postdoctoral work in Environmental Engineering at the California Institute of Technology. After many years at UCLA, she left the academic world to form Aerosol Dynamics Inc. She has served as a Board Member and as President of the American Association for Aerosol Research, and in 2007 was honored as the recipient of the BYH Liu Award, presented by the Association in recognition of contributions to aerosol instrumentation.
2. ***Research findings on particulate air pollution from the Southern California Particle Center*** by John R. Froines, Ph.D., Professor, Environmental Health Sciences, School of Public Health, UCLA. Professor Froines joined the faculty of the School of Public Health in 1981. He received a B.S. in chemistry from UC Berkeley (1963), and an M.S. in chemistry (1964) and Ph.D. in physical-organic chemistry (1967) from Yale University. Before coming to the UCLA School of Public Health, Dr. Froines was Assistant Professor of Chemistry at the University of Oregon and later served as Director of Toxic Substances at the Occupational Safety and Health Administration and Deputy Director of the National Institute for Occupational Safety and Health. Dr. Froines is the Director of the Southern California Particle Center and Supersite. His area of expertise is toxicology and exposure assessment.

His research interests are in the qualitative and quantitative characterization of risk factors in environmental and occupational health. Dr. Froines chairs the State of California's Scientific Review Panel and the central review panel at the State level for identifying toxic air contaminants.

REPORT

The Advisory Council met on April 13, 2011 and May 11, 2011 to discuss the presentations and materials received at the March 9, 2011 meeting on Ultrafine Particles: Health Effects, Measurement and Analysis and prepared a report for the Air District Board of Directors.

Advisory Council members Sam Altshuler, Dorothy Vura-Weiss and Liza Lutzker prepared a draft report for the March 9, 2011 meeting and thereafter, discussed and revised the draft report at the April 13, 2011 Advisory Council meeting. At the May 11, 2011 meeting, the Advisory Council discussed the revised draft report and finalized their recommendations. The completed final report will be presented for consideration at the Board of Directors December 7, 2011 meeting.

JUNE 8, 2011 ADVISORY COUNCIL MEETING

The following presentations were made at the June 8, 2011 Advisory Council meeting on Ultrafine Particles (UFPs): Sources and Characteristics:

1. ***Mobile Source Ultrafine Particle Emissions: Past, Present, and Future*** by Barbara Zielinska, Ph.D., Research Professor, Desert Research Institute (DRI), Division of Atmospheric Sciences, Reno, Nevada; and Director, Organic Analytical Laboratory, DRI. Dr. Zielinska has been working in the field of organic analysis for over 30 years. She has extensive experience in development of measurement methods for organic compounds in both the gas and particle phases in ambient air. She has also developed analytical methods for identifying biologically active compounds in primary and secondary particulate organic matter, kinetics, and products of gas-phase reactions. She has published numerous articles on emissions sources of organics in the gas and particle phases, including leading edge work in diesel particulate matter emissions and secondary particle formation. She has served on the US EPA Clean Air Scientific Advisory Council (CASAC), which provides scientific guidance to Congress and she is currently a member of the CASAC Ambient Air Monitoring and Methods Subcommittee. She earned her M.Sc. in Chemistry at the Technical University of Lodz, Poland and her Ph.D. in Chemistry from the Polish Academy of Sciences.
2. ***Physical, Chemical and Toxicological Properties of Ambient Ultrafine Particles and their Sources*** by Anthony Wexler, Ph.D., Professor, Mechanical and Aerospace Engineering;, Civil and Environmental Engineering; and Land, Air and Water Resources, UC Davis; Director, Air Quality Research Center, Crocker Nuclear Laboratory; and EPA's San Joaquin Valley Aerosol Health Effects Research Center, UC Davis. Dr. Wexler has worked on the atmospheric transport and transformation of airborne particles for over 20 years. Currently, he is investigating how early childhood exposure may lead to lung function decrements, where particles are deposited in airways; the thermodynamic properties of organic and inorganic compounds in the atmosphere; ion mobility spectrometry for aerosol chemical composition analysis; and source-oriented sampling of ambient particles. Dr. Wexler has developed new equipment for analyzing nanoparticles in air and has participated in multiple

US EPA projects to measure air quality impacts in selected cities, including Pittsburgh, Pa., Houston, TX, and Fresno, CA. He earned his B.S. in Engineering Physics at UC Berkeley, M.S. in Mechanical Engineering at the Massachusetts Institute of Technology, and Ph.D. in Mechanical Engineering at California Institute of Technology.

REPORT

The Advisory Council met on July 13, 2011 and September 14, 2011 to discuss the presentations and materials received at the March 9, 2011 meeting on Ultrafine Particles: Sources and Characteristics, and prepared a report for the Air District Board of Directors.

Advisory Council members Sam Altshuler, Benjamin Bolles, Harold Brazil, Robert Bornstein prepared a draft report for the June 8, 2011 meeting and thereafter, discussed and revised the draft report at the July 13, 2011 Advisory Council meeting. At the September 14, 2011 meeting, the Advisory Council discussed the revised draft report and finalized their recommendations. The completed final report will be presented for consideration at the Board of Directors December 7, 2011 meeting.

OCTOBER 12, 2011 ADVISORY COUNCIL MEETING

The following presentations were made at the October 12, 2011 Advisory Council meeting on Ultrafine Particles: Characterization of Mobile Source Emissions and Related Health Effects:

1. ***Internal combustion engine generated particles: formation, measurement, trends, and knowledge gaps*** by Dr. Alberto Ayala, Ph.D. MSE. Dr. Ayala is the Chief of the Monitoring and Laboratory Division at the California Environmental Protection Agency, Air Resources Board. He holds an M.S. in Engineering and a Ph.D. in Mechanical and Aeronautical Engineering from the University of California at Davis. Dr. Ayala directs the State's ambient air monitoring program, several analytical laboratories, and programs focused on the measurement and characterization of air pollution, motor vehicle emissions, fuel analyses, asbestos, consumer products, and air emergency response. His principal research interests are emissions and ultrafine particle characterization. His group has ongoing collaborations with international agencies and is leading the ARB's studies of emission and fuel measurement protocols and control technology assessment. He has published more than 50 articles in peer-reviewed journals, a number of them focused on particular matter (PM) and ultrafine particle emissions from internal combustion engines and has made presentations at more than 100 conferences. He has recently served on EPA's ACCACA for review of Black Carbon.
2. ***Semi-volatile components of fine and ultrafine particles: Do they exacerbate airway allergies, promote development of cardiovascular disease and induce inflammation in the brain?*** by Dr. Michael T. Kleinman, Ph.D. Dr. Kleinman is a Professor of Occupational and Environmental Medicine in the Department of Medicine at the University of California, Irvine (UCI). He holds a M.S. in Chemistry (Biochemistry) from the Polytechnic Institute of Brooklyn and a Ph.D. in Environmental Health Sciences from New York University. He has published more than 100 articles in peer-reviewed journals dealing with environmental contaminants and their effects on cardiopulmonary and immunological systems, and has directed more than 50 controlled exposure studies of human volunteers and laboratory animals to ozone, PM and other pollutants. Dr. Kleinman's current research focuses on

neurological and cardiopulmonary effects of inhaled particles on humans and laboratory animals. His recent studies have demonstrated that inhalation of combustion-generated particles can promote airway allergies and accelerate the development of cardiovascular disease and that these effects may be associated with organic and elemental carbon components of the ultrafine fraction of the ambient aerosol. He has also served on EPA CASAC panels for PM and chairs the Air Quality Advisory Committee for California.

REPORT

The Advisory Council met on November 9, 2011 to discuss the presentations and materials received at the at the October 12, 2011 meeting on Ultrafine Particles: Characterization of Mobile Source Emissions and Related Health Effects.

Advisory Council members Stan Hayes, Sam Altshuler, Jane Martin and Robert Bornstein prepared a draft report for the October 12, 2011 meeting and thereafter, discussed, revised and finalized the draft report at the November 9, 2011 Advisory Council meeting. The completed final report will be presented for consideration at the Board of Directors December 7, 2011 meeting.

BUDGET CONSIDERATIONS/FINANCIAL IMPACTS:

None.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

- Attachment 1: Final Report on March 9, 2011 Advisory Council Meeting
- Attachment 2: Advisory Council Minutes of March 9, 2011
- Attachment 3: Advisory Council Minutes of April 13, 2011
- Attachment 4: Advisory Council Minutes of May11, 2011
- Attachment 5: Final Report on June 8, 2011 Advisory Council Meeting
- Attachment 6: Advisory Council Minutes of June 8, 2011
- Attachment 7: Advisory Council Minutes of July 13, 2011
- Attachment 8: Advisory Council Minutes of September 14, 2011
- Attachment 9: Final Report on October 12, 2011 Advisory Council Meeting
- Attachment 10: Advisory Council Minutes of October 12, 2011

**FINAL REPORT ON MARCH 9, 2011 ADVISORY COUNCIL MEETING ON
“ULTRAFINE PARTICLES (UFP): HEALTH EFFECTS, MEASUREMENT AND
ANALYSIS”**

SUMMARY

The following presentations were made at the March 9, 2011 Advisory Council meeting on Ultrafine Particles: Health Effects, Measurement and Analysis:

1. ***Ultrafine Particle Measurement: historical perspectives and recent developments*** by Susanne V. Hering, Ph.D., President, Aerosol Dynamics. Dr. Hering is the founder and President of Aerosol Dynamics, Inc. and has over thirty years of experience in the field of atmospheric aerosols. Her primary interest is the in-situ, automated characterization of the size and chemical composition of atmospheric particles. Dr. Hering holds a Ph.D. in Physics from the University of Washington, with postdoctoral work in Environmental Engineering at the California Institute of Technology. After many years at UCLA, she left the academic world to form Aerosol Dynamics Inc. She has served as a Board Member and as President of the American Association for Aerosol Research, and in 2007 was honored as the recipient of the BYH Liu Award, presented by the Association in recognition of contributions to aerosol instrumentation.
2. ***Research findings on particulate air pollution from the Southern California Particle Center*** by John R. Froines, Ph.D., Professor, Environmental Health Sciences, School of Public Health, UCLA. Professor Froines joined the faculty of the School of Public Health in 1981. He received a B.S. in chemistry from UC Berkeley (1963), and an M.S. in chemistry (1964) and Ph.D. in physical-organic chemistry (1967) from Yale University. Before coming to the UCLA School of Public Health, Dr. Froines was Assistant Professor of Chemistry at the University of Oregon and later served as Director of Toxic Substances at the Occupational Safety and Health Administration and Deputy Director of the National Institute for Occupational Safety and Health. Dr. Froines is the Director of the Southern California Particle Center and Supersite. His area of expertise is toxicology and exposure assessment. His research interests are in the qualitative and quantitative characterization of risk factors in environmental and occupational health. Dr. Froines chairs the State of California's Scientific Review Panel and the central review panel at the State level for identifying toxic air contaminants.

DISCUSSION MEETING

At the April 13, 2011 meeting, the Council discussed the presentations and the materials received at the March 9, 2011 meeting and the draft report. At the May 11, 2011 meeting the Council discussed the revised draft report and finalized the recommendations.

KEY POINTS

Dr. Susanne V. Hering

- Ultrafine Particles (UFP), <0.1 microns in diameter, account for the largest **number** of particles in PM, but only a small proportion of the total **mass** of PM; they also have a much higher surface area on which to carry other molecules.
- PM mass (PM_{2.5}) is not well correlated with PM number
- UFPs are more numerous in urban areas, especially near freeways, than in other areas, and are more numerous during rush hour than overnight.
- The technology exists to count the number of these tiny particles, regardless of their composition. However, new technology may be needed to characterize some of their components.
- There are also extremely high concentrations of UFP indoors (in fact often higher than outdoors), especially with furnaces and in kitchens, most notably when pilot lights are burning constantly.

Dr. John R. Froines

- For a given mass, as particle size decreases, the number of particles increases. Standards for PM_{2.5} or UFP based on total mass may not be the most appropriate criteria to use for regulation.
- Semi-volatile compounds go back and forth between vapor phase and liquid phase, by condensing into (and onto) particles. They interact more with cells while in the vapor phase, and can cross membranes in the lungs into the bloodstream, and travel to other organs such as the heart, liver, and brain.
- Health effects of UFP include premature death, cancers in the lungs and elsewhere, asthma and other respiratory disease, cardiovascular disease, adverse birth outcomes, neurotoxicity, and probably neurodegenerative diseases.
- Oxidative stress is associated more with UFP than with larger particles. UFP enter the mitochondria inside cells by means of diffusion (because they're so small) and disrupt the electron transport process.
- UFP (acting as adjuvants) make the body more susceptible to developing allergic responses to various substances and to reacting more strongly when re-exposed to the same substance
- Chronic inflammation in the brain caused by UFP may have serious chronic neurodegenerative effects. This is an area for more study.
- Toxicology studies done in a lab can demonstrate the impact of air pollution chemicals at the cellular level. Specific individual chemicals and combinations of chemicals can be studied, and we can determine the actual mechanism of cellular disruption. These studies can be done more quickly than epidemiologic studies.
- The rate or extent of cellular changes caused by an air sample could be used as the criteria for regulation, rather than the concentration of one or more specific components of the air sample.

EMERGING ISSUES FROM THE ADVISORY COUNCIL

- Identification of the chemical composition of UFP is necessary in order to determine the likely causes of the observed health effects and guide the in vitro lab studies examining cellular-level changes.
- Measurement of real-time concentrations of key chemical components of UFP such as vapors of organic compounds, metals, sulfates, nitrates, elemental and organic carbon is limited by the lack of available instrumentation.
- High concentrations of ambient UFP within 100 meters of freeways and other sources of combustion are a cause for concern.
- Specific mechanisms of health effects from exposure to UFP nitrates and sulfates are not well known or defined. More research is needed, as they can constitute an important fraction of ambient PM_{2.5}, and likely also in the UFP size range.
- Health effects of semi-volatile organic compounds and UFP metals are not well understood.
- There is poor correlation between UFP number and PM 2.5 mass concentrations. This raises the concern that control measures designed to reduce PM 2.5 may not reduce UFP, and in some cases may actually increase UFP.
- The size distribution of particles emitted by diesel engines is affected by PM emissions control systems. Where significant diesel PM mass reductions have occurred in highly impacted areas, such as the Port of Oakland, studies are needed to evaluate potential increases of UFP concentrations and impacts on nearby residents.
- UFP may be emitted from engines not only as a result of combustion but also as a result of engine lubricating oil consumption. These UFPs may contain metals (iron, copper, and zinc), organics and sulfates in both the particulate and vapor phases.
- High emitter (gross polluter) vehicles may contribute disproportionately more UFP emissions.
- Indoor exposure to UFP can be equal to or greater than outdoor exposure. As people spend a greater proportion of time indoors, total exposure to UFP can be greater indoors depending on combustion sources and ventilation in the home. UFP exposure while commuting in heavy traffic may also be greater than other outdoor exposure.

ADVISORY COUNCIL NEXT STEPS

During the course of the next 6 months, the Advisory Council will learn more about UFP and relevant consideration for the health of Air District residents. Scheduled presentations will include:

A. Physical, Chemical and Toxicological Properties of Ambient Ultrafine Particles and their Sources

Anthony S. Wexler, Ph.D.
Professor, Civil and Environmental Engineering
Director of Air Quality Research Center
UC Davis

B. Mobile Source Ultrafine Particle Emissions: Past, Present, and Future

Barbara Zielinska, Ph.D.
Director, Organic Analytical Laboratory
Division of Atmospheric Sciences
Desert Research Institute

On the basis of these presentations and the Advisory Council discussions that follow, the Advisory Council will make specific recommendations to the Board. These recommendations will likely pertain to, but not be limited to, issues surrounding the following questions:

- What is the nature of UFP in Air District, and how should it be monitored?
- What are the important sources of UFP in the Air District?
- What is the nature of receptor exposure to UFP and what are the health effects of concern?
- What is the effect of various PM control measures on UFP levels?

Advisory Council members note that the Air District would greatly benefit from the expertise of a Health Effects Officer when considering these and other health issues, and hiring for this position should be prioritized.

AGENDA: 10, ATTACHMENT 2

Bay Area Air Quality Management District
939 Ellis Street
San Francisco, CA 94109
(415) 749-5000

APPROVED MINUTES

Advisory Council Regular Meeting
9:00 a.m., Wednesday, March 9, 2011

CALL TO ORDER

Opening Comment: Chairperson Blonski called the meeting to order at 9:06 a.m.

Roll Call: Chairperson Ken Blonski, M.S., Vice Chairperson Stan Hayes; Secretary Robert Bornstein, Ph.D., and Council Members Sam Altshuler, Louise Bedsworth, Ph.D., Benjamin Bolles, Jeffrey Bramlett, M.S., Harold Brazil, Peter Chamberlin, Jonathan Cherry, AIA, Alexandra Desaultels, Stan Hayes, John Holtzclaw, Ph.D., Kraig Kurucz, M.S., Gary Lucks, JD, CPEA, REA I, Liz Lutzker, MPH, Jane Martin, Dr.Ph.D., Kendall Oku, Jonathan Ruel and Dorothy Vura-Weis, M.D., M.P.H.

Absent: Member Jennifer Bard

Public Comment Period: There were no public comments.

Consent Calendar:

1. Approval of Minutes of the February 9, 2011 Advisory Council Meeting

Council Action: Member Holtzclaw made a motion to approve the minutes of February 9, 2011; Member Bramlett seconded the motion; carried unanimously without objection.

PRESENTATION: ULTRAFINE PARTICULATE

2. Ultrafine Particulate: Health Effects, Measurement and Analysis

A. Measurement and Analysis of Ultrafine Particulate

Susanne V. Hering, Ph.D.
President
Aerosol Dynamics, Inc.

Deputy APCO Jean Roggenkamp introduced and gave a brief background of Susanne Hering, Ph.D., founder and President of Aerosol Dynamics in Berkeley, California.

Dr. Susanne Hering began her presentation on historic perspectives and recent developments of ultrafine particle (UFP) measurement, noting there are both health issues and climate implications. She reviewed global climate issues and presented satellite photo of clouds formed from particulate emissions, their effect, and their magnitude for atmospheric aerosols. One health effect from UFPs that grow large enough to become nuclei for cloud formation is the effects on global climate; the likelihood of droughts. With regard to their distribution with respect to size, they can be presented on a number concentration or mass concentration, and particles differ in their size, chemistry, morphology, optical characteristics, and hygroscopicity, and she presented examples of each. Size distribution of particles can be presented on a number basis or mass basis, and described each, stating most particles when counted are tiny, while the mass distribution is weighted more towards larger particles.

She provided an overview of ambient number concentration data, and presented particle number concentrations from winter time data at night in Fresno taken as part of an Air Resources Board (Kraypac) study, which show concentrations vary daily from 10,000 to 100,000 particles per cubic centimeter. Dr. Hering presented size distribution of ambient particles during early morning rush hour and nighttime when there are heating and stagnation effects, showing a movie of changes occurring from morning to evening.

The simplest way to characterize the concentration of UFP is to measure the total number of the concentration because the UFPs dominate the particle number. This is an important indicator in regard to health issues, as well as climate and the number of cloud droplets. It is also the oldest measurement in the atmosphere, and Dr. Hering reviewed the first measurements dating back to 1889. She presented John Aitken's work in Scotland on the number of dust particles in the atmosphere, and described his work on measurement. The highest concentrations Dr. Aitken saw were indoors in a room near the ceiling. She presented concentrations measured in a car when going through the Caldecott Tunnel and in a residential kitchen which significantly increase once an oven is turned on. One of the constant sources was found to be pilot lights, especially faulty ones. Combustion sources produce UFPs which are all below 100 nanometers in size. She presented the Kelvin Relation, noting that the elevation required is proportional to the surface tension and it is inversely proportional to the particle diameter or particle radius. Supersaturation increases as one over the particle diameter.

Dr. Hering presented various approaches to creating the vapor supersaturation:

Adiabatic Expansion (water)

- Aitken, GE counter

Turbulent Mixing (various working fluids)

- Kousaka, Flagan, delaMora

Thermally Diffusive – Butanol-CPCs

- Numerous manufacturers
- TSI (3760, 3010, 3025, 3775, 3776)
- MetOne, Grimm

Differentially Diffusive – Water-CPC

- 3781, 3783, 3785, 3786, 3787, 3788

Dr. Hering described the history of particle counting, as follows:

- 1890s: Aitken: first measurements of particle concentrations (by adiabatic expansion)
- 1912: Wilson Cloud Chamber: Applied Aitken's principle to particle physics (Nobel Prize, 1929) Determined precise expansion ratios for avoiding homogeneous particle formation.
- 1950s: Vonnegut: Automated adiabatic expansion counter - recognized particles grow to uniform size, fully automated counter.
- 1970s: Sinclair, Bricard: First Continuous flow particle counters (butanol)
- 2003: First continuous flow water-based particle counter

She then reviewed the Butanol based CPCs where heat transfers to the walls with minimal vapor transport, versus the water based CPCs, where both heat and water vapor are transported from the walls into the flow, but the water vapor moves more quickly resulting in supersaturation, allowing one to run a particle counter without butanol.

When measuring particles and identifying CPC performance characteristics, one should care about:

- Activation Cutpoint:
 - What is the smallest particle that can be detected
 - Does the response depend on particle type of chemistry?
- Concentration Range
 - For ambient sampling, ability to measure high concentrations especially important

Dr. Hering then described the response to traffic aerosol from the Caldecott Tunnel and individual trucks using both water and butanol instruments which give the same response.

Regarding high concentrations, they are a challenge if an instrument is chosen for monitoring. Particles are grown by condensation and they are sent through a light beam. Each particle gives a light scattering pulse, which is then counted. The problem lies in that when there are high concentrations, pulses start to pile up and there several droplets in the light beam all at once and they get much more difficult to count. There is not time for the signal to go back down to zero before the next particle leaves. When instruments shift, there is a calibration gap. She presented an example of a single count vs. photometric mode which reveals a transition gap when instruments shift from single counting to photometric mode. Therefore, the single count mode gives much more consistent data.

To extend the single particle count to high concentrations which are relevant for ambient sampling, one looks for fast, symmetric, uniform pulses, faster electronics, and then accurately account for dead time (the time the particle is in the light beam). Dr. Hering said this was done as an example on the Caldecott Tunnel on a calibration and checking at high dilution factors. It is possible to get rid of this mode and there are instruments that will count reliability up to 1 million counts per cubic centimeter.

In summary, Dr. Hering said when looking at UFPs and asking how to monitor for those, the best single indicator is to measure the particle number concentration. An alternative would be to do a complete science distribution, but there are complications with many numbers to report. She noted that to monitor by number, most ambient particles are “ultrafine.” Particle number concentration is the simplest approach for ultrafine particle monitoring. Particle number concentration measurement is well developed, the oldest air quality measurement, and the continuous flow instruments are more than 40 years old and water based instruments are over 8 years old.

Regarding their operating principle, condensation is used to grow particles to a size that is detectable optically by light scattering. Different instruments use different condensation approaches, but the end result is the same. Important performance characteristics in terms of what one would look for is what is the smallest minimum detectable size and then looking at what the upper concentration limit is because data in ambient air will go to very high concentrations.

Dr. Hering said lastly, it is important to realize that some of the highest concentrations of UFPs are actually not outdoors but indoor where there are close combustion sources from poorly operating furnaces, cooking appliances, pilot lights, and other combustible sources.

Advisory Council members thanked Dr. Hering for her presentation.

A. Health Effects of Ultrafine Particulate

John R. Froines, Ph.D.
Professor, Environmental Health Sciences
School of Public Health
UCLA

Deputy APCO Jean Roggenkamp introduced and gave a brief background of John Froines, Ph.D., Professor of Environmental Health Sciences at UCLA’s School of Public Health, a faculty member of UCLA’s Institute of the Environment and Sustainability and Director of the Southern California Particle Center, and chairs the State of California’s Scientific Review panel.

Dr. John Froines said his presentation would be extremely complicated, noted that considerable research has been done recently where they have identified significant new health effects and toxicity associated with coarse particles. They see oxidative stress, inflammatory markers, and toxicity. The issue of UFPs versus PM2.5 and coarse particles is not a simple whatsoever, and it will take a while to sort out.

Secondly, he emphasized that in their research center, they never violate a rule that when measuring emissions or exposure, they always link it with toxicology or human health effects. It is crucial to link measurements with health effects and these cannot be separated. He believes standards are needed for UFPs, but they do not know yet what they want to measure, stating in Europe they measure non-volatile numbers, which the U.S. considers a waste of time and having nothing to do with health effects.

Dr. Froines said in 1997, the National Research Council conducted a report which revealed there is uncertainty in health effects associated with particles; however, he noted that EPA has pulled back funding for this.

Important to recognize is that in the last 12 years, we have seen premature death and lung cancer and he guarantees that cancers will be seen at other sites. Cancer is not a single organ phenomenon but can be created in organs throughout the body, in lung, breast, and other illnesses. They have seen increases in these, as well as adverse birth outcomes. Diseases are multi-factorial and areas requiring more intense and wide ranging study. He said most important are semi-volatile compounds which start out in a vapor or particle phase, and these are what causes disease—metals and semi-volatiles. So, what we should be measuring are denuded semi-volatiles, metals and secondary organic compounds.

He provided an outline of what their Southern California Particle Center does. The perspective of this research is about characterization of PM for the chemical reactivities associated with adverse health effects, pro-oxidant effects and electrophilic activity. These are irreversible reactions from DNA. They focus on cellular nucleophiles, thiols and amines as targets of the reactive species. Their operating hypothesis is that toxicity of a number of chemicals due to two primary reactions that determine disease outcome:

- Oxidation of sensitive proteins and DNA by reactive oxygen species (ROS) leading to oxidative stress;
- Irreversible alkylation of reactive proteins by electrophiles present in pollutants

Pollution that causes electrophilic reactions leads to disease outcomes. Their research is about what happens when you have chemical reactivity to begin, what happens with the 20 to 30 steps in-between, and the result or outcome. They are interested in chemical reactivity to:

- Assess the magnitude of early changes that would lead to illness and disease exacerbation
- Ability of sample to catalyze electron transfer from oxygen to generate ROS, oxidative stress, impact on signaling pathways and gene expression
- Ability of sample to catalyze generation of hydroxyl radical by Fenton reaction catalyzed by metals
- Ability of sample to irreversibly inactivate biological molecules by covalent bond formation

He discussed chemical assays for pollutant activity:

1. Dithiothreitol (DTT) based redox assay
Measures thiol oxidation capacity, using DTT as the thiol
2. Dihydroxybenzoate (DHBA) based redox assay
Measures metal based hydroxyl forming capacity by the hydroxylation of salicylate
3. Glyceraldehyde-3-phosphate dehydrogenase (GAPDH) inactivation.
Measures electrophile content by the loss of enzymatic activity due to alkylation

These assays provide quantitative measures of the capacity of a given sample to carry out the reactions indicated. They can compare the capacity of different samples to carry out these reactions. Current studies examined:

DEP samples provided by the EPA

Particle and vapor samples collected simultaneously in Riverside, CA.

Dr. Froines presented a slide that shows what happens with particles going a distance from the freeway and as distance progresses, particles tend to grow with the mass staying the same.

Dr. Froines displayed what happens with particles going a distance on the freeway, high levels of ultrafine particles and as distance progresses, particles tend to grow and mass stays the same. He emphasized that concentrations of nanoparticles are much higher in the winter than summer because particles are formed when combusting fuel; however, what comes out of the tailpipe are hot vapors which then cool and form particles. These have very high semi-volatile concentrations, and one could argue that those particles that do not have significant carbon cores potentially have more bio-availability and be more toxic.

Dr. Froines emphasized that if technology is used to control particles and put filters on tailpipes, this will not cut it. What will cut it is if you can put filters on and also dealing with particles formed by nucleation condensation.

He presented a slide showing three emission sources—1) emission sources of air pollutants (traffic, freeways, ports, power plants); 2) Atmospheric dilution where particles are diluting and new particles are formed, some of which are ultrafines and others with different chemical constituencies. One of the greatest crimes he thinks in this field is that we have emphasized PM and we have ignored vapors which should not have been done. 3) Atmosphere aging and photo-chemical reactions (photo-chemical reactions of gas phase SVOC with O₃ and oxidant gases and formation of secondary organic aerosol formations.

He then presented a study measuring the rate of air across the basin and certain chemicals going across the basin. What happens is that there is phenanthroquinone content; naphthoquinones and phenanthroquinone in Santa Monica, and high levels in Riverside. The two compounds produce oxidative stress.

He presented a chart of median pollutant concentrations by roadway and urban area, noting that as PM_{2.5} goes down, numbers of particles skyrocket. Similarly, as the number goes down, the particle mass goes up. He presented a Caldecott tunnel study by Kirchstetter in 1997 and UCLA's work in 2004 showing that as PM_{2.5} goes down, particle numbers go up. Therefore, he questioned whether we were measuring the right thing in PM.

He then presented a graph of redox activity (DTT assay) of semi volatile and total PM from newer diesel trucks. Particles are heated and semi volatiles come off and are captured in XAD resin traps. Particles contain significant amounts of semi-volatile particulate matter and when heated, this is lost. The point he makes is, should we forget size as the measure of what we regulate or should we be regulating organic compounds in metals. He would advocate measuring organic compounds in metals.

He presented a study of the Los Angeles Port, pointing out that black are ultrafine particles, grey are fine particles, and the darker grey are coarse particles. He said there is no question that when it comes to oxidative stress and the toxicity associated with it, ultrafines are the highest.

Dr. Froines gave concluding remarks, stating they are very concerned with goods movement in both southern and northern California ports:

- Newer vehicles have increased emissions of semi volatile organic compounds (SVOC) ultrafine PM; redox activity much higher than nonvolatile PM;
- These particles may pose a greater risk to public health;
- Dilution of air parcels from the point of emission drives SVOC species off the PM phase into the gas phase;
- A better understanding of the linkages between the SVOC phase, chemistry and toxicity in order to adopt regulatory strategies that protect the public

He then showed mitochondria: an important subcellular target of PM and a source of ROS generation on slide 11. Ultrafine particles not only enter the cell, but they enter the mitochondria which mean they are having a negative impact of the electron transport process in the mitochondria. The slide shows that ultrafine particles not only are small but they are small enough that they enter the cell by diffusion, which means they can go through membranes.

He presented results of comparison of three sites; Riverside, USC and Westwood. Important is that the electrophilic activity is 10 times higher in the vapor phase. The irreversible finding of chemicals with proteins and DNA are 10 fold higher than in the vapor phase while the redox activity is 7 to 10 fold higher in the PM 2.5 particle phase. Therefore, there is a contradiction. We are saying that highly toxic chemicals are demonstrating toxicity in the vapor phase. As suggested earlier, we have been guilty of not paying attention to the vapor phase. They find iron (Fe) and copper (Cu) are metals important in terms of hydroxyl radical formation. Copper is 60 times more toxic than iron. Electrophiles have been shown to activate a transcription factor; protein Nrf2, which actually results in the formation of enzymes that are protective. They have also seen electrophiles activate the epidermal growth factor receptor which activates signaling pathways leading to transcription factor activation of inflammatory pathways. Therefore, in looking at what is and is not toxic, there are protective processes and adverse processes, and the relative rates of competition between those processes must be looked at, which he said is done now.

He then reviewed cell response to air pollutants: oxidative and electrophilic stress, actions of prooxidants and electrophiles, prooxidant content in particles and vapors, and the point he made was that ultrafine particles will get into the epithelial cell and chemicals can react with lung-lining fluid. Important is that lung-lining fluid can contain high quantities of ascorbic acid or vitamin C, which actually then creates reactive oxygen species and other qualities. Ascorbic acid produces electrons, which react to oxygen to form reactive oxygen species, and reactive oxygen species are part of the toxic problem.

Dr. Froines then discussed a study on atherosclerosis disease showing mice are susceptible to heart attacks. Mice were kept in non-exposed, filtered air, PM2.5 and PM0.1 (UFP). They did a 5 hour, 3 times a week session for 5 weeks and were interested in aortic atherosclerosis assessment. He said in looking at metals and organic carbon in comparing PM2.5 and UFPs. In UFPs there is 52% organic carbon. With PM2.5, there is 25% organic carbon. Therefore, for disease processes, this shows a prediction that PM2.5 will be toxic but not as toxic as UFPs.

He presented histologic slides of aortic lesions in the heart resulting in the most significant impact. One important thing about low density cholesterol; good and bad cholesterol is that low density cholesterol is bad cholesterol for more reasons than one realizes. It gets oxidized by reactive oxygen species and it impacts the high density cholesterol. So, air pollution has an impact on low density cholesterol oxidation which facilitates the atherosclerotic process. This is why emissions and exposure can be studied, but most important is to study what happens from it. He presented the number of aortic atherosclerotic lesions, and UFPs demonstrate much more in the way of aortic lesions.

Regarding adjuvant (or exacerbated) effects of UFPs resulting in allergic airways disease including asthma, Dr. Froines said they looked at all regions in the mouse from the nasal passages down to the Alveolar region and toxicity effects were found in every region. He described primary versus secondary immune responses when providing antibodies. OVA and UFPs produce allergic airways disease and asthma. When a second and third dose of UFPs are given, the same kinds of histology are seen. The inflammatory process is immense and UFPs will cause exacerbation of allergic airway disease and exacerbation of asthma. The bottom line is that humans get cancer, asthma and heart disease, and he feels it is important to understand the complexities of those processes.

While academic, the District needs to determine what it must regulate and if not enough is known about mechanism, it will not regulate the right material.

Dr. Froines then briefly reviewed and discussed other assays in cells they study, displayed chemical pathways for cellular effects. They reviewed ultrafine particles and elderly people in assisted living facilities who had had heart attacks and looks at their biomarkers of inflammation, ambulatory blood pressure, electrocardiographic ST and airway inflammation. What they saw is air pollutant particles are associated with increased ambulatory blood pressure with seniors citizens exposed to UFPs and they saw circulating biomarkers.

Dr. Froines then presented a children's health study done in 12 cities in Los Angeles. As elemental carbon, which is a surrogate for diesel, goes up the amount of air you can breathe out in one second becomes more difficult. This shows that diesel exhaust has an impact on lung function in children. It gets less difficult away from major roads but the problem with epidemiology is that this does not indicate what causes it. They must go back and identify what is causing the problem, and it will not be the number of UFPs or the mass of UFPs. He reiterated that PM 2.5 is not the causal agent for disease in air pollution, but rather it is a surrogate for health impacts.

Children's lung growth over time is dramatically affected by air pollution. This leads to the fact that when the child reaches 65 or 70, there will be a problem with cardiovascular disease because lungs have been impacted because they never grew to begin with. He said important to

understand is there are upstream and downstream effects one should be concerned with. He stated they took mice and based on work done at the University of Rochester that UFPs are translocated to the brain where they stimulate brain cells to produce inflammatory markers. It turns out that those markers are crying and it does not go away overnight. Every day when one is commuting and getting UFPs, the implication is any number of central nervous system disorders.

Dr. Froines added there is a whole new field of science emerging called “upstream downstream science” and what it is trying to do is to identify upstream events like the ones presented and work to find relevance to downstream apical disease. So, if this transcription factor for inflammation he presented has relevance to the exacerbation of asthma, then he questioned why the transcription factor cannot be regulated. If we understand mechanisms, we can regulate and do risk assessments on upstream assays like transcription factors which are things that lead to disease. Therefore, there is no reason why epidemiology must be done and always do human based studies, and cellular biological assays can be done and the District could regulate on that basis. This would cause an extraordinary improvement in our understanding of what is going on.

Conclusions:

- To determine the contribution of PM sources (both primary and secondary) to exposure and evaluate their relative toxicity.
- The SCPC has addressed the effect of vehicular emissions for the nation.
- This is clearly a national problem ranging from goods movement to global warming
- Pro-oxidant and electrophilic chemistry play a crucial role in health effects
- Advanced understanding of mechanism dramatically
- Demonstrated multiple endpoints heretofore unrecognized
- Important role of ultrafine particles vis a vis health effects
- Important role of ultrafine particles vis a vis health effects
- The role of vapors is vitally important;
- Speculations that non-familial neurodegenerative diseases are related to exposures to environmental toxins
- Pathways of inflammatory responses to primary and secondary organic aerosols (POA & SOA) in elderly populations
- Air pollutant particles are associated with increased ambulatory BP in elderly subjects with coronary heart disease.
- There is strong evidence for adjuvant effects in respiratory/allergic illness.
- Upstream biological and chemical events have been identified with relevance for assessing risk

Going back to 1998, he presented an article headline from the Los Angeles Times which names diesel exhaust as posing a strong cancer risk, which amazingly, is still being debated. Diesel exhaust was proven a carcinogen in 1975 and he believes the burden should be on the industry, which he reviewed along with their associated health impacts. He said several studies dating

back to 1998 all demonstrate an increased risk of lung cancer from diesel, and biodiesel is not the answer. Vegetable oil becomes rancid and therefore produces toxic chemicals.

Dr. Froines then reviewed a USC study of downtown London, and he displayed people walking down Oxford Street getting heavy doses of diesel from buses, taxicabs, and cars. He then showed a picture of Hyde Park where one would conclude there is not a lot of diesel. They took people with light asthma and heavier asthma. One group walked through Hyde Park for 2 hours and the other group downtown. He presented the results, stating lung function dramatically declines for individuals in the downtown as compared to lung function at the park.

The final slide he presented shows the risk of low pre-term and low term birth babies as a function of trucks and heavy duty vehicles. The risk is elevated if one is in proximity to trucks. This demonstrates what they call “developmental effects” and spontaneous abortion, miscarriage, birth defects, toxicity, and developmental effects. No one has done a study of neurodevelopmental effects, or what happens to the fetus’ brain, and he said this should be done.

PANEL DISCUSSION

3. Health Effects, Measurement and Analysis of Ultrafine Particulate

Mr. Kendall noted that Advisory Councilmember Sam Altshuler will serve as the lead author, with Dr. Dotty Vura-Weis and Liza Lutzker also serving. Mr. Kendall indicated he would like to meet with these individuals after the meeting.

Chairperson Blonski noted that the following questions submitted to speakers:

- a. Are ambient air quality and/or emission standards for ultrafine particulate necessary?
- b. If so, at what level and form:
 - i) level
 - ii) measurement units (mass, particle count, surface area)
 - iii) averaging time (one hour, 24 hours, annual, other)
- c. What would be the best way to measure ultrafine particulate for ambient air quality and/or emission standards?
- d. Should ultrafine particulate monitoring be conducted in the Bay Area and, if so, what locations should monitoring focus on?
- e. What are the implications of ultrafine particulate for the Air District’s regulatory and legislative agendas, and programs?

Dr. Holtzclaw referred to the semi volatiles and asked how much do they change during measurement, from gaseous state to particulates or vice versa? Secondly, do they grow during measurements; is there aggregation during the measurements themselves? When they are condensing water around them, does this keep them from aggregating or do they condense together?

Dr. Hering said she talked about measuring concentrations as a practical way to assess ultrafine levels. It is a surrogate and it would need to be accompanied by some of the more complex forms of measurement on a study basis so that you are always looking at the correlation of toxicity, the

reactive oxidant stress level. The question must address whether or not the changes in combustion sources have changed that toxicity relative to the number of concentrations. ROS measurements cannot be done to achieve measurements 24 hour at 50 sites in the basin; therefore, one would look at the concentration measurement.

Regarding whether or not that measures semi volatiles, you are just counting particles, so if you lose some of the semi volatile material off the particle in the counting process, you do not see it. So, you will still count that particle even if the measurement process causes a little bit of loss.

Regarding coagulation, whether or not there is a practical problem with particles conglomerating together in the measurement process, at any reasonable concentration level, these measurements move quickly. One would enhance the coagulation probability by making them all larger, but it is measured in a second or half second, so there is not enough time for much coagulation.

Dr. Froines agrees that the Europeans are using particle number not knowing or ignoring all the science. It could be that you could decide to do particle number as the District's regulatory monitoring element, but what worries him is that what it boils down is a dose response curve. Doing it by numbers may give a steeper slope and regulations will be more rigid. He noted that 80% of UFPs people are breathing are during commute. He said they found lots of toxicity is lost if they use a filter based sampler as opposed to an impinger-based sampler, and we must be careful that we are not losing material that we should be measuring. The issue of losses on filters is 40-50 years old.

Executive Officer/APCO Jack Broadbent said it is appropriate to ask both speakers that, given the breadth and depth of the District's control and monitoring program, he asked for comment on the sufficiency of what the District does, keeping in mind that the Advisory Council is charged with providing recommendations to the governing board who makes ultimate policy, rules and resources decisions. He asked for comment about where the organization should go, as there is much more to be done.

Dr. Hering said in thinking about measurement of criteria gases versus where the measurements of particles have been on a monitoring basis, particulate measurements are in the dark ages. Ozone is a specific molecule and this is measured with minute or five second resolution. It is reported as hourly averages. It is a specific compound with health impacts and one to regulate. The same thing could be said for carbon monoxide. She described first monitoring devices and their performances by pulling air through filters for 24 hours and then performing measurements.

The first advance was PM10; it was collected on a sample. For PM2.5, it is smaller, but it is a surrogate and does not even address what is the health effect, but rather something correlated to it. She thinks whatever is monitored, there is a need before a robust monitor but there is the danger that because it is being monitored, it is the end thing that needs to be controlled, which is the pitfall to avoid.

On the other hand, Dr. Hering said she would also push to get particulate surrogate or a handful of surrogates on the same time resolution and the same data completeness as done for the gases. Getting it every 3-6 days gives holes, so getting a consistent time base on something is important to establish geographical and seasonal differences and for identifying problems. However, unlike ozone, this is not going to be true for what is being measured with particles.

Dr. Froines said he slightly disagreed, stating they have discovered that no one practically in the world knows—if you take ozone and expose it in the presence of polycyclic aromatic hydrocarbons, which is what we do when we breathe, the ozone oxidizes the polycyclic hydrocarbon and that produces quinones which generate reactive oxygen species. This will cause heart defects as well as respiratory effects.

Therefore, they have to be very careful that they are working to figure out what is going on because we are not there yet. It is much more complicated and it may mean the District will have to regulate ozone to prevent reactive oxygen species formation, and this is a different thing than worrying about somebody's lungs.

He said in his view, the District should monitor close to transportation sites. The District should look at the issue of dilution, which is complicated. Secondly, he would go 300 meters away from a freeway to have a background, and the last thing he would say is the District needs to deal with the receptor site issue. Quinones are formed and you must deal with the secondary organic species that are formed which will have different characteristics than primary emissions or dilution. The District should deal with secondary emissions, primary emissions, transportation, and then metals, which cannot be ignored. The last one is vapors. The District cannot ignore them because they are more toxic than the reactive toxic species. The District needs to figure out what vapors it wants to measure, such as Acrolein, which is super-toxic; however, there is very little of it in the air and not a good surrogate.

We need to look at chemicals in a broader issue. If vapors are proposed, the ARB should assist the District in determining which are most appropriate.

Mr. Broadbent said the Bay Area struggles because there are a number of policies that will continue to densify the Bay Area, including creating livable communities and getting people out of their cars. Often many land use decisions are those that put people at greater risk. Dr. Froines suggested holding a series of workshops over time where these issues get discussed and over time, some answers begin to emerge that cannot all be resolved in a two-hour session. He felt it will take some work and he knows government can sometimes be hard to move. He would say that the most progressive forces in the State on air pollution are the air districts and the bottom is EPA at this point. He discussed the \$40 million in research funds; the EPA has seems to have lost its interest in PM which he felt was absurd.

Sam Altshuler said over the years there has been the issue of asthma, and as criteria pollutants have dropped, asthma rates have gone up. He asked if the UFPs are the missing link to explain this. Dr. Froines said in his review, ultrafines is not the answer but whether it is considered from the point of view from mass or number, is a surrogate that one can decide on whether or not to move ahead on that level. He showed the steps that occur in the cell that causes asthma. It is not a simple thing like ozone, but the chemistry leading to asthma. Therefore, the question of whether we should take this transcription factor that binds with DNA and then produces inflammatory effects--is this enough to regulate? He would say yes, but others might say no.

Mr. Altshuler said a number of years ago there was a study reported at the Air and Waste Management Conference that showed the I-110 freeway in Los Angeles that does not have diesel traffic on it, which showed a high concentration. He presumed it was gas powered vehicles and issues were lube oil, and he asked if the same level of effort was going on to understand the

effects of lube oil and emissions occurring relative to diesel or is it silently off to the side? Dr. Hering said when looking at the chemistry of the particulate matters, from diesel trucks there is a lot of polycyclic aromatic hydrocarbons associated with that PM and has its origins in the lube oil. In a broader sense, knowing the chemistry of these particles is critical. Dr. Froines agreed, and said this is why caution should be taken in relying on CNG buses because it may be the oil is just as an important factor.

Dr. Hering added that even though there is a huge difference in the mass of particulate matter that comes from diesel engine as compared to a gasoline engine, there are still a huge number of particles that come from spark emission engines, so their composition is fairly different but also in question.

Dr. Froines said in looking at cars in Europe years ago versus now, the number of particles has gone up dramatically. The issue of numbers versus mass is not something recognized. When they did the Caldecott Tunnel study, they found the toxicity of the gasoline particles was greater than those from diesel vehicles.

Mr. Altshuler said in trying to evaluate this and add value, he questioned what is different in the Bay Area than Los Angeles or other areas, as there are different indoor exposures, the environment allows for windows to be opened differently, and different heating systems. Dr. Hering said in the East Bay, people are crammed between I-80 and the hills. So, it is the combustion sources that provide ultrafine particles. Cooking, furnace, cigarette smoking, candles, and outdoor sources are traffic. In looking at land use areas, there have been comments that given concerns about lung development, schools should not be located near freeways, and Dr. Froines agreed that schools and parks should not be located near freeways, and he discussed a situation in Long Beach and a school site.

Mr. Broadbent noted the Bay Area has similar sources but less of them. What the Bay Area does have is a much more dense population base which is somewhat unique and is the reason why there is so much discussion on land use regulation and decisions, in addition to the control program. He added there is also a significant amount of public transit used by children as well.

Mr. Hayes referred to current federal and state standards, which are written in terms of PM_{2.5} and in terms of mass. The District must develop a control program to achieve those and will have to pick from a menu of control measures. Knowing everything Dr. Froines knows about measurement and health effects of UFPs versus PM, he asked what the best advice is about how the District ought to take UFPs into account in the selection of control measures for the PM plan.

Dr. Hering said ultrafine concentrations are basically uncorrelated with PM_{2.5} mass. So, it becomes a problem that PM_{2.5} mass is itself a surrogate because it is now the pitfall of having now to control it, and there is an EPA regulation based on it. In controlling it and looking at PM_{2.5} mass, the District you will look at secondary nitrates, sulfates secondary organic matter, and probably none are correlated with the ultrafines. Therefore, they are two different questions. In developing strategies, the District must look at chemical composition first because it identifies where they came from. But the answer not achieved is polycyclic aromatic hydrocarbins, which are associated with ultrafines, because they are so miniscule.

Mr. Hayes said, therefore, it is likely that in designing a control program for PM2.5 mass, the District does not have a handle on the ultrafine piece at all, to which Dr. Hering agreed. She said this is why she thinks having a surrogate for ultrafines in the monitoring effort is perhaps justified because they are almost unrelated quantities. Dr. Froines agreed. He further elaborated on a study where, in using reactive oxygen species and calling it a measure of toxicity, for example, they compared mass-based ultrafines with numbered-based ultrafines, and he firmly could not choose between the two. Neither would be perfect, but there would be no major difference between the two, so the District would have to make a terrible decision, and this is why the District must link measurements with toxicity.

Dr. Hering said with regard to PM2.5, there are other implications other than direct health effects. The majority of the particles that comprise PM2.5 mass are the ones that affect visibility, have impacts on global climate, and it ultimately has effects on droughts, crops succeeding, which has its own set of worldwide issues.

Ms. Lutzker said she comes back to the indoor and outdoor concentrations and asked if it was 3 to 5 times higher UFPs indoors. Dr. Hering said it depends; if there are no indoor sources, they are lower. If cooking or if you have a furnace or hot water heater, the emissions get into the house.

Ms. Lutzker said looking at concentrations may not be the best way of looking at things as it is merely a surrogate, if there is a regulation of UFPs and it does succeed in reducing ultrafines outdoors by a certain percentage, she asked what contribution would it make to human health given there are indoor exposures. Dr. Hering said the District can do a lot to control by getting rid of pilot lights and by replacing old furnaces which has a huge effect. She thinks it is a question largely ignored, given the fact that people spend 85% of their time indoors.

Dr. Froines reiterated that 80% of UFPs people breathe are those when commuting and he guessed that the chemistry and toxicity indoors may not be as significant as outdoors.

Mr. Kurucz said in making sure what gets measured gets managed and making a positive impact, using the envitro testing, he asked if there is a possibility to identify a set of indicator species that if measured, would lead the District to regulate something that would make an impact on all pollutants. He asked if there was a possibility to use Dr. Henry's methodology at USC using regression from the receptor model back to sources by fingerprinting pollutants that would lead to a strategy for regulating something that would make a positive impact. Dr. Froines said yes; while stretching it a bit, one could regulate air pollution on the basis of the activation of upstream assay transcription factor. It is not necessarily enough because the electrophiles and reactive oxygen species are different and research must be done to sort out the differences and competition with the Nrf2 which is adaptive and protective. He said work can be done, but he strongly believes we are at a place in the United States that we know enough cellular biology and genetic toxicology that we can say we can use an upstream event. We do not have to do epidemiology before regulating. We can go upstream and look for events like that. He thinks that what we have done by looking at mechanism of disease is that we have created the possibility for identifying upstream assays you can use for policy purposes.

Dr. Vura-Weiss referred to the identification of NFkB, this is related to development of asthma, and she asked if there were other markers that would be related to some of the cancer causing effects or others. Dr. Froines said he believes this. They may be wrong, but he thinks prooxidant and electrophilic steps are the first 2 steps. He said there are different mechanisms and differences at the first two steps, and he discussed a chemical called Acrylamide which causes terrible peripheral neuropathy, it causes synapses to not function effectively, and this is a neurotoxic event. But, acrylamide causes pancreatic cancer, and he does not think the pancreatic cancer has the same mechanism that the peripheral neuropathy does and this is where one of the great scientific challenges is. Chemicals can cause lots of different diseases by different pathways. They believe they know the first two steps, but it can then become very complicated, and this is why he said a better understanding of Nfr2 and NFkB.

Dr. Froines said in looking at the State's Office of Environmental Health Hazards Assessment document on environmental tobacco smoke and look at the number of diseases that ETS causes, it is 20 to 25 diseases. To look at these things in simplistic terms does no one any good, and this should be about people valuing research and not just a question of getting the regulatory rules set so the EPA approves them. These are policy, regulatory, and risk assessment issues, so there is a need to link the science with the regulatory process and not have that regulatory process be so rigid the way it is now.

Mr. Lucks said in following up with Mr. Kurucz's question, he said the District's mission is to take science and turn it into regulation to the extent it is warranted. He said Dr. Froines was talking about looking upstream for the downstream effect and the idea of the transcription factor and using health risk assessment and cell biology as a mechanism. For the District's purposes, he asked to elaborate on what that would translate into in thinking of strategies. He asked if this means a permit applicant would perform a health risk assessment. Dr. Froines said he was not fully confident in answering that question and suggested having a second workshop in which this was the subject matter. He said if he did an epidemiologic study similar to the study that looked at asthma incidents up to 300 meters or, if an asbestos study was done, the Council would be comfortable with that. Then if he took a mouse and a rat in a national toxicology program and they did two-year chronic animal bio assays and got positive results for cancer, there are some who would not accept this. So, for the most part we believe them and the sooner we get work done to start identifying what needs to be identified, the sooner the District will be able to translate this to policy and regulation. He discussed his chairing of a committee that did a study on the use of methyl iodine which was very controversial. They argued with the Governor over whether it should happen and the committee worked hard to try and identify the steps that would give them the upstream and downstream process. It can and should be done, the science exists for it, but agencies must buy into it. His view is that not only is it possible, but it is essential.

Dr. Bornstein summarized that the only possible way forward is that right now, we are observing surrogates and both speakers pointed out many times that the District needs to be more specific. It is not only we have many specific chemicals that do damage, but they also have synergistic effects, which makes things worse. So this leads us to depression, but we must move forward, and we come back to surrogates. We now have to get an optimum number and need to identify those things that stand in and capture the sources and health effects. Then government agencies can think about specific standards of indicators at what kind of sites, which we talked about as being where we should measure. There must also be some specificity as the Bay Area is different than other areas. Therefore, the only thing the District can do is keep up with the science so that

when science provides the information, the District can attempt to pressure the government agencies to come up with surrogates to make more intelligible measurements that can control something that will have a health impact.

Dr. Hering added that having a consistent surrogate so there is a historical record is important, but the danger is having that surrogate be your end point of what you are going to control. At the same time, as different scientists develop different upstream measurements, NFkB may be what is viewed today as the best upstream measurement, but it could be something different. She said it is also a very expensive measurement as compared to setting up a particle counter. Therefore, science studies are needed and the ideal would be to do upstream measurements in coordination with surrogate measurements on a fairly routine basis.

Dr. Froines said he has said on many occasions about the competition between NFkB and Nrf2. Nrf2 produces protective enzymes. He added they did a study using a genetically altered mouse that was Nrf2 deficient. In other words, they made the mouse genetically incapable and they got stronger allergic inflammation, and the study knocked out one piece and reinforced the importance of the other side. Science can be done to differentiate things and he discussed a study using potentiation.

Mr. Kendall referred to slide 15 and voiced concern when looking at the slide. He said the control of diesel began in 1987 and later it started focusing on PM and NOx. There are people living by freeways with a lot of diesel traffic with health effects. From a policy perspective, the work has been successful in reducing PM mass and NOx coming from heavy duty diesel vehicles, but the particle count has increased by a factor of 10 when worrying about the PM and by a factor of 100 when the District started worrying about reducing the NOx. He questioned if public health has been improved.

Dr. Froines said he showed results from three separate studies, and he said the health effects are real, and we should get over this notion of being locked into mass based measurements. The answer is, we do not know and a high priority research agenda would be to answer your question, as the answer to the question does not yet exist. He would say that we do not have to prove that people are dying to be able to say changes are needed to be made. While agreeing in principle, we have to get past epidemiology studies because they are too long and past animal studies and other studies because they are expensive and take too long. Epidemiology and animal chronic anobioassay studies can measure risk of 1 in 100 at best. Therefore, he said mathematical extrapolation must be done called risk assessment.

Mr. Kendall asked if diesel emissions can be controlled without increasing the number of particles. Dr. Froines said he thinks we need to deal with vapors and control that, and while he is not an engineer, we need catalytic converters, oil, primary emissions and vapors that come out of the tailpipe. If these three can be addressed, significant progress and strides would be made.

OTHER BUSINESS

4. Council Member Comments/Other Business

Chairperson Blonski recognized Dr. Holtzclaw and Jenny Bard for presenting the Advisory Council's recommendations from its February Council meeting at the March 2, 2011 Board of Directors meeting.

Chairperson Blonski reminded members on the need to complete Ethics Training, stating the District will hold a workshop on March 24, 2011 from 1:00 p.m. to 3:00 p.m. Individuals can also complete on-line training.

5. Time and Place of Next Meeting - 9:00 a.m., Wednesday, April 13, 2011, 939 Ellis Street, San Francisco, CA 94109.

6. Adjournment: The meeting adjourned at 12:18 p.m.

Lisa Harper
Clerk of the Boards

AGENDA: 10, ATTACHEMENT 3

Bay Area Air Quality Management District
939 Ellis Street
San Francisco, CA 94109
(415) 749-5000

APPROVED MINUTES

Advisory Council Regular Meeting
9:00 a.m., Wednesday, April 13, 2011

CALL TO ORDER

Opening Comment: Chairperson Blonski called the meeting to order at 9:00 a.m.

ROLL CALL

Present: Chairperson Ken Blonski, M.S., Vice Chairperson Stan Hayes, Secretary Robert Bornstein, Ph.D., and Council Members Sam Altshuler, Jennifer Bard, Louise Bedsworth, Ph.D., Benjamin Bolles, M.S., Harold Brazil, Peter Chamberlin, Jonathan Cherry, AIA, Alexandra Desautels, John Holtzclaw, Ph.D., Kraig Kurucz, Gary Lucks, JD, CPEA, REA I, Liza Lutzker, Kendall Oku, and Dorothy Vura-Weis, M.D., M.P.H.

Absent: Council Members Jeffrey Bramlett, Jane Martin, Ph.D., and Jonathan Ruel

Also in attendance: Mr. Gary Kendall, Advisory Council Liaison

Staff: Brian Bunger, Air District Counsel
Eric Stevenson, Director of Technical Services
Henry Hilken, Director of Planning, Rules & Research

Public Comment Period: There were no public comments.

CONSENT CALENDAR

1. Approval of Minutes of the March 9, 2011 Advisory Council Meeting:

The following amendments to the minutes of March 9, 2011 were proposed:

Page 2: spell out the meaning of the abbreviation CPCs “Condensation Particle Counters”

Page 3: replace “science distribution” with “size distribution”

Page 4: replace “is not a simple whatsoever” with “is not simple”

Page 6: Change “organic compounds in metals” to “organic compounds and metals”

Page 13: Delete remaining paragraph after: “the District must look into chemical composition”

Page 14: replace “envitro” with “in-vitro”

Page 14: Add “or cells” after “identify a set of indicator species”

Page 14: Change “regulate something” to “regulate UFP or chemical species”

Page 14: Nrf2 is the correct term

Page 14: Correct spelling of Dr. Vura-Weis’ name

Council Action: Member Holtzclaw made a motion to approve the minutes of the March 9, 2011 Advisory Council Meeting, as amended; Member Kurucz seconded the motion; carried unanimously without objection.

DISCUSSION

2. Discussion of Draft Report on the Advisory Council’s March 9, 2011 Meeting on Ultrafine Particulate: Health Effects, Measurement and Analysis.

Mr. Altshuler presented a power point slide show (attached to these minutes), titled “Ultrafine Particulate Matter (UFP): Cause for Concern” to the Advisory Council. Dr. Vura-Weis and Ms. Lutzker also assisted with the presentation. The slide show and the report are the basis for the future presentation and report to the Board of Directors.

The following comments were made about the slide show and report:

- Ensure that the report backs up the power point.
- Power point is a good introduction to discuss the draft report.
- Very positive.
- Good review of the issues.
- Regarding the recommendation - whether and to what extent should the Air District regulate PM or UFP in terms of permitting? Where does this lead in terms of policy?
- Are we ready to make a presentation to the Board and make a recommendation? Perhaps we should give them an update.
- Certain conclusions in the presentation are less controversial, fairly certain, tell the Board about that.
- CEQA runs parallel with permitting, and UFP would be a significant impact.
- The big point is that we need to follow the science. Don’t know where it may take us. The science is not mature, but promising. We can see the cell changes now, rather than waiting for the epidemiology. We need to follow the testing and see where it goes.
- Look more at the PM numbers near freeways. Look into data about filters and ultra-tight windows.
- It’s premature to set a CEQA threshold.
- Historically we’ve been given 10 minutes to present before the Board of Directors, maybe they’ll give us more time. Can this be broken down into 5 minutes summary of the science, 5 minutes of emerging issues? A science introduction is needed. Don’t count on more time. What’s the most important 5 minutes?

- May need to pick the ten best slides.
- Indoor air quality information and the historical background helped paint the whole picture.
- Reorganize the slides. The report is clear and condensed. Liked the order/logic of the recommendations. Monitoring is intended to answer the questions “What is in the air and where does it come from?” Add that to the report. Combine recommendations 2 and 4 which are both related to health impacts, link them together.
- For Recommendation #3, broaden or expand that to control measures. How might this affect the design of our PM 2.5 control program; need to understand the implications of the PM 2.5 control measures have on UFP. Need to understand how they correlate with our other control measures. We haven’t established the measurements or metrics. Emerging issue is that particles numbers are going up, while mass is going down. We have reduced PM 2.5; is that increasing the UFP?
- We’ve just begun to touch on this issue, and need to go deeper. What is the implication of what we’ve heard? Let’s agree on some things to talk to the Board about and tell them to stay tuned, and that we have more coming.
- Tell the Board up front that this is our first look at this. The first recommendation, regarding monitors in environmental justice areas; prefer that monitoring occur in high impact areas, wherever they are. A variety of monitors and locations is not a bad idea.
- Look into the correlation between the UFP and the PM 2.5. The part we are leaving behind may be what we couldn’t even measure before. Smaller particles may not be of the same nature, and there are different issues.
- Don’t just focus on the UFP. Would like an explanation of particle mass decreasing, but with particle numbers increasing. How can this be? If we have these controls, how can there be more particles?
- We need an explanatory on vapors. Where are we are looking, and how are we monitoring? Needs clarification.
- Regarding the detail in the presentation: cubic centimeter note was helpful.
- UFP monitoring should measure particle numbers and composition.
- Indoor exposure occurs when people use common cleaning products. Sealed windows will keep the outdoor air from entering, but they don’t allow the indoor air to exit. How do feel about indoor air quality?
- The maximum exposure you get is on the freeway, or if you live in the zone around the freeway. Someone needs to come in and talk about exposure.
- Regarding Recommendation #1 - where does the money come from? What would you recommend as location, how many and where is the money coming from? They will be put in high traffic, high diesel, and high population areas to measure exposure. We are developing a strategy to place these near road ways.
- Try to not be too detailed and specific. They are looking into it and thinking about it. Should be worded “as appropriate” instead of listing specific steps.

- Is it particle numbers or composition we want to monitor? You won't use the same monitor. What do we want to track? We will watch the science as it emerges. Let's not do the recommendations now. Prepare a report after we have more information and hear more speakers.
- During a normal smog test, there is no attempt to measure burning oil. If we look at gross polluters, we may end up going in that direction. Expand it to gross polluters.
- Timing on this. Are we doing it sooner or later? 4 recommendations – set up, track, look and compare. Tell the Board what we want to do with the information. Is this a one, four or five year process?
- I am very concerned about the health effects. What are other regulatory agencies doing for this now?
- Show that PM 0.1 is UFP.
- Reference the power point in the report. Put the science in report and highlight it on the power point.
- Emerging issues – how the technology for UFP is changing. Make a recommendation of what we should be monitoring, number or size or composition. Where is this going? Making policy that is flexible as our knowledge deepens, not to put on blinders as we get more information.

Secretary Hayes recommended that Advisory Council members send emails to the team if they had further comments or additions. Please send comments to Mr. Altshuler within a week. The team will make the changes they feel are necessary. There will be final action on this report at the next meeting.

Chair Blonski thanked Ms. Lutzker, Dr. Vura-Weis and Mr. Altshuler for their hard work on the report and presentation.

3. Discussion of Advisory Council Members attending the Annual Air & Waste Management Association (A&WMA) Meeting in June.

Chair Blonski noted that five members had expressed interest in attending.

Mr. Brazil, Dr. Bornstein, Mr. Holtzclaw and Mr. Altshuler will be representing the Advisory Council at the A&WMA conference. Chair Blonski requested that the representatives report back to the Advisory Council after their trip. Mr. Hayes is also attending the conference, but his trip is not being funded by the District.

OTHER BUSINESS

4. Council Member Comments / Other Business

Mr. Kendall spoke about scheduling speakers for the upcoming topic meetings. A team is needed to do a report on the information received. Mr. Kendall is arranging for a speaker at the June meeting who will talk about UFP from mobile sources; and another speaker is being considered who will talk about what happens between the tailpipe of a vehicle and 300 meters away; a discussion of the chemistry and physics of what occurs in the atmosphere with those particles as they are transported away from the source.

Mr. Altshuler, Dr. Bornstein and Mr. Bolles volunteered to join the next work team. Mr. Kendall asked if anyone else wants to help, let us know at the next meeting. (Mr. Brazil was added to the work team after meeting adjourned)

Mr. Lucks passed out an article that summarizes all the environmental legislation that passed last year.

Mr. Kendall announced that Mr. Lucks has volunteered to do a presentation to the Advisory Council about the legislative process, tentatively scheduled at 11:00 a.m., immediately after the May Advisory Council meeting.

Mr. Kurucz attended a meeting at UC Berkeley regarding green chemistry. The science is very interesting and ties in well with what we are talking about.

Ms. Bard stated that the Lung Association is working with the Air District in San Jose, on the development of a Community Risk Reduction Plan (CRRP). They have made an initial set of recommendations that look at healthy indoor air and reduction of emissions in communities located near freeways. There is a lot of community involvement and Ms. Bard had a handout for the Advisory Council.

Ms. Bard also reported that the American Lung Association's "State of the Air" report will be released on April 27, which is a national air quality report. They look at levels of ozone and PM 2.5 in counties through the country that have monitoring. The counties are graded on the number of days they exceed air quality standards. Ms. Bard also asked staff about the progress of a bill that the Air District and MTC are co-sponsoring. Mr. Hilken replied that the bill is in the pipeline and that an update would be given at a Legislative Committee meeting.

Mr. Hayes let the Advisory Council know that A&WMA is sponsoring an international conference "Greenhouse Gases in a Changing Climate" on November 16 - 17, 2011 in San Francisco. The deadline for abstracts is May 2, 2011. He is grateful that the Air District supports these events.

Mr. Altshuler alerted the Advisory Council to interesting articles about UC Berkeley professor, Richard Muller. Muller was a skeptic about global warming, and was hired by a group to perform a study to debunk previous global warming studies. Instead his results supported climate change science and he presented those results to the GOP.

5. **Next meeting:** The next meeting of the Advisory Council will be held on Wednesday, May 11, 2011 at 9:00 a.m. at 939 Ellis Streets, San Francisco, CA 94109
6. **Adjournment:** Chair Blonski adjourned the meeting at 10:58 a.m.

Kris Perez Krow
Clerk of the Boards

Bay Area Air Quality Management District
939 Ellis Street
San Francisco, CA 94109
(415) 749-5000

APPROVED MINUTES

Advisory Council Regular Meeting
9:00 a.m., Wednesday, May 11, 2011

CALL TO ORDER

Opening Comment: Chairperson Blonski called the meeting to order at 9:05 a.m.

ROLL CALL

Present: Chairperson Ken Blonski, M.S., Vice Chairperson Stan Hayes, and Council Members Sam Altshuler, P.E., Harold Brazil, Peter Chamberlin, John Holtzclaw, Ph.D., Liza Lutzker, Jane Martin, Ph.D., Kendall Oku, Jonathan Ruel and Dorothy Vura-Weis, M.D., M.P.H.

Council Members Jennifer Bard, Louise Bedsworth, and Gary Lucks, JD, CPEA, REA I arrived after the roll call was taken.

Absent: Secretary Robert Bornstein, Ph.D. and Council Members Jeffrey Bramlett, Benjamin Bolles, M.S., Jonathan Cherry, AIA, Alexandra Desautels and Kraig Kurucz

Staff: Brian Bunger, Air District Counsel
Jean Roggenkamp, Deputy Air Pollution Control Officer

Public Comment Period: There were no public comments.

CONSENT CALENDAR

1. Approval of Minutes of the April 13, 2011 Advisory Council Meeting:

Council Action: Member Ruel made a motion to approve the minutes of the April 13, 2011 Advisory Council Meeting; Member Holtzclaw seconded the motion; carried unanimously without objection.

DISCUSSION

2. Continued Discussion of Draft Report on the Advisory Council's March 9, 2011 Meeting on Ultrafine Particulate: Health Effects, Measurement and Analysis.

The Advisory Council discussed the draft report that was in the agenda packet.

Member Vura-Weis commented that the composition of the ultrafine particulate matter (UFP) was important.

Vice Chairperson Hayes requested that a bullet point be added to page 3, stating there is poor correlation between UFP numbers and PM 2.5 mass concentrations and this raises the concern that control measures designed for PM 2.5 may not reduce UFP, and in some cases may actually increase UFP. He requested that headings for Air Quality, Emission Inventory, Exposure and Health Effects and Control Measures be added to make a clearer, more logical sequence. The changes were made on the draft report.

Member Lutzker stated that there is an exposure issue and the chemical processes may be part of the exposure issue.

Vice Chairperson Hayes noted that evaluating the effect of PM 2.5 control measures have on UFP, was not included in the recommendations. He stated that the speakers were clear, and there is no correlation.

Member Bedsworth talked about the value of a public health officer and remembered that this request had been made previously.

Ms. Roggenkamp responded that the Air District did create and recruit for the position of a Health Officer, however, in the meantime there has been a hiring freeze and the hiring has been put on hold. Staff recognizes the importance.

Member Altshuler suggested that the Health Officer recruitment should be raised to the highest priority after hiring freeze is over.

Chair Blonski said the recommendation will be kept in the draft and after the Advisory Council has heard other speakers adjustments can be made to have a flow in the recommendations.

There was discussion regarding whether or not the Advisory Council would make recommendations to the Board of Directors at this time, or wait until other speakers had been heard and more information gathered. It was suggested that the Advisory Council make a presentation to the Board reviewing the work that has been done thus far, and updating them on emerging issues of UFP. The recommendations would be done at a later time. The consensus

was to bring forward emerging issues so the Board knows the direction the Advisory Council is heading.

Ms. Roggenkamp stated that more speakers are scheduled, and additional information will help refine the current report. Going to the Board twice with recommendations could be confusing.

Member Lutzker stated that one recommendation already known is to hire the public health officer.

Chair Blonski stated that a spokesperson was needed to take the presentation to the Board.

Discussion continued regarding the title and functions of a Public Health Officer, whether that person would be a physician, and how the Air District currently looks at health effects.

Ms. Roggenkamp explained that the Air District has a toxicologist on staff in addition to staff in the CARE program. Staff review health studies, research materials and evaluate health risks. A Health Officer, if hired in the future, may not necessarily have M.D. credentials.

Member Vura-Weis said that the title of Health Officer means an M.D., and having a physician makes a difference. The Air District needs a Public Health Officer.

Member Altshuler added that the title could be Health Effects Officer, or be a Director.

Member Lutzker agreed that there is more credibility to have a M.D., but cautioned against pigeon holing the position. She stated that it is important to put this forward, if there is a lift in the hiring freeze, the Health Officer should be a priority.

Member Bard suggested that the Advisory Council give the Board a few bullet points about what the Advisory Council is thinking about and what the direction of the recommendations. A section titled "Going Forward" or something similar would be good. The Board may be left wondering if we leave it without some room for afterthought.

Member Lutzker said that emerging issues and potential recommendations could be brought to the Board. These are initial thoughts, and areas of concern where we see gaps.

Member Brazil noted that the report can explain that more speakers and presentations are forthcoming.

Member Holtzclaw suggested letting the Board of Directors know that the Advisory Council had dedicated a year to UFP issues, and bring them up to date.

Vice Chairperson Hayes suggested a heading or title of Advisory Council "Next Steps" rather than "Recommendations". Let them know that this is a work in progress and point the way to more specific conclusions. We are not ready for these recommendations. We've had

presentations, we have more coming, let the Board know that to date we are seeing these concerns.

Council Action: Member Vura-Weis made a motion to approve the draft report with the understanding that the subcommittee will summarize the comments from Members for inclusion in the report as Advisory Council “Next Steps” rather than “Recommendations”. The motion was seconded by Member Bard, and passed unanimously without opposition.

The Advisory Council then reviewed the slide show presentation. Mr. Altshuler presented the slide show and Members discussed the presentation and made comments and changes to be incorporated into the final presentation. A copy of the slide show is attached to these minutes.

Member Lutzker noted that the slides containing recommendations would be changed.

Member Altshuler said that the Recommendations would be changed to Next Steps, or On-going or Emerging Issues. He said that beyond measurements we need to know where the UFP are originating. Tracking of epidemiology and toxicology studies and providing information to the public would be greatly assisted by having a Public Health Officer on staff.

Member Lucks commented that the presentation was crisp and informative. Asked about adding a bullet to include the environmental effects of black carbon, which could be a sleeping giant in climate change. Black carbon is an issue and he would like to have one bullet for black carbon effects. On slides 8 and 9, rename Health and Environmental effects.

Member Holtzclaw thought the presentation was excellent. He suggested that when slide 4 is shown, that the presenters say mass or weight, so the audience understands.

Member Bard noted that semi-volatile organic compounds and metals listed on slide 11 are key contributors in health effects and that was a large part of the presentation by Dr. Froines.

Member Altshuler said there are many things that may or may not have health effect and he was trying not to get too specific in the presentation.

Member Vura –Weis said that slide 11 could say that the health effects are not well understood, but significant.

Vice Chairperson Hayes had a question about the accuracy of slide 6, and thought that particle mass should follow CO.

Member Bedsworth also thought this slide needed some additional explanation.

Member Vura-Weis said that the work group would look for a better slide to be used in the presentation.

Vice Chairperson Hayes said that the lack of correlation between UFP and PM 2.5, raises concerns about the effect of our PM 2.5 controls on UFP; and should be included on the Emerging Issues slide.

A typo was found on slide 10; the last bullet should say “may all be”.

A suggestion was made to change the bullet on slide 10 to say that “People spend much more time indoors...”

Chair Blonski thanked member Altshuler and his team, Members Vura-Weis and Lutzker.

Ms. Roggenkamp stated that a helpful addition to the presentation would be to explain that there are air quality standards for PM 10 and PM 2.5, and that there are not ambient air quality standards for UFP.

Member Holtzclaw noted that there are federal and state standards for PM10 and PM 2.5. The Air District is leading the state and is on the cutting edge.

Chair Blonski suggested that a version number be added to the slide show to avoid any confusion with previous versions.

OTHER BUSINESS

4. Council Member Comments / Other Business

Member Lucks said that he would be doing a presentation after the July Advisory Council Meeting; a one hour primer on Air Quality Law. It will be at noon so that Air District personnel can attend.

Member Lucks told the Advisory Council members about SB 763 a bill that would acknowledge green/ sustainability leaders and asked for the members to consider supporting this bill. Member Lucks requested that Advisory Council members introduce themselves and specifically talk about their affiliations.

Chair Blonski called upon Advisory Council members, staff and the sole audience member, one at a time. Everyone present gave an introduction, commented about their affiliations, interests and background.

Chair Blonski asked if there were any other comments from the Advisory Council Members.

Member Bard stated that the Lung Association recently released the State of the Air report, and another report discussing the benefits of stronger clean car standards. Member Bard handed out the reports to the Advisory Council Members.

5. **Next meeting:** The next meeting of the Advisory Council will be held on Wednesday, June 8, 2011 at 9:00 a.m. at 939 Ellis Streets, San Francisco, CA 94109.
6. **Adjournment:** Chair Blonski adjourned the meeting at 11:22 a.m.

Kris Perez Krow
Clerk of the Boards

**FINAL REPORT ON JUNE 8, 2011 ADVISORY COUNCIL MEETING ON
“ULTRAFINE PARTICLES (UFP): SOURCES AND CHARACTERISTICS”**

SUMMARY

The following presentations were made at the June 8, 2011 Advisory Council meeting on Ultrafine Particles (UFPs): Sources and Characteristics:

1. ***Mobile Source Ultrafine Particle Emissions: Past, Present, and Future*** by Barbara Zielinska, Ph.D., Research Professor, Desert Research Institute (DRI), Division of Atmospheric Sciences, Reno, Nevada; and Director, Organic Analytical Laboratory, DRI. Dr. Zielinska has been working in the field of organic analysis for over 30 years. She has extensive experience in development of measurement methods for organic compounds in both the gas and particle phases in ambient air. She has also developed analytical methods for identifying biologically active compounds in primary and secondary particulate organic matter, kinetics, and products of gas-phase reactions. She has published numerous articles on emissions sources of organics in the gas and particle phases, including leading edge work in diesel particulate matter emissions and secondary particle formation. She has served on the US EPA Clean Air Scientific Advisory Council (CASAC), which provides scientific guidance to Congress and she is currently a member of the CASAC Ambient Air Monitoring and Methods Subcommittee. She earned her M.Sc. in Chemistry at the Technical University of Lodz, Poland and her Ph.D. in Chemistry from the Polish Academy of Sciences.
2. ***Physical, Chemical and Toxicological Properties of Ambient Ultrafine Particles and their Sources*** by Anthony Wexler, Ph.D., Professor, Mechanical and Aerospace Engineering, Civil and Environmental Engineering; and Land, Air and Water Resources, UC Davis; Director, Air Quality Research Center, Crocker Nuclear Laboratory; and EPA’s San Joaquin Valley Aerosol Health Effects Research Center, UC Davis. Dr. Wexler has worked on the atmospheric transport and transformation of airborne particles for over 20 years. Currently, he is investigating how early childhood exposure may lead to lung function decrements, where particles are deposited in airways; the thermodynamic properties of organic and inorganic compounds in the atmosphere; ion mobility spectrometry for aerosol chemical composition analysis; and source-oriented sampling of ambient particles. Dr. Wexler has developed new equipment for analyzing nanoparticles in air and has participated in multiple US EPA projects to measure air quality impacts in selected cities, including Pittsburgh, Pa., Houston, TX, and Fresno, CA. He earned his B.S. in Engineering Physics at UC Berkeley, M.S. in Mechanical Engineering at the Massachusetts Institute of Technology, and Ph.D. in Mechanical Engineering at California Institute of Technology.

DISCUSSION MEETING

At the July 13, 2011 meeting, the Council discussed the presentations, materials received at the June 8, 2011 meeting, and the draft report on that meeting. The revised draft report will be discussed and finalized at the September 14, 2011 meeting.

KEY POINTS

Dr. Barbara Zielinska

- New diesels (post 2006) with filters have such low mass PM emissions, i.e., 99% lower than the 1998 standard, as well as lower particle counts, that they over achieved the 2007 emissions standard. Diesels with retrofit traps also have low PM emissions. Nitrogen Oxides (NO_x) controls were also implemented in 2010 diesels.
- Old (un-retrofitted) diesels emit 10 times as much Polycyclic Aromatic Hydrocarbons (PAH) as gasoline engines.
- Gasoline engines that burn lubricating oil are gross polluters and are thus significant sources of UFPs. UFP emissions attributable to lube oil include: the oil itself, oil additives [e.g., zinc dialkyl-dithio-phosphate (ZDDP), sulfur compounds], and PAHs. Changing lube oil frequently reduces the potential to emit PAHs.
- Standards and/or regulations should focus on emission magnitudes (i.e., numbers of UFP > 23 nm), as is the European approach, rather than on an Ambient Air Quality Standard (AAQS).
- Understanding UFP state (i.e., gas, liquid, solid) is challenging, as ambient temperature affects the state, and particles are dynamic and change in state and size (i.e., grow or shrink) over time, space, and temperature.

Dr. Anthony Wexler

- Exposure of children to UFP and ozone is a concern because their lungs are still developing. Rats exposed to ozone showed measureable and significant reductions in lung function, while those exposed only to PM did not show the same results. While we were not given the concentrations or the nature of the PM that the rats were exposed to, and test ozone levels were 500 ppb, i.e., five times its AAQS.
- Exposure to UFP that occurs on and near freeways and in road tunnels is most important and potentially harmful to health because UFP count is markedly higher in these areas.
- Most lubricating oil comes out of tail pipes volatilized or as unburned and unhealthy semi-volatile organic carbon (OC).
- The methodology to trace PM source by elemental analysis and time sequence sampling, as used in field research studies, is expensive and complicated.

EMERGING ISSUES FROM THE ADVISORY COUNCIL

1. BAAQMD programs to remove old vehicles (both gasoline and diesel) via Transportation Fund for Clean Air (TFCA) funds have been effective in targeting and reducing significant PM sources. Targeting gross polluters (i.e., lube oil burners) also is also effective. New state programs now replace past BAAQMD programs.
2. The state (i.e., gas, liquid, solid) of UFPs change as they exit tailpipes, migrate along road ways, and then drift away from roadways. Ambient temperature affects their state, and particles are dynamic and change physical state and size over time, based on changes in atmospheric temperature, pressure, and humidity.
3. UFP emissions standards (as particle counts) are preferable to AAQS (as concentrations).
4. Observations show that UPM concentration is significantly higher near freeways, relative to background. Potential health impacts of UPM on near-freeway receptors are expected to vary depending on factors, such as use of nearby facilities (e.g., long or short term exposures), sensitivity of receptors (e.g., young, old, asthmatics, sick), and environmental factors (e.g. prevailing winds). New development projects within this zone need to be monitored and reviewed closely, depending on their projected use of such facilities and on their use by sensitive populations. The Air District is working with the City/County of San Francisco and City of San Jose to develop Community Risk Reduction Plans that can serve as models for reducing exposure to UPM.
5. The Advisory Council would like to review the District's pending ambient monitoring and modeling plans for UFP in light of recent information provided to the Council. Questions include: How does the program integrate with the District's ongoing modeling on 4 and 1 km grid-cell scales? Is the purpose of the monitoring to determine population-exposure to UFP or to describe emission sources (i.e., freeways)? We noted in our May 11th report that the size distribution of particles emitted by diesel engines is affected by PM emission control-systems. Where significant diesel PM mass reductions have occurred in highly impacted areas, such as the Port of Oakland, studies are needed to evaluate potential increases of UFP concentrations and their impacts on nearby residents. *(We asked the speakers their opinions on the issue. Both speakers said they had seen this study, but it has not been repeatable and other studies refute it.)*

ADVISORY COUNCIL RECOMMENDATIONS

The following Advisory Council recommendations to the Board are based on the above presentations and on subsequent discussions among Advisory Council members. These recommendations are made with the knowledge that further advances on measurements, physical state, and health effects will be made. We encourage the Air District to:

1. Continue efforts to remove or retrofit older diesel and gasoline vehicles and to remove gross polluting automobiles.
2. Request Bureau of Automotive Repair (BAR) to modify the SMOG check program to identify vehicles that are lube oil burners, so that they can be targeted for repair or removal.
3. Collaborate with BAR to develop recommendations on how to reduce UFP emissions from lube oil (re frequency changes, synthetic or non-synthetic oil), and to publicize this information on the Air District's website and through other means.
4. Continue to develop recommendations concerning the short and long term reduction of existing and future location of schools, child care centers, housing, adult care facilities, athletic fields, and other places congregating sensitive human receptors (e.g., children, elderly, and those with cardio-respiratory conditions) within 300 meters of freeways and major roadways. Meteorology (especially prevailing wind directions) needs consideration.
5. Evaluate the potential unintended consequences of mitigation of UFP, e.g., increased use of Heating, Ventilation, and Air Conditioning (HVAC) filtration to reduce indoor UFP may result in increased greenhouse gas emissions from electric power plants.
6. Monitor the European UFP standard and support, where appropriate, development of an UFP standard for motor vehicle emissions in California that includes semi-volatile organics.
7. Continue to develop means to integrate PM 2.5 and UFP considerations into identifying, ranking, and selecting control measures in the Air District's Air Quality Control Plan.

GLOSSARY

AAQS: Ambient Air Quality Standards, set by US EPA and California Air Resources Board.

BAR: Bureau of Automotive Repair, state agency responsible for coordinating state's vehicle emissions testing program.

HVAC: Heating, Ventilation, and Air Conditioning, system used to cool or warm air within buildings.

OC: Organic Carbon, by-product of combustion of petroleum; generally more reactive and toxic than elemental carbon. OC may be laced with other more toxic hydrocarbons.

PAH: Polycyclic Aromatic Hydrocarbon, highly toxic organic compound.

PM 2.5: Particulate Matter of size ≤ 2.5 microns; includes UFPs in its lower size range.

TFCA: Transportation Fund for Clean Air, Air District grant program used to replace, retrofit, or repair older, dirtier engines (usually diesel).

UFP: Ultrafine Particulate matter in size < 0.1 micron (or 100 nanometers).

ZDDP: Zinc Dialkyl-Dithio-Posphate, exotic zinc compound used in lubricating oil to enhance lubricating properties.

AGENDA 10, ATTACHMENT 6

Bay Area Air Quality Management District
939 Ellis Street
San Francisco, CA 94109
(415) 749-5000

APPROVED MINUTES

Advisory Council Regular Meeting
9:00 a.m., Wednesday, June 8, 2011

CALL TO ORDER

Opening Comment: Chairperson Blonski called the meeting to order at 9:05 a.m.

ROLL CALL

Present: Chairperson Ken Blonski, M.S.; Secretary Robert Bornstein, Ph.D. and Council Members Sam Altshuler, P.E., Jennifer Bard, Louise Bedsworth, Benjamin Bolles, M.S., Jeffrey Bramlett, Harold Brazil, Peter Chamberlin, Jonathan Cherry, AIA; Alexandra Desautels; John Holtzclaw, Ph.D., Kraig Kurucz ; Gary Lucks, JD, CPEA, REA I; Liza Lutzker; Jane Martin, DrPh; Kendall Oku; Jonathan Ruel and Dorothy Vura-Weis, M.D., M.P.H.

Absent: Vice Chairperson Stan Hayes

Public Comment Period: There were no public comments.

CONSENT CALENDAR

1. Approval of Minutes of the May 11, 2011 Advisory Council Meeting:

Member Altshuler noted that his title was stated incorrectly on the May 11, 2011 minutes.

Council Action: Member Holtzclaw made a motion to approve the minutes of the May 11, 2011 Advisory Council Meeting, with the correction as noted; Member Martin seconded the motion and it carried unanimously without objection.

PRESENTATION: ULTRAFINE PARTICLES

2. Ultrafine Particles: Sources and Characteristics

A. Mobile Source Ultrafine Particle Emissions: Past, Present and Future

Deputy Air Pollution Control Officer, Jean Roggenkamp, introduced speaker Dr. Barbara Zielinska and offered the following biographical information about Dr. Zielinska:

Dr. Zielinska is a Research Professor at the Desert Research Institute, Division of Atmospheric Sciences, Reno, Nevada and the Director, of the Organic Analytical Laboratory.

Dr. Zielinska has been working in the field of organic analysis for over 30 years. She has extensive experience in development of measurement methods for organic compounds in both gas and particle phases in ambient air. She has also developed analytical methods for identifying biologically active compounds in primary and secondary particulate organic matter, kinetics and products of gas-phase reactions. She has published numerous articles on emissions sources of organics in the gas and particle phases, including leading edge work in diesel particulate matter emissions and secondary particle formation. She has served on the US EPA Clean Air Scientific Advisory Council (CASAC) that provides scientific guidance to Congress and is currently a member of the CASAC Ambient Air Monitoring and Methods Subcommittee.

Dr. Zielinska earned her M.Sc. in Chemistry at the Technical University of Lodz, Poland and Ph.D. in Chemistry from the Polish Academy of Sciences.

Dr. Zielinska gave her presentation to the Advisory Council. The power point presentation is attached to these minutes for further detail. Dr. Zielinska explained past scientific methods and results of measuring ultrafine particulate matter. She reviewed studies of emissions from gasoline and diesel engines, and showed comparisons of emissions that occur related to driving speed, load and temperature. She discussed particle size, composition and distribution for a variety of fuel types and engines.

Dr. Zielinska presented results from the Advanced Collaborative Emissions Study (ACES) which looked at four engine types and compared emissions against past standards to show improvements in emissions technology since 1998. The results showed significant decreases in regulated particulate matter (PM), carbon monoxide (CO), and non-methane hydrocarbons (NMHC) emissions, close to 90% or greater below the 2007 standard; and nitrogen oxide (NO_x) was 10% below the standard. Comparisons between a 2004 engine and a 2007 engine showed decreases in unregulated emissions of between 71 – 99%.

Dr. Zielinska affirmed that the concentrations and spatial variations in the diesel particulate matter (DPM) estimated from the West Oakland Monitoring Study (WOMS) data were consistent with the adjusted modeled results from the California Air Resources Board (ARB) and the Air District's health risk assessment.

Dr. Zielinska talked about the Health Effects Institute (HEI) studies performed using the EUPHORE photo-reactor located in Valencia, Spain. The HEI Special Committee on Emerging Technologies produced a report titled "The Future of Vehicle Fuels and Technologies: Anticipated Health Benefits and Challenges" that discussed promising new technologies such as engine modification and exhaust aftertreatment, as well as electric drive technologies and new fuels for the future of emissions reductions.

Dr. Zielinska discussed her answers to the questions posed by the Advisory Council prior to her appearance. She stated that ultrafine particles (UFP) can originate from anthropogenic sources (i.e. direct motor vehicle emissions) and from biogenic sources (secondary organic aerosol (SOA) from terpenes/ sesquiterpenes emissions). She assessed that ambient UFP standards are difficult to enforce, as biogenic SOA is not controllable, and a UFP standard on motor vehicle emissions would be more effective and easier to implement. Dr. Zielinska discussed the European standard for UFP, based on the number of particles, will be phased in for all diesel vehicles in 2011 and fully in place in 2013; and will be extended to all gasoline vehicles in 2014 with full implementation in 2015. She stated the European Particulate Measurement Program (PMP) includes solid particles only, down to 23 nm in size, and debate continues regarding whether volatile particles should be included.

Dr. Zielinska noted elevated concentrations of UFP have been observed near major roadways in many studies and the exponential decay of particle number concentrations was observed with increasing distance from the roadways. She stated that the Environmental Protection Agency is developing guidance for expanded monitoring capability, and the main pollutants recommended for monitoring were nitrogen dioxide (NO₂), nitrogen monoxide (NO), nitrogen oxide (NO_x), black carbon, carbon monoxide (CO), ultra-fine particles (UFP), particle-size distribution, particulate matter between 10 microns and 2.5 microns (PM_{10-2.5}), particulate matter of 2.5 microns or less (PM_{2.5}), elemental carbon (EC), organic carbon (OC), carbon dioxide (CO₂), ozone (O₃), total reactive nitrogen (NO_y), sulfur dioxide (SO₂), and benzene, toluene, ethyl benzene and xylene (BTEX).

Dr. Zielinska concluded her presentation and Advisory Council members held their questions until after the second presentation was completed.

B. Physical, Chemical and Toxicological Properties of Ambient Ultrafine Particles and their Sources

Deputy Air Pollution Control Officer, Jean Roggenkamp, introduced speaker Anthony S. Wexler, Ph.D. and offered the following biographical information about Dr. Wexler:

Anthony S. Wexler, Ph.D. is a Professor, Mechanical and Aerospace Engineering, Civil and Environmental Engineering and Land, Air and Water Resources at UC Davis; and Director, Air Quality Research Center, Crocker Nuclear Laboratory and EPA's San Joaquin Valley Aerosol Health Effects Research Center at UC Davis.

Dr. Wexler has worked on the atmospheric transport and transformation of airborne particles for over 20 years. Currently, he is investigating how early childhood exposure may lead to lung function decrements, where particles deposit in the airways, the thermodynamic properties of organic and inorganic compounds in the atmosphere, ion mobility spectrometry for aerosol chemical composition analysis, and source-oriented sampling of ambient particles. Dr. Wexler has developed new equipment for analyzing nanoparticles in air and has participated in multiple

Environmental Protection Agency projects to measure air quality impacts in selected cities including Pittsburgh, Pennsylvania; Houston, Texas; and Fresno, California.

Dr. Wexler earned his B.S. in Engineering Physics at UC Berkeley, an M.S. in Mechanical Engineering at Massachusetts Institute of Technology and Ph.D. in Mechanical Engineering at California Institute of Technology. Dr. Wexler gave his presentation to the Advisory Council and focused on roadway particle dynamics, source-oriented sampling and toxicity, and the disruption in lung growth after juvenile exposure to ozone and particles. The power point presentation is attached to these minutes for further detail.

Dr. Wexler stated that health effects are connected to emissions and roadway particles cause health concerns for children growing up near freeways. Children may be uniquely susceptible because their lungs are developing, and studies show lung function deficits, and increased asthma. He added that freeway emissions contain fresh combustion emissions, close to populations, and road and tire wear dust are part of those emissions.

Dr. Wexler explained the event chain of roadway emissions, starting with hot tailpipe emissions in particle and gas phases, then the tailpipe-to-roadway dilution which includes rapid cooling and reduction of vapor pressure, and then the roadway-to-community dilution.

Dr. Wexler concluded that particle composition and size was similar on the roadway and far from the roadway, near the roadway particles are larger and have more organic content. He stated that the health impacts depend on the composition and toxicity of the condensing organics and whether they are more or less toxic in the gas and particles phases. Studies show impacts of near roadway exposure but do not conclusively define the specific cause, whether it is the high concentration of particles, size or composition, or the concentrations of coarse material.

Dr. Wexler discussed ways to deduce health effects from different sources using source oriented sampling. He showed results of source oriented sampling collected in Fresno using 10 high-volume ChemVol samplers assigned to different sources. He presented data on particle classes, source combinations and single particle summary statistics.

Dr. Wexler discussed his research about lung growth and his study of rats exposed to high levels of ozone, and how that relates to disruption in lung growth for children. Results suggested that ozone was more damaging than PM for lung development.

Dr. Wexler explained the use of the Rapid Single-ultrafine-particle Mass Spectrometer (RSMS-III) in his research and the methods of collection of data and the parameters.

PANEL DISCUSSION:

3. Ultrafine particles: Sources and Characteristics

Council members discussed the findings with both of the speakers. Topics discussed included: health concerns for truck drivers, and comparing occupational roadway exposure with community exposure. Dr. Zielinska responded to a question regarding her recommendations for UFP standards by stating regulating is best done at the source, that Europe has limits of 23 nm for PM and regulations should include semi-volatile organics and PM. Dr. Wexler noted regulations are motivated by health effects and climate change, and UFP is mostly having effect on cardiovascular systems but little is known about the pathway.

Council members asked questions about infill and transit oriented housing near freeways, mitigation measures and standards. Both speakers stated that 300 meters was a preferable buffer distance to minimize exposure for housing and schools, noting that studies show children who live within 300 meters have health effects from exposure. Dr. Zielinska stated that although there are sources of indoor PM, such as cooking, they are not the same toxicity as PM from fuel combustion, and said it was important to know the source of the PM. The speakers explained high efficiency particulate air (HEPA) filters are effective, as is air conditioning but both methods require energy; barriers around freeways disrupt the flow of air and reduce exposure.

There was discussion about the Dr. Wexler's research with rats, including the levels of ozone exposure, the standards used when doing testing, and the findings.

Lubrication oil in vehicles was discussed as a source of black smoke; particles can be tested to determine the signature of lubricant oil and gross pollutants are a large part of the problem.

Planning Division Modeling Manager, Saffret Tanrikulu addressed the Advisory Council and updated the members about exposure studies and inventory being planned, and monitoring currently performed by the Air District.

Polycyclic aromatic hydrocarbons (PAHs) were discussed and Dr. Zielinska stated PAHs are hazardous air pollutants and on the toxics list; they are found in wood smoke, combustion from gas, diesel and lube oil and some are specific to biomass burning.

The speakers were asked what they felt was the biggest challenge in the UFP area. Dr. Wexler replied that measurement was important, and controlling emissions by particle number was preferred. Dr. Zielinska added that UFP is emitted from all kinds of engines, but newer engines decrease the number.

OTHER BUSINESS

4. Council Member Comments / Other Business

Member Lucks said that he would present a regulatory primer on air quality law during the next Advisory Council meeting. The presentation will be placed on the agenda and begin around 11:00 a.m.

5. Next meeting: The next meeting of the Advisory Council will be held on Wednesday, July 13, 2011 at 9:00 a.m. at 939 Ellis Streets, San Francisco, CA 94109.

6. Adjournment: Chair Blonski adjourned the meeting at 12:05 p.m.

Kris Perez Krow
Clerk of the Boards

Attachments:

- A. Mobile Source Ultrafine Particle Emissions: Past, Present and Future
- B. Physical, Chemical and Toxicological Properties of Ambient Ultrafine Particles and their Sources

Please note: Attachments are part of the recorded minutes, but will not be included in the packet for the July 13, 2011 Advisory Council meeting.

AGENDA 10, ATTACHMENT 7

Bay Area Air Quality Management District
939 Ellis Street
San Francisco, CA 94109
(415) 749-5000

APPROVED MINUTES

Advisory Council Regular Meeting
9:00 a.m., Wednesday, July 13, 2011

CALL TO ORDER

Opening Comment: Chairperson Blonski called the meeting to order at 9:05 a.m.

ROLL CALL

Present: Chairperson Ken Blonski, M.S., Vice Chairperson Stan Hayes, and Council Members Sam Altshuler, Ph.D., Jenny Bard, Louise Bedsworth, M.D., Benjamin Bolles, Jeffery Bramlett, Harold Brazil, Peter Chamberlin, Jonathan Cherry, John Holtzclaw, Ph.D., Kraig Kurucz, Gary Lucks JD, CPEA, REA, Liza Lutzker, Jane Martin, Ph.D., Kendall Oku, Jonathan Ruel and Dorothy Vura-Weis, M.D., M.P.H. were in attendance.

Absent: Secretary Robert Bornstein and Council Member Alexandra Desautels were absent.

Public Comment Period: There were no public comments.

CONSENT CALENDAR

1. Approval of Minutes of the June 8, 2011 Advisory Council Meeting:

Council Action: Chairperson Blonski made a motion to approve the corrected and revised minutes of June 8, 2011, and Member Holtzclaw seconded the motion; the motion carried with an abstention from Vice Chair Hayes.

DISCUSSION

2. Discussion of Draft Report on the Advisory Council's June 8, 2011 Meeting.

Mr. Altshuler gave an overview of the report and stated the conclusions were consistent with the previous speakers and reports. Mr. Altshuler led the Advisory Council in a discussion of the report. He stated the purpose of the report was to add value to what the speakers had said.

Advisory Council members agreed that abbreviations and acronyms will be spelled out at the first appearance and inclusion of a glossary was suggested.

There was discussion with staff about current and future air monitoring, and the location of equipment. Members were interested in reviewing the Air District's monitoring plans and hearing about what programs are already in process.

Mr. Kurucz asked about recommendations # 2 and # 4, and which agency they were directed toward. There was discussion as to whether the recommendations should remain separate or combined into one.

Members discussed the lack of regulatory authority over vehicles and whether to appropriately support emission standards implemented by other agencies.

The correlation between PM and ultrafine particles (UFP) was discussed. Mr. Altshuler noted a discussion at the Air and Waste Management Association conference (AWMA) indicated that numbers of UFP may go up, but the particles are less health harmful; however there was not a clear consensus, and there were questions about what needed to be tracked. It was mentioned that both of the speakers noted a concern about whether PM control measures lead to UFP.

Chair Blonski and Mr. Altshuler requested that member comments be emailed to Mr. Altshuler for incorporation in the final report.

Mr. Ruel noted the challenge of the Advisory Board to make recommendations even as new information is being obtained; thought that a stronger recommendation could be made at the end of the year after hearing all speakers.

Dr. Vura-Weis suggested that an update or status report from the Air District on current programs and monitoring would be helpful as the Advisory Council considers new topics and recommendations. She also hoped an explanation of the process of how UFP particles change can be given to the Board of Directors; and had suggestions for the wording regarding gasoline engines that burn oil. Dr. Vura-Weis wanted information on polycyclic aromatic hydrocarbon (PAH) to be included as well.

There was discussion about the unintended consequences of certain mitigation measures, such as the amount of energy usage while filtering air, and how to address that concern in the report and recommendations.

The Council discussed the sharing of information and comments for the report, and they were given instruction from District Counsel Brian Bunger to email Mr. Altshuler directly only, and not to copy or "reply to all".

Mr. Hayes gave comments about item #3, on Emerging Issues. He noted that the term "significantly high" does not quantify the amount, and inquired at what level does PM create a

matter of concern. He suggested saying “significantly high, relative to background” and changing wording regarding monitoring to reflect the need for further review and consideration. Mr. Hayes noted a recent study indicated semi-volatiles on UFPs are a larger problem than the particles themselves. He stated research such as this gives important clues as to what issues should be pursued.

There was further discussion about UFP exposure impacts on locations near roadways. Committee members considered impacts on schools and other buildings located near traffic, mitigation measures, and how to include those concerns into the report and recommendations. Outreach to residents and educating citizens about UFP exposure health impacts was also discussed. Council members considered many methods of mitigation and impacts to high risk communities. The desire to balance the emphasis placed on emission reduction of gross pollutants and the need for mitigation measures was considered. It was noted that regional collaboration would be needed as the Air District’s authority is limited and focused on stationary sources, however the Air District supports best practices and has influence beyond regulations.

Mr. Kurucz suggested that the key points from Dr. Zielinska be elaborated upon, especially regarding the migration of particles. Further discussion of particles, the effects of semi-volatiles, metals and organics continued.

Dr. Bedsworth hoped the group could synthesize all the information together and make the Advisory Council’s recommendations relevant for the near term and long term.

Mr. Chamberlain remarked that the suggestion of setbacks in recommendation #3 was a familiar parameter to set for development, adding that if building occurred within the setback a variance and mitigation measures could be required. He also requested the wording in this recommendation be changed from “children” to “sensitive receptors”.

There was discussion about the large amount of information provided to the Advisory Council and the distilling of those facts into clear and relevant recommendations. The time limitation of the presentation to the Board of Directors was talked about, and suggestions were made regarding the slide content and quantity.

Gary Kendall noted the Advisory Council has a break in August and resumes in September. He also said that next year’s schedule would be set up differently to keep the momentum. He advised the Council that he is arranging speakers for future meetings and considering continuing the UFP topic through 2012. Members gave Mr. Kendall the names of speakers they would like to hear from, and requested a presentation from the Bureau of Automotive Repair on their smog check and other programs.

Members were again reminded about contacting Mr. Altshuler with their comments, keeping in mind the Brown Act by communicating only with Mr. Altshuler. It was noted that discussion and back and forth correspondence would be limited to the ad hoc working group only.

3. Report on the Annual Air & Waste Management Association (AWMA) Meeting, June 21-24

Advisory Council Members Holtzclaw, Brazil, Altshuler and Hayes reported about their attendance at the AWMA conference.

OTHER BUSINESS

4. Council Member Comments / Other Business

Ms. Bard reported on public workshops being given by California Air Resources Board, handed out a health and equity matrix for inclusion in sustainable community programs, and requested support for SB 582.

Chair Blonski reminded the Advisory Council and the audience that Mr. Lucks' presentation would begin after the adjournment.

5. Next meeting: The next meeting of the Advisory Council will be held on Wednesday, September 14, 2011 at 9:00 a.m. at 939 Ellis Streets, San Francisco, CA 94109

6. Adjournment: Chair Blonski adjourned the meeting at 11:10 a.m. The meeting was immediately followed by a presentation from Member Lucks.

Kris Perez Krow
Clerk of the Boards

Bay Area Air Quality Management District
939 Ellis Street
San Francisco, CA 94109
(415) 749-5000

APPROVED MINUTES

Advisory Council Regular Meeting
9:00 a.m., Wednesday, September 14, 2011

CALL TO ORDER

Opening Comment: Chairperson Blonski called the meeting to order at 9:05 a.m.

ROLL CALL

Present: Chairperson Ken Blonski, M.S., Vice Chairperson Stan Hayes, Secretary Robert Bornstein and Council Members Sam Altshuler, Ph.D., Jenny Bard, Louise Bedsworth, Ph.D., Benjamin Bolles, Harold Brazil, Peter Chamberlin, Jonathan Cherry, Alexandra Desautels, John Holtzclaw, Ph.D., Kraig Kurucz, Liza Lutzker, Jane Martin, Ph.D., Kendall Oku, and Dorothy Vura-Weis, M.D., M.P.H. were in attendance.

Absent: Council Member Jeffery Bramlett, Gary Lucks JD, CPEA, REA, and Jonathan Ruel were absent.

Public Comment Period: There were no public comments.

CONSENT CALENDAR

1. Approval of Minutes of the July 13, 2011 Advisory Council Meeting:

Council Action: Mr. Holtzclaw made a motion to approve the minutes of July 13, 2011, and Mr. Altshuler seconded the motion; carried unanimously without objection.

DISCUSSION

2. Discussion of Revised Draft Report on the Advisory Council's June 8, 2011 Meeting on Ultrafine Particles: Sources and Characteristics

Chair Blonski requested the Council move through the report once again and requested Mr. Altshuler lead the efforts to complete the report.

Mr. Altshuler stated he received feedback from numerous Council members and that he incorporated all requests.

Chair Blonski asked if anyone had additional comments and several members responded. Mr. Altshuler informed the Council members that the glossary of acronyms and abbreviations was new.

Dr. Vura-Weis requested that each abbreviated item be spelled out prior to using the abbreviation. Dr. Vura-Weis also provided additional changes, including correcting the spelling of particules to particles, providing the proper spelling of Oxides of Nitrogen (NO_x), Polycyclic Aromatic Hydrocarbons (PAHs), and Zinc Dialkyl-Dithio-Phosphate (ZDDP).

Mr. Bolles expressed his concern about the emphasis placed on mitigation rather than pollution control and suggested that the Council de-emphasize mitigation and emphasize pollution control.

Gary Kendall responded by stating the main issue is differential exposures and the pollution control side of the equation is moving forward, as there are new standards for trucks and buses and that cars are getting cleaner year after year.

Deputy Air Pollution Control Officer, Jean Roggenkamp, commented on the emerging issues and recommendations section of the report. The Air District implemented a Vehicle Buyback program for many years and scrapped more than 50,000 vehicles, the State began implementing a vehicle scrap program, so the Air District has put its program on hiatus for as long as the statewide program is in place.

After extensive discussion regarding the draft report, numerous edits were incorporated and would be forwarded to Mr. Altshuler, Dr. Bornstein and Mr. Kendall for final review. Mr. Kendall provided the Council with information regarding heating and air conditioning. He also explained that High Efficiency Particulate Air (HEPA) filters, while more efficient at removing smaller particles, increase pressure drop across the filter.

Ms. Bard asked if the discussion is limited to mobile sources Ms. Bard wanted to explore the composition of ultrafine particles (UFP) in woodsmoke.

Mr. Altshuler responded to Ms. Bard, informing her of the information included in the draft report, relative to the previous Council meetings.

Mr. Kendall also responded, stating it is the Air District's goal to obtain speakers in 2012 who would discuss exposure assessment (indoor and outdoor micro-environments). Mr. Kendall continued, stating Council members suggested examining mitigation strategies employed by

local cities (San Francisco and San Jose). These topics may provide an additional opportunity to consider woodsmoke.

Dr. Holtzclaw asked about diesel fueled construction equipment. Ms. Roggenkamp said these engine's emissions are not specific to UFP, but to particulate matter (PM) in general. Ms. Roggenkamp continued, saying that all the lessons learned from this evaluation of UFP will include mobile and diesel sources. The Air District will continue to consider on-road sources, off-road sources, woodsmoke and industrial sources.

Dr. Martin asked about sensitive receptors in recommendation #4 and asked if it would be useful to the Board of Directors to specifically call for focus on the Community Air Risk Evaluation (CARE) communities and if this would help in terms of what the Council is trying to accomplish. Ms. Roggenkamp stated the Board of Directors is aware of the CARE program and that they are often impacted by diesel emissions, but that other areas can also be impacted by UFP.

Further edits to the draft report, were incorporated after discussion by the Council.

Council Action: Dr. Holtzclaw made a motion approve the revised draft report on the June 8, 2011 Advisory Council meeting on Ultrafine Particles: Sources and Characteristics, as amended; Dr. Bedsworth seconded the motion; carried unanimously without objection.

OTHER BUSINESS

3. Council Member Comments / Other Business

Chair Blonski suggested a round-robin to ensure each member had an opportunity to comment.

Ms. Desautels stated she has received several requests from community groups for the Air District's analysis of the drawbacks associated with infill and transit oriented development, and she requested this matter be discussed at a future meeting. Ms. Roggenkamp stated that this is an on-going issue and referred Ms. Desautels to relevant Air District staff.

Dr. Vura-Weiss suggested that the list of mitigation strategies be easily accessible to the public on the Air District website.

Mr. Kurucz announced the Golden West Section of the Air & Waste Management Association (A&WMA) would be holding a meeting regarding CEQA with excellent speakers on September 21, 2011.

Dr. Bornstein asked about the status of Mr. Altshuler's presentation to the Board of the Directors. Mr. Kendall informed the Council that all presentations presented to the Board are scheduled as time permits. In addition, there is a possibility that both reports may be presented at the same meeting.

Mr. Hayes informed the Council that he is a member of a taskforce developing policy to increase public outreach. He will continue to update the Council on any developments relevant to Council activities.

Mr. Brazil thanked Chair Blonski for his work with the Council and commented that the Council is progressing and congratulated the Council on its achievements.

Mr. Oku asked how the work on ultrafine would dovetail into a larger effort to get regulation for ultrafine.

Ms. Bard expressed her appreciation for the Air District News Clips and noted a National Oceanic Atmospheric Administration (NOAA) report on the measurement of ship emissions where cleaner, lower sulfur-containing fuels provide emissions reductions of up to 90%. In addition, Ms. Bard requested that the City of Davis – Yolo Clean Air be considered as a guest speaker for future meetings. Yolo Clean Air advocates for a wood burning regulation that bans wood burning on days when wind speed is less than 5 miles an hour.

Mr. Kendall stated that the workgroup of authors are arranged for the October 12, 2011 meeting. Mr. Kendall continued saying the Council's work products are the reports and is essential that members participate on preparing the reports.

In addition, Mr. Kendall stated the Council should continue to look at UFP next year, as it is a very complicated topic with many facets. Mr. Kendall also stated it is not as important to have an educational meeting in 2012, although they have been useful. It would mean the first meeting with speakers would be in February, with discussion meetings in March and April, the second speaker meeting in May with discussion meetings in June and July, and the third speaker meeting in September with discussion meetings in October and November.

Mr. Eric Stevenson, Division Director, Technical Services, provided the Council with an update on speakers for October 12, 2011 meeting. Mr. Stevenson informed the Council that arrangements have been made with Dr. Alberto Ayala Chief, Monitoring and Laboratory Division at the California Air Resources Board and, Dr. Michael T. Kleinman, a professor at the University of California, Irvine. Dr. Ayala is a recognized expert in engine emissions and ultrafine particles. Dr. Kleinman is an expert in traffic related health affects around major roadways. Ms. Bard explained that several health organizations have developed health and equity

metrics investigating reductions in premature mortality due to PM_{2.5} exposures, in addition to asthma incidents exacerbated by traffic pollution, using NO₂ as a proxy.

Dr. Bornstein said the Council has evolved nicely, and thanked Mr. Altshuler for his important contributions, authoring the last two reports and summarizing the presentations well.

Chair Blonski thanked everyone for their time.

4. **Next meeting:** The next meeting of the Advisory Council will be held on Wednesday, October 12, 2011 at 9:00 a.m. at 939 Ellis Streets, San Francisco, CA 94109
5. **Adjournment:** Chair Blonski adjourned the meeting at 1:00 p.m.

Vanessa Johnson
Executive Secretary II

FINAL REPORT ON THE OCTOBER 12, 2011 ADVISORY COUNCIL MEETING ON ULTRAFINE PARTICLES (UFP): CHARACTERIZATION OF MOBILE SOURCE EMISSIONS AND RELATED HEALTH EFFECTS

SUMMARY

The following presentations were made at the October 12, 2011 Advisory Council meeting on Ultrafine Particles: Characterization of Mobile Source Emissions and Related Health Effects:

1. ***Internal combustion engine generated particles: formation, measurement, trends, and knowledge gaps*** by Dr. Alberto Ayala, Ph.D. MSE. Dr. Ayala is the Chief of the Monitoring and Laboratory Division at the California Environmental Protection Agency, Air Resources Board. He holds an M.S. in Engineering and a Ph.D. in Mechanical and Aeronautical Engineering from the University of California at Davis. Dr. Ayala directs the State's ambient air monitoring program, several analytical laboratories, and programs focused on the measurement and characterization of air pollution, motor vehicle emissions, fuel analyses, asbestos, consumer products, and air emergency response. His principal research interests are emissions and ultrafine particle characterization. His group has on-going collaborations with international agencies and is leading the ARB's studies of emission and fuel measurement protocols and control technology assessment. He has published more than 50 articles in peer-reviewed journals, a number of them focused on particular matter (PM) and ultrafine particle emissions from internal combustion engines and has made presentations at more than 100 conferences. He has recently served on EPA's ACCACA for review of Black Carbon.
2. ***Semi-volatile components of fine and ultrafine particles: Do they exacerbate airway allergies, promote development of cardiovascular disease and induce inflammation in the brain?*** by Dr. Michael T. Kleinman, Ph.D. Dr. Kleinman is a Professor of Occupational and Environmental Medicine in the Department of Medicine at the University of California, Irvine (UCI). He holds a M.S. in Chemistry (Biochemistry) from the Polytechnic Institute of Brooklyn and a Ph.D. in Environmental Health Sciences from New York University. He has published more than 100 articles in peer-reviewed journals dealing with environmental contaminants and their effects on cardiopulmonary and immunological systems, and has directed more than 50 controlled exposure studies of human volunteers and laboratory animals to ozone, PM and other pollutants. Dr. Kleinman's current research focuses on neurological and cardiopulmonary effects of inhaled particles on humans and laboratory animals. His recent studies have demonstrated that inhalation of combustion-generated particles can promote airway allergies and accelerate the development of cardiovascular disease and that these effects may be associated with organic and elemental carbon components of the ultrafine fraction of the ambient aerosol. He has also served on EPA CASAC panels for PM and chairs the Air Quality Advisory Committee for California.

DISCUSSION MEETING

At the November 9, 2011 meeting, the Advisory Council discussed the presentations and materials received at the October 12, 2011 meeting and the draft report on that meeting, and finalized the draft report.

KEY POINTS

Dr. Alberto Ayala

- We need to be careful about generalizing UFP (see glossary for acronyms: particles with diameter < 100 nm or 0.1 microns). Not all UFP's are created equal, especially in terms of either composition or health impacts.
- The number, size, chemical composition, and physical state of UFP are dynamic, that is, they change with time and location, even the mode by which a UFP emission source is operated (e.g., vehicles in cruising or acceleration mode). All of these variations may affect UFP toxicity.
- There are many different sources of UFP, including stationary, mobile, industrial, occupational, and atmospheric conversion (i.e., secondary formation via photochemical processes).
- 85% of urban California ambient UFPs result from fuel combustion. On-road vehicles are the largest contributors to UFP.
- The biggest challenge with engines is cold start emissions, as these can exceed emissions generated while driving.
- Motor vehicle UFP is not just a "diesel only" problem. All internal combustion engines and fuels produce UFP, including engines fueled by gasoline, diesel, natural gas, hydrogen, ethanol, and biofuels. In the case of fuels that theoretically result in particle-free combustion, lube oil use from internal combustion engines contributes to UFP generation.
- The concentration of UFP from roadway emissions drops sharply with distance from the roadway due to such factors as dispersion, chemical conversion, particle coagulation, and deposition. Accumulation mode particles (> 100 nm in diameter) may have longer atmospheric residence times. The implication is that the correlation of UFP and accumulation mode PM may be poor when determined over a wide geographic area.
- One frequently measured indicator of UFP is particle number, that is, the number of particles in a cubic centimeter of air.
- UFP monitors are commercially available that count particles and could be deployed, but more elaborate measurements, such as speciation, can be expensive.

- Under some driving conditions, UFP can be in the exhaust from any engine type and fuel combination.
- The highest accumulation-mode particle-number emissions are from conventional diesel engines, these particulates being proportional to total PM mass.
- A diesel particulate filter (DPF)-equipped diesel engine can be low PM mass emitting, but under some conditions can emit a large number of UFPs.
- Recent research shows that the particles formed may be lower in toxicity (if in the form of nitrates and sulfates) than some organic components of UFPs, notably polycyclic aromatic hydrocarbons (PAHs).
- The contributions of lube oil and metals to UFP are of growing interest. The fractional contribution of sulfur from lube oil becomes larger as fuel sulfur drops.
- Diesel engine and emissions reduction technology is evolving. The DPF is a PM “game-changing” technology that not only achieves dramatic reductions in PM mass emissions from a non-controlled baseline engine, but also reduces UFP particle numbers to a level similar to those from compressed natural gas (CNG) and conventional gasoline engines.
- Gasoline engine technology is also evolving. Gasoline direct injection (GDI) is effective in reducing carbon dioxide for climate protection purposes, but earlier-vintage GDI engines emitted higher total PM mass and UFP particle counts than conventional gasoline engines. Newer GDI engines, however, have reduced PM mass and UFP emissions significantly.
- Transition from traditional internal combustion engines to hybrid engines, fuel cells, and electric vehicles will reduce UFP emissions.

Dr. Michael Kleinman

- Increases in air pollutant concentrations can lead to increased mortality and hospital admissions because of cardiovascular diseases.
- Exposure to elevated PM levels in ambient air can lead to increased heart rate and decreased heart rate variability in elderly patients. Individuals 65 years and older are more susceptible to air pollution-associated heart-related morbidity and mortality.
- PM can accelerate atherosclerosis (hardening of the arteries) and can cause premature mortality due to cardiac causes.

- Dr. Kleinman described results of a series of experiments in which he found that the semi-volatile components of PM_{2.5} and UFP can exacerbate airway allergies and promote development of cardiovascular disease. The findings of these experiments include:
 1. Rats were exposed before, during, and after wildfires in Southern California, and their cardiac physiology during UFP exposures measured. Results showed that a significant drop in blood pressure occurred in UFP-exposed rats during the fire.
 2. Rat hearts were injected (in vitro) with UFP directly into the venous return to the heart, and heart contractile function and coronary flow were measured. Results showed that UFP can directly alter heart physiology and cardiac contractile function, which is closely correlated to changes in coronary flow.
 3. Mice were exposed to UFP in ambient air downwind of a freeway in Southern California. Measurements of allergy response biomarkers were made at 50, 150, and 250 meters downwind of the freeway. Results showed that ambient UFP exposures near the freeway (~50 meters downwind) induced airway allergies, but responses at greater distances (~150 ~250 meters downwind) were not statistically significant. The association with allergy biomarkers was strongest for elemental carbon (EC) and organic carbon constituents (OC), but was not explained by difference in particle number, metals, or particle mass concentrations.
 4. Mice were exposed to quasi-UFP (< 180 nm) concentrated ambient particles (CAPs) in which a thermal denuder was used to strip semi-volatile components by heating and undenuded CAPs. Results showed that heart rate variability decreased progressively over an eight-week period in mice exposed to undenuded CAPs, but mice exposed to normal air or denuded CAPs were not significantly affected. Exposure to undenuded CAPs significantly accelerated development of aortic plaque (associated with atherosclerosis, or hardening of the arteries), but denuded CAPs (with about 80% removal of the organic semi-volatile constituents, including PAHs) did not accelerate plaque formation.
- These results suggest that
 - UFP can directly alter heart physiology and cardiac function.
 - Decreases in heart rate variability and increased aortic plaque buildup with UFP exposure are more attributable to semi-volatile organics coated on the UFP core than to the UFP core particles themselves.
 - Stripping organic carbon (semi-volatiles) from CAPs leaves denuded CAPs, which: include heavy metals and elemental carbon, have reduced particle size and mass, and are not as harmful to health as the larger, undenuded particles.

- Very-near roadway exposures to UFP (~50 meters downwind) can induce airway allergies, but these effects drop to statistical insignificance at greater distances (~150 and ~250 meters downwind) due to dilution and particle conversion.
- UFP deposit in both upper and lower respiratory tracts.
- Inhaled UFP penetrate directly into the brain by traveling along the olfactory nerve, bypassing the blood-brain barrier, the defensive shield that blocks unwanted chemicals from reaching sensitive brain cells.
- Growing evidence exists that PM exposure increases production of inflammatory mediators and can damage or kill brain cells. PM exposure can also affect cells essential for the production and metabolism of the neurotransmitter dopamine, thus damaging cells in the part of the brain injured in degenerative nerve diseases, such as Parkinson's.
- In addition to damaging cells that make dopamine and diminishing its production, inhaled PM_{2.5} and UFP can induce inflammation in the brain that persists for weeks after exposure.
- The linkage of PM-induced injury in the central nervous system may also be related to impaired control of heart and lung functions (i.e., HRV define ?? is controlled by the balance of sympathetic and parasympathetic nerve pathways).
- The transfer of inhaled fine and ultrafine particles into the brain raises serious concerns, for example:
 - for individuals exposed in regions with high concentrations of these particles, i.e., near heavily trafficked roads
 - near pollutant sources and in workplaces during the manufacture or application of numerous industrial and commercial products that contain nanomaterials.
- Oxidative stress is an important mechanism for UFP health effects, but other mechanisms may also exist.
- UFP effects are not just about inflammation, but also may be related to cancer.

Panel Discussion

- UFP is contained within, and thus is a part, of PM_{2.5}, but UFP size and chemical composition is dynamic and changes with time and location.
- Historically, UFP has been characterized by particle number, primarily because it was easy to measure; however, by itself, particle number does not correlate well with biological response.
- Thus, it would be difficult to set a UFP air quality standard based on just particle number. We need a better metric of UFP, one that correlates more closely with biological response. One proposed measure is particle surface area.
- A strong association exists between PM health effects and some metals.
- We need to look at PM and air pollutant gases more holistically, taken together as a mixture and not just separately.
- The same things we are doing to address PM_{2.5} are those that we would do for UFP.
- Dr. Ayala suggested that nothing that we have learned about UFP suggests that a control strategy based on PM_{2.5} needs to be fundamentally changed to be used for UFP. We need to: reduce PM emissions with cleaner cars, use vehicles less to reduce miles traveled (VMT) and reduce near-road exposures.

EMERGING ISSUES FROM THE ADVISORY COUNCIL

1. Nothing we have learned about UFP suggests that the current control of PM_{2.5} is going in the wrong direction. We need to stay the course, including removal of older and gross polluting vehicles and replacement of traditional internal combustion engines with hybrids, fuel cells, electric vehicles, and cleaner fuels (e.g., hydrogen, natural gas, bio fuels). We should, however, be wary of strategies that might decrease PM_{2.5} mass emissions, but would also increase particle number or surface area.
2. The interrelationships between PM_{2.5} and UFP, and their implications for public health, control technology design, and control measure selection, need further investigation and supporting research.
3. Measurements of UFP that correlate better with public health impacts than particle number are needed. Better tools are needed to assess UFP exposure, particularly on and near heavily-traveled roadways.

4. More research is needed to build on the growing evidence that both PM_{2.5} and UFP: cross the blood-brain barrier through the olfactory nerve; permeate, linger, and diffuse through sections of the brain; trigger inflammatory responses that are dose dependent; and those inflammatory responses trigger oxidative stresses that may activate cells involved in cancer.
5. As PM emissions from diesel engines have been significantly reduced, emissions of PM from gasoline engines have become more important. PM emissions from gasoline engines result from different driving cycles (e.g., high acceleration, cold starts) and lube oil control (e.g., engine design, age, and wear).
6. Semi-volatile hydrocarbon constituents (i.e., unburned or partially burned fuel and lube oil) are associated with some of the most adverse cardiovascular and pulmonary health impacts. UFP nitrates, sulfates, and metals may not be as toxic in producing those effects but they might have other toxic effects. While the Europeans are focused on total number of solid UFP, ARB is keeping the focus on semi-volatile UFP as well.
7. The role of metal and metal oxide UFP in producing adverse biological responses (e.g., neurological effects) from UFP exposure needs to be better understood.
8. The contribution of burned lube oil in engine exhaust to UFP and in producing adverse biological responses from UFP exposure needs further investigation.
9. Growing research on the unique impacts of near roadway UFP exposure supports the need for additional strategies to reduce exposure in new developments, as well as for existing populations near heavily traveled roadways.

ADVISORY COUNCIL RECOMMENDATIONS

The following Advisory Council recommendations to the Board are based on the above presentations and subsequent discussions among Advisory Council members:

1. While no UFP air quality standard has been proposed or is on the immediate regulatory horizon, we recommend that the Air District continue to regard UFP as likely to have important public health significance.
2. We recommend that the Air District continue its proactive stance on UFP and we endorse its efforts to integrate UFP considerations into PM2.5 planning.
3. We recommend that the Air District move ahead as planned with its efforts to reduce PM levels in the Bay Area, and in doing so, we further recommend that the Air District:
 - a. Maintain a focus on PM2.5 and UFP emissions from fuel-burning vehicles, with particular attention to PM emissions from unburned and partially burned fuel and lube oil.
 - b. Continue to investigate and evaluate implications of UFP for the design of PM reduction strategies for the Bay Area.
 - c. Continue to investigate and evaluate measures to: reduce personal exposure to PM2.5 and UFP, as well as to reduce their emissions; collaborate with the Association of Bay Area Governments and the Metropolitan Transportation Committee (MTC) to educate the public on the public health effects associated with on-road and near road UFP and with PM2.5 exposures; and promote strategies to reduce vehicle miles traveled.
 - d. Collaborate with other agencies (e.g., ARB, South Coast Air Quality Management District) in: studying UFP measurements, health impacts; fashioning effective public policy strategies; and focusing policy development on vulnerable populations and highly impacted areas.
 - e. Prioritize filling the Health Officer position.
4. We recommend that the Air District continue to point out the importance of, and to lend its support to, further UFP-related research to identify better metrics for assessing UFP health impacts and to continue to monitor ongoing research on UFP health effects, chemical composition, and emission control technology.
5. We recommend that for the Air District to continue its efforts to characterize UFP sources, chemical composition, and ambient air levels in the Bay Area, it

- a. Consider development of a UFP emission inventory and monitoring strategy.
- b. Consider conducting short-term intensive UFP monitoring to characterize ambient UFP levels and speciation at selected key locations (e.g., near heavily traveled roadways), possibly integrating those efforts with upcoming near-roadway continuous NO₂ monitoring to be done pursuant to the 1-hour NO₂ national AAQS.
- c. Monitor improvements in UFP control technology and its integration with PM_{2.5} reduction efforts, especially as regards vehicle engine exhaust.

GLOSSARY

AAQS	Ambient Air quality Standard
CAP	Concentrated ambient particles
CNG	Compressed natural gas
EC	Elemental carbon (i.e., black carbon)
GDI	Gasoline direct injection
NO ₂	Nitrogen dioxide
OC	Organic carbon, can be semi-volatile
Oxidative Stress	A biological indicator of health effects on biological cells
PM _{2.5}	Fine sized PM less than 2.5 microns in diameter
PM	Particulate matter (of all sizes)
UFP	Ultrafine PM, less than 0.1 microns in diameter
PAH	Polycyclic aromatic hydrocarbons (i.e., a family of compounds that contains several known human carcinogens)

AGENDA: 10, ATTACHMENT 10

Bay Area Air Quality Management District
939 Ellis Street
San Francisco, CA 94109
(415) 749-5000

APPROVED MINUTES

Advisory Council Regular Meeting
Wednesday, October 12, 2011
9:00 a.m.

CALL TO ORDER

Opening Comment: Chairperson Blonski called the meeting to order at 9:05 a.m.

ROLL CALL

Present:

Chairperson Ken Blonski, M.S., Vice Chairperson Stan Hayes, Secretary Robert Bornstein and Council Members Sam Altshuler, Ph.D., Benjamin Bolles, Jeffrey Bramlett, Harold Brazil, Jonathan Cherry, John Holtzclaw, Ph.D., Gary Lucks JD, CPEA, REA, Liza Lutzker, Jane Martin, Ph.D., Kendall Oku, and Jonathan Ruel were in attendance.

Absent:

Council Members Jenny Bard, Louise Bedsworth, PhD., Alexandra Desautels, Kraig Kurucz, and Dorothy Vura-Weis, M.D., M.P.H. were absent.

Public Comment Period: There were no public comments.

CONSENT CALENDAR

1. Approval of Minutes of the September 14, 2011 Advisory Council Meeting:

Council Action: Mr. Holtzclaw made a motion to approve the minutes of September 14, 2011, and Mr. Hayes seconded the motion; carried unanimously without objection.

PRESENTATION: ULTRAFINE PARTICLES

2. Ultrafine Particles: Characterization of Mobile Source Emissions and Related Health Effects

A. Internal combustion engine generated particles: formation, measurement, trends, and knowledge gaps.

Alberto Ayala, PhD, MSE
Chief, Monitoring and Laboratory Division
Air Resources Board
California Environmental Protection Agency

Jean Roggenkamp, Deputy APCO, introduced and gave a brief background of Alberto Ayala, PhD, MSE, Chief, Monitoring and Laboratory Division Air Resources Board, California Environmental Protection Agency.

Dr. Ayala began his presentation on Internal Combustion Engine Generated Particles: formation, measurement, trends, and knowledge gaps and its historical perspective. He said the knowledge gaps highlighted include particles generated from internal combustion emissions.

Dr. Ayala explained that in 1950s Ken Whitby and Bruce Cantrell, both of the University of Minnesota, discovered the tri-modal distribution of the aerosol in ambient air. Dr. Ayala stated that a lot is known about ambient aerosols including the source, specifically the motor vehicle source, and what causes these particles, how they are measured and what can be done about reducing them.

Source attributions include:

- Surface coating – 0.2%,
- On-Road vehicles – 43.1%,
- Other mobile sources – 10.4%,
- Waste burning – 1.3%,
- Other industrial processes – 7.2%,
- Miscellaneous processes – 5.2%,
- Petroleum industry – 0.5%; and
- Stationary fuel use – 32.2%

In addition, Dr. Ayala stated that motor vehicle contribution to ambient mass concentration is 17%. He also said the problem is not as it once seemed and that precursors in ambient air lead to secondary formation. On a clear day when air quality appears to be at its best, there are secondary formation of aerosols, which are small particles and are not easy to detect.

The tools being developed to better understand the formation and dispersion of these particles are coming along.

Dr. Ayala said from a health standpoint that the latest and best assessment in terms of ultrafine particles versus fractions of the particulate matter is the integrated science assessment that the U.S. Environmental Protection Agency (EPA) just released. The California Air Resources Board (CARB) needed and was able to utilize its own diesel assessment program. Before any action can be taken, one need is to find out the concern from a health perspective.

Dr. Ayala continued stating when the study was initially conducted it was everyone's theory that this was a diesel only problem, but after 10-15 years of research it was understood that this was not the case. Anytime there is internal combustion, there is the potential to form particles.

Complete combustion of gas is particle free, but anytime fossil fuel is burned in an engine there will be a need for lubricating oils, some incomplete combustion and a need for after-treatment controls.

He also stated when it comes to motor vehicle emissions the historical marker comes from a study that Susan Bagley and John Johnson of Michigan Technological University (MTU) conducted in 1996. The key issue they came across was that newer diesel engine technology for reduced the total mass emissions but it increased the number of the various small particles, and the end result was an increase in the very small particles resulting in an increase in the total number of particles.

Dr. Ayala stated the Children's Health Study is the first time CARB tried to look at the issue of seasonality and the spatial distribution of ultrafine particles and ambient air. Dr. Ayala stated there are short term acute impacts which everyone is aware of, but the question is what happens long term. The need is for better tools to assess exposure.

He said if we are interested in reducing emissions, we should also concern ourselves not only with the engines and fuel, but lubricating oil, activity and other factors that will come into play. In addition, there is an issue of proximity to the sources. If you are planning to get close to the roadway you are bound to see higher emissions. In addition, ultrafine particles are not emitted by themselves, but they are usually in a mixture of emissions and this is important from a health standpoint.

Dr. Ayala said CARB is in the process of rulemaking for the next set of car standards, and is working closely with the Federal Government in specifically looking at the light duty fleet. The light duty fleet is primarily gasoline powered. An effort is being placed on understanding gasoline particulate matter (PM) emission from conventional technology and from a chemistry perspective. If you look at the carbon fraction most of the emissions from conventional gasoline engines are organic in nature with minimal soot. Particles are not a diesel only problem. A recent study shows a chase experiment which consists of a mobile lab that follows a vehicle of interest. While conducting this test, it was determined that under acceleration a car can emit lots of small particles. If you review the particles smaller than 300 nanometers, the excess emissions from the gasoline fleet under acceleration have particle concentrations just as high as what you see in diesel fleet.

Dr. Ayala stated he is working to determine how much lube oil can contribute to PM, and this work is being conducted at Southwest Research. Looking ahead, gasoline technology, because of the emphasis on the reduction of greenhouse gases, is going to evolve into Gasoline Direct Injection (GDI). This means that diesel is very efficient so a gasoline would run like a diesel engine. However, benefit of better CO₂ emissions comes from upward pressure on PM emissions. There is an emphasis in the United States and Europe to focus on understanding the

impacts and tweaks that can be made to the engine and whether there is there after treatment that can be considered.

He said he feels car makers will be able to deploy this with minimal or no cost. The selling point about GDI is better fuel economy like diesel, but the emissions resemble a diesel because there is more soot and black carbon than organic carbons. The key question is how diesel-like features can be reduced. Dr. Ayala shows a comparison of particle mass / particle number (PM/PN) and stated the low emission choices are the current technology which is the port fuel injection (PFI) gasoline engines. He said if you put a diesel particle filter (DPF) on a GDI then those emissions would be eliminated. Mr. Bornstein requested Dr. Ayala explain the acronyms. Dr. Ayala stated compressed natural gas (CNG), gasoline direct injection (GDI) and diesel particle filter (DPF) diesel.

Dr. Ayala stated biodiesel has different blends and feed stocks, and depending on the blend and the feed stock there will be different PM emissions. For example, an engine without control versus an engine with control is consistent with what has been seen in the past, which is that the control technology is reducing emissions, and that blends with higher proportions of the biodiesel is going to reduce PM emissions.

The alternative fuel CNG is the most current compliant technology because it is advanced, has better combustion, has after treatment and has very low emissions that are very hard to measure. There are many factors that influence emissions, which include:

- Ambient conditions,
- Engine design,
- Driver,
- Lubricating oil,
- Other factors,
- Maintenance,
- After treatment,
- Activity, and
- Fuel

The formation of diesel PM is affected by:

- Heterogeneous mixture of fuel injected into hot compressed air
- Fuel rich/oxygen deficient regions
- High temperature/pressure breaks down fuel before combustion
- Pyrolysis (high temperature cracking reaction) leads to formation of soot

- Condensation of unburned and partially burned species
- Agglomeration
- Visible smoke

Diesel PM is comprised of sixty percent carbon, five percent is ash, ten percent is sulfate and water, twenty percent is lube oil soluble organic fraction (SOF) and five percent is fuel SOF. Dr. Ayala stated if you want to reduce emissions, you would include an after treatment and the after treatment technology has become more advanced. Moving diesel emissions control technology from diesel oxidation catalysts to the particulate filters, results in the virtual elimination of all diesel engine soot emissions.

Dr. Ayala mentioned that diesel particles are not perfect spheres and are not just carbon, but that there are many things associated with them and embedded in all of this are precursors that can actually lead to aerosol particles. He said you do not need a lot of sulfur in the fuel to obtain formation of small particles, as this does not count for much of the mass.

He continued stating a filter can be effective at controlling particles of all sizes and that number of particles coming from a DPF equipped diesel can be very low under certain conditions. If a filter is added particles of all sizes are eliminated. In addition to PM control, there is a need for nitrogen oxides (NO_x) control and the industry has chosen the technology solution known as Selective Catalytic Reduction (SCR).

Dr. Ayala stated there are now tools which allow one to follow the particle size distribution, as well as the total concentration in real time as it is emitted from the vehicle. Dr. Ayala said with a vehicle running at 50 miles per hour, it shows a lot of catalytic action, high exhaust temperature, sufficient precursors in the exhaust which leads to formation of small particles, some less than 20 nanometers. Dr. Ayala stated these are volatile particles, which explains the sharp gradient seen in ambient air. In addition, the size distribution is different for the technology that has the high concentration, but when heated, the concentrations are lower.

Dr. Ayala mentioned that the Conception Model for Particle Formation is whether or not sulfur is in the form of SO₂ or the particle form. Dr. Ayala provided an example of a basic model depicting when nucleation occurs in the heavy duty diesel engine (HDDE) with after treatment. The important factors are catalyst, catalyst storage, and SO₂ to SO₃ conversion.

He mentioned the biggest challenge with engines is cold start emissions, as this exceeds by far the total emissions that you generate while driving. Dr. Ayala emphasized that cold start emissions are something to be concerned about.

Dr. Ayala said people ask what can be done in the lab to conduct a measurement that is a representative of what the health concern would be. Dr. Ayala stated that the emissions from different technologies are run through different assays. These are cellular assays that health experts stated were good ideas to look at when assessing emissions.

Dr. Ayala concluded his presentation and thanked the Council for the opportunity. Chair Blonski thanked Dr. Ayala for the comprehensive overview.

- B. Semi-volatile components of fine and ultrafine particles: Do they exacerbate airway allergies, promote development of cardiovascular disease and induce inflammation in the brain?

Michael T. Kleinman, PhD

Professor

Division of Occupational and Environmental Health

University of California, Irvine

Jean Roggenkamp, Deputy APCO, introduced and gave a brief background of Michael Kleinman, PhD, Professor, Division of Occupational and Environmental Health, University of California, Irvine.

Dr. Michael Kleinman said he could talk about a complex set of studies involving large numbers of people as this is team collaboration.

Dr. Kleinman stated that epidemiological studies link air pollution to cardiovascular disease. The studies show the following:

- An increase in air pollutants leads to increased mortality and hospital admissions because of cardiovascular diseases (Analitis A. et al. 2006, Zanobetti et al. 2003, Dominici et al. 2006, Peel et al. 2007)
- Exposure to elevated levels of particulate matter (PM) in ambient air leads to an increased heart rate (HR) and a decreased heart rate variability (HRV) in elderly patients (Dubowsky Adar S. et al. 2007, Luttmann-Gibson et al. 2006)
- Individuals in the >65 year-old age bracket are more susceptible to air pollution-associated heart-related morbidity and mortality

Dr. Kleinman cited relevant health components associated with urban air, some of which include:

- Emissions from power plants, motor vehicles, dust.
- Pollutants gases:
 - Ozone and NO₂ are major problems in California.
 - SO₂ and organic vapors are also important.

- Particles or Particulate Matter (PM):
 - Particles are associated with increased heart-related deaths during air pollution episodes.
 - Toxicology studies show that PM_{2.5} accelerates the development of atherosclerosis.
 - The strongest associations with human heart-related illness and death are with PM.

He stated that human studies are very important and epidemiological studies are currently the gold standard for setting regulatory limits, but in order to develop relationships direct measurements need to be conducted. Although human clinical studies can be conducted, where you can control exposures and look at short term effects, when you attempt to look at the mechanisms and its long term effects, animal models are used.

Dr. Kleinman stated he has used animal models for various kinds of human diseases or human states. Dr. Kleinman said he has conducted studies with aged rats, in particular geriatric rats that are close to the end of their normal life expectancy and studies with animals with hypertension.

He mentioned these studies are conducted in the ambient air. The animals are placed in sealed chambers, the chambers are loaded on a cart with an air purification system and the cart is rolled into a van, which is driven to various locations. Studies have been conducted next to freeways and at various distances from freeways, as well as various locations in Southern California. He also stated studies were conducted in Mexico City.

Dr. Kleinman stated they installed a device similar to the installation of a pacemaker. This radio device was hooked to an electrocardiograph miniaturized to about the size of a thumbnail, and with a magnet attached to the device, it could be turned on or off and it could broadcast the cardiograph 24 hours a day. The measurement included EKG's and blood pressure. This test can be conducted during or after exposures, and this allows for a comprehensive study.

He stated the same endpoints could be measured as in humans which include:

- Biochemistry
 - Blood Samples
 - Acute phase proteins
 - Cytokines
 - Expired Breath
- Cardiac Physiology
 - Heart Rate and Heart Rate Variability (HRV)

- Blood Pressure
 - Systolic
 - Diastolic
 - Mean
- Developed Pressure
- Contractility
- Molecular Biology
 - Gene/protein expression from lung, heart, brain
 - In-situ hybridization for effects localization

Dr. Kleinman stated these systems can be deployed almost anywhere and in various circumstances. Examples of these locations are:

- Wildfires in Southern California
 - Rats exposed before, during and after the fires.
 - spontaneously hypertensive (SHR)
 - pithed normotensive (WKY)
 - Cardiac Physiology Monitored During Exposures.
- Allergy Studies Near a Freeway

He said the blood pressure was measured in two types of rats, one type who had high blood pressure and the other type with normal pressure. The study shows that as the blood pressure dropped, the heart rate also dropped, which meant there was a substantial decrease in cardiac output, which is not good from a health standpoint.

Dr. Kleinman said he used a model called the Langendorff System, where beating heart is suspended, kept alive and perfused with media. The cardiac output is measured as well as the amount of pressure it develops and the heart rhythms. Then somewhere between 1 and 10 micrograms of ultrafine particles is injected into the perfusate. As a result, there was a dramatic effect of the heart.

Another model was also used with asthma as an endpoint that can be developed two weeks after exposure, as opposed to a couple of months of exposure with the cardiac model. This study looked to see if particles increased the tendency of the animals to become allergic to an antigen.

He also noted that some results are difficult to explain. For example, near roadway exposures with (~50 m) induced airway allergies in mice but effects were not significant at greater distances (~150 m). An aerosol mass spectrometer (AMS) was used to analyze ambient and quasi-ultrafine concentrated ambient particles (CAPs) and a thermal denuder was used to strip semi-volatile components from CAPs. An AMS is a device that determines particles down to nanometer sizes and then conducts chemical analysis on the individual particles and sorts the data to a functional particle size. CAPs are run through a thermal denuder to remove the

organics. The denuder heats the particles, then the particles come out and the animals are exposed to the naked particle.

The naked particle contains carbon and metallic components without almost any loss, but what is lost is about 50% or more of the actual mass therefore leaving most of the ultrafine mass as organic. Dr. Kleinman provided a summary of what happens when you denude quasi-ultrafine CAPs:

- Particle number and mass are reduced.
- Refractory constituents, such as heavy metals and elemental carbon, were only marginally affected by heating.
- Labile species such as total and water soluble organic carbon and PAHs showed progressive loss in concentration with increase in thermal denuder (TD) temperature.

What happened to the animals and their heart rate variability (HRV)? The air exposed animals over an eight week period had no change in HRV, but there was a small change to the animals that were exposed to the denuded particles. Yet, when looking at the un-denuded particles which the organics attached to them, there is a very dramatic drop in HRV and this is a chronic effect accumulated over the course of an eight week period, and is not just a transient affect. Dr. Kleinman briefly mentioned the effect of aortic plaque, stating plaque is expected in the animals based on their cholesterol level and they will get some plaque, but the ones exposed to the un-denuded particles had a huge amount of plaque.

He provided a summary of the environmental effects on the brain which include:

- Degenerative brain disease incidences are increasing and may be irreversible.
- There is increasing evidence of environmental interactions in the rising disease rates.
- Mechanisms are elusive, at best.

Some of the key cells that make dopamine in the brain were dead so there is an association between PM exposure and brain damage. Dr. Kleinman stated there were numerous questions when asked relative to brain damage. The following are some of the questions:

- Does inhalation represent a “privileged” route of entry for pollutants that affect the brain?
- Is uptake to the brain from the respiratory tract greater than by other routes?
- Can inhaled PM or PM components bypass normal mechanisms that control uptake of toxic chemicals in the brain?
- Can pollutants access the brain directly by transport along the olfactory nerve?
- Do cytokines and other mediators released from the respiratory tract after PM deposition make the blood brain barrier more permeable to toxic pollutants?
- Do free radicals generated in the brain by the action of PM or PM components mediate damage to neurons?

Dr. Kleinman stated that ultrafine particles deposit in the upper respiratory tract very efficiently, in fact they deposit in both the upper and lower respiratory tract. Once deposited, they can move through the mucus layer by diffusion and get into the ends of cells and migrate and get into the brain.

He also stated inhalation of fine and ultrafine particles injures or kills cells in the brain that make dopamine from tyrosine hydroxylase in the region called the substantia nigra. This may be due to glial fibrillary acidic protein (GFAP). In addition, Mr. Kleinman said both fine and ultrafine particles can cause inflammatory responses in the brain, which can be identified by measuring increased levels of the cytokines TNF-alpha in the brains of CAPs exposed mice.

Dr. Kleinman stated when conducting studies you want to see that there is some dependence on dose. He conducted a study of diluted concentrations of ambient particles and identified two very prominent markers of an inflammation different than TNF-alpha. The high concentration of CAP 15, which had about four times as much concentration in terms of mass as CAP 4, had the greatest affect, but there is an affect at the lower CAP 4 concentration.

Dr. Kleinman presented a slide entitled What Do We Know and it showed the following:

- Inhaled ultrafine particles can travel from the nose to the brain by traveling along the olfactory nerve.
- This “backdoor” pathway bypasses the blood brain barrier which is the brain’s defensive shield that blocks unwanted chemicals from reaching sensitive brain cells.

He also asked, “Where Do We Stand?”:

- Inhaled fine and ultrafine particles can damage brain cells in the part of the brain that we know is also injured in degenerative nerve diseases such as Parkinson’s.
- In addition to damaging cells that make dopamine, inhaled ultrafine and fine particles induce biochemical pathways of inflammation in the brain and those changes can be seen weeks after the exposures were completed.

“What does it all mean?”:

- The linkage of PM-induced injury in the central nervous system may also be related to impaired control of heart and lung function (i.e. HRV is controlled by the balance of sympathetic and parasympathetic nerve pathways).
- The transfer of inhaled fine and ultrafine particles into the brain raises serious concerns, for example:
 - for individuals exposed in regions with high concentrations of these particles, i.e. near heavily trafficked roads,

- near pollutant sources and in some workplaces during the manufacture or application of numerous industrial and commercial products that contain nanomaterials.

Conclusions:

- The nuclei and accumulation mode particle compositions are different.
 - Accumulation mode contains more oxygenated organics
 - Quasi-ultrafine CAPs are composed of less oxygenated compounds including PAHs.
- Toxicity and free radical generating capacity of CAPs is greatly reduced by thermal denuding of the particles.
- CAPs exposure increases inflammatory responses in the brain and is associated with damage to dopamine producing cells in the brain.
- The effects of denuded CAPs on HRV and arterial plaque formation are significantly reduced suggesting that organic components can affect cardiac function and disease pathology due to toxic effects of the organics (e.g. PAHs or oxygenated hydrocarbons) or by free radicals released by organic constituents.

He also stated that motor vehicle exhaust and motor vehicle emissions are critical both in terms of air pollution levels and effects on health. Dr. Kleinman thanked the Council.

Council Action: None.

PANEL DISCUSSION

3. Ultrafine Particles: Characterization of Mobile Source Emissions and Related Health Effects

Eric Stevenson noted that questions were sent to the speakers for answers or at least to shed light on certain issues. Those questions include:

- a. Are ambient air quality and/or emission standards for ultrafine particles necessary?
- b. If so, at what level and form:
 - i) level
 - ii) measurement units (mass, particle count, surface area)
 - iii) averaging time (one hour, 24 hours, annual, other)
- c. What would be the best way to measure ultrafine particles for ambient air quality and/or emission standards?

- d. What are the implications of ultrafine particulate for the Air District's regulatory and legislative agendas, and programs?

Dr. Kleinman said one of the implications of ultrafine particulate is that fine particulates contain the ultrafine particles stick together, attracting to larger particles, and they accumulate and grow.

He provided an illustration of putting ultrafine particles in a box, and particles would disappear and larger particles would grow. Chemically, some of this is conserved so what are the things that disappear, are there labile compounds that are lost from the particles that might carry some of the biological effects. He continued that is not just the particles, but you have to look at the particle vapor as a mix.

Dr. Kleinman mentioned that it would be difficult to develop a standard that just looks at particle number, as the number by itself does not correlate with biological responses. Dr. Kleinman suggested looking for some of the hot chemicals that are associated with the particles or least some of a marker for those hot chemicals. He said one of the other things that come out of the freeway curve where it showed a decrease in concentration, underneath the particle curve there was a carbon monoxide curve, which tells you something that carbon monoxide does not oxidize very rapidly which is being reduced by dilution. Therefore, the loss of particle number over time is particle dilution but there is also something else happening in terms of the dynamics of where organics are on the particle and whether they jump from little particles to big particles.

Dr. Ayala said the more we think about particles and learn about them and we know what makes them and how to measure them and that the complexities of the issue are interesting and raise questions, but the things that one would do to control particles are the same things that one would do to control other type of pollutions. Dr. Ayala said if you are concerned about internal combustion engine generated particles, then you have to get rid of internal combustion. He said that is why ARB has a transportation vision that calls for transition away from conventional technology to something that is cleaner, i.e. hybridization, electrification of the motor fleet and then eventually fuel cell hydrogen fuel vehicles and new technology forthcoming.

Dr. Ayala spoke about near road exposure to particles and said if you get close to a heavily trafficked road, you will be exposed to particles, but you are also going to be exposed to higher CO and higher hydrocarbons. If you had a choice between a clean and a dirty car, you would not need to know the particle concentrations and the emissions to make the determination. It would be wise to get away from the dirtier car. He said the more we learn about particles, the more we understand that we are not really talking about anything distinctly different from the central mission which is getting rid of the emissions to the extent that we can.

Dr. Ayala asked why is there such an emphasis in particle number versus surface, versus biological activity, versus a long list of different metrics that is more representative than mass.

Dr. Ayala said the answer is simple we can count particles rather easily that is why you see in the

literature and 90% of what is published is particle number. He also stated it is relatively simple and easy to grow the particles and to use a particle counter to count them but we should step back and let the medical community and the public health community tell us the real concern as we become smarter at looking at the PM emission profile.

He also mentioned the particle number regulation currently in Europe. He stated there is a misconception because the regulation in Europe that limits particle number from cars is very specifically focused on solid particles. Dr. Ayala said it is those non-solid particles, and in some cases, it is the non-solid organic particles that are going to be of concern.

Mr. Lucks thanked the presenters and asked what the Air District can do from a policy standpoint to address ultrafine particles and from a regulatory standpoint that is mobile source driven. Dr. Kleinman said you can consider roadways as long skinny stationary sources, and there is not enough information on ultrafine components of large stationary sources. The most that has come out of the research from the health side is that there is a very strong relationship between biological response and the metallic components. Those components include nickel and vanadium which are associated with fuel oil, combustion and some other things associated with coal combustion which we don't have much of. He said when organics are stripped off the ultrafine particles the results is not benign, so there is some effect on heart rate variability. He also said for stationary sources looking at specific components of the emissions, may be better than some particle number approach which may not be well defined unless you are close to the source.

Dr. Ayala said there is not a lot of data but counterparts are active in pursuing more information. He mentioned in particular South Coast Air Quality Management District made a significant effort to try and understand specifically particles and stationary sources, and were involved in advisory activities. Dr. Ayala also said to reduce emissions as much as possible. Dr. Ayala said if you are focusing solely on ultrafine particles, you would not do anything differently. He said they are taking that approach and trying to do as much as possible with motor vehicles, but for motor vehicles new vehicles are very clean, but the concern is after 100,000 miles, what happens after lack of maintenance and when things go wrong.

Mr. Altshuler asked Dr. Ayala if the white smoke emitters were also lube oil burners. Dr. Ayala said the National Renewable Energy Lab funded an extensive project, specifically looking at the question of diesel and gasoline emissions. He said the selling point is when you have a smoking vehicle and things appear to be worse than a conventional diesel. The study also looked at high emitters and whether an identified high PM emitter (vehicle) is a high oil fine particle emitter, and what can be done about it. The answer to the first one is no, you can have a high emitter that is high PM that does not necessarily have a high number of various small particles and the opposite is also true. One can have a high emitter that is high in hydrocarbons that is not a PM emitter.

Dr. Ayala also said they took a couple of vehicles and ran them through the smog check test, and also completed the certification test in their labs and then sent the vehicles out to be repaired. When the vehicles were returned if you get high emissions of PM from a vehicle, it is likely because you are either burning oil or blew the rings or you are running rich. Therefore, the fuel metering needs adjustment or repair, but what was found, the bottom line, was that the repair for these vehicles was more expensive than the value of the vehicles. In that particular strategy the best thing was to get rid of the vehicles and modernize the fleet.

Mr. Altshuler asked if cold starts contributed to more emissions when looking at hybrids. Dr. Ayala stated he did not have any results on hybrids. Dr. Ayala said cold starts are due to transient emissions similar to up and down inclines, acceleration and deceleration and the change from 50 miles per hour and stopping. A hybrid mitigates this issue, as the engine is not powering the vehicle you are only essentially charging the battery.

Mr. Hayes asked if the ultrafine particle problem, by controlling fine particles will be addressed or is this something that we will have to address in a different way. Dr. Kleinman said the problem is that the ultrafine particles here may differ from place to place. As there is a continuous manufacturer of ultrafine particles in the air just from gas to particle conversion relative to hydrocarbons from motor vehicles, other sources, natural sources and photochemical reactions. He said if there is photochemistry and you have organic vapor, you will find ultrafine particles and eventually they will grow into fine particles. There is a question as to whether the secondary organic particles are as toxic as the particles from primary emissions. He said there is not much data available.

Mr. Hayes also asked if ultrafines are an on roadway issue. Dr. Kleinman said no, you will have ultrafines from a number of sources, but the toxicity of the ultrafines near the roadway maybe different than the toxicity ultrafines in a different location. Dr. Kleinman stated a simplistic approach should not be taken regarding ultrafines.

Dr. Ayala said nothing that we have learned in the last two decades with respect to ultrafine particles suggest a strategy that is focused on PM_{2.5} is the wrong strategy.

Dr. Kleinman also added that when you look back at the history of particulate regulation, we started with a TSP standard because that what was measured. This was measured because the existing samplers were originally Electrolux vacuum cleaners that were set out and deployed by the U.S. Atomic Energy Commission to measure radioactive fallout from nuclear weapons tests. He also stated when EPA was created it essentially took that existing technology and started collecting 8x10 filters. He also said there are a lot of large particles that you do not even inhaled in the TSP, so they established a PM₁₀ standard because PM₁₀ was theoretically the cut point where you are able to inhale those things. Based on fluid dynamics of particles and breathing under normal conditions, when you are breathing in, 10 micron particles can make that transition and be sucked into your nose. In addition, he said it is not true but it is the theory that they used to develop a PM₁₀ sampler and collect lots of PM₁₀ samples.

Dr. Kleinman said when the Six Cities Study was conducted, there were some particle size analyses and found that small particles correlated better with the biological effects that they were looking at, and John Bockman at EPA suggested measuring PM_{2.5}. He said EPA stimulated a regulation based on little measurement data, but this allowed them to deploy PM_{2.5} samplers across the country when they were not there in the past. Dr. Kleinman said California had some data but, one of the big problems with understanding the ultrafine measurements is that we do not have that many data points on a regular basis, where we can begin to draw a conclusion about what the correlations are to health effects.

He said he is not saying that PM_{2.5} is the wrong way to go, you definitely have to control PM_{2.5}, but for ultrafine particles knowing they are source related we should think more in terms of not building schools next to the freeways and encourage individuals not to jog or exercise along busy roads and there are a lot of common sense things that can be done to protect health beyond putting a cork in the bottom of a car. He also said he agrees that if we can move to hybrids and maybe to zero emission vehicles, that would be make a big improvement and mass transit would make a big improvement, but he is not sure you can develop an overall policy on emission reduction other than getting rid of those sources.

Dr. Holtzclaw said we don't have control as an Air District over anything other than stationary sources, but we do have control over the use of mobile sources. He also said we have promoted smart growth and complete streets. In addition he asked how the presenters would evaluate the programs in terms of improving or reducing the amount of toxicity from particulates. Dr. Kleinman suggested reducing the use of the roads to some extent, will reduce emissions, and on a total emission basis this helps. The toxicity issue gets complicated because the particles coming out of a car during idling are different than particles coming out of a car when it is moving steadily. He also suggested having traffic control to improve traffic flow to reduce the amount of idling time might be helpful.

Dr. Ayala said if you are thinking in terms of simple accounting of emissions, people are trying to come up with inventories where you take a simple mass emission factor, and make it more sophisticated and add size fractionation of that emission. He suggested limiting emissions to the extent that we can and if need be, to focus on ultrafine particles, but also limiting emissions of every other type of pollution. Dr. Ayala said yes, we need to continue to understand it better and there are many years of excellent research and future research that is going to make us smarter and more educated in terms of the nuisances of what do get if you have a combination of vehicle fuel activity, etc. It all comes back to reducing PM pollution, reducing dependence on fossil fuel combustion to the extent that we can. He also said education is the key and that agencies should get the word out, but he is not sure that ultrafine particles are any different than any other issue that we should be concerned about, including climate change and greenhouse gas emissions.

Dr. Ayala mentioned the State is leading the charge in this area, but we have to balance both and it comes down to better planning, promote walking instead of driving and riding your bicycle rather than driving your car or taking the bus.

Mr. Brazil asked Dr. Ayala if vehicle acceleration tests were conducted on freeways. Dr. Ayala said the test was conducted on a freeway. Dr. Ayala said the tests were conducted on freeway on ramps and that the magnitude of the acceleration is proportional to the production of the particles.

Dr. Martin asked Dr. Kleinman if in his research, if he looked at the reversal of health effects once the chronic exposure to pollution was stopped, from a mitigation perspective. Dr. Kleinman said that was done only a few times because usually the animals are killed after the exposure and its biological affect and with certain things they look to determine what happens physiologically after exposures, so there is some recovery but for things long term the best examples are studies of smoking cessation in humans, where you can see recovery of lung function to some extent but not entirely. But if someone quit smoking then 30 years later their risk of dying of a heart attack is the same as nonsmokers. So there is repair and regeneration. One of the most interesting studies with regard to that is out of the UCS Children's Health Study, where they showed children growing up in more polluted communities in California had diminished lung function when they reached adulthood. He also said if they left before they were fully grown, their lungs recovered back to what the norm would be. So that while there is regeneration happening in growth, there is a possibility to improve things. Once lungs are fully formed, those stem cells stop being active and repair become less likely, the same as with your heart.

Ms. Lutzker said she appreciated Dr. Ayala's simplified policy approach but asked about diesel control approach and noticed there is only one that does not increase ultrafines to baseline and wondered if this would be considered more of a nuance policy approach which is not always the most affective policy approach. We want to control PM overall and pollutants overall, but with the need to take in consideration each pollutant that we want to control in relative sizes when looking at different control options.

Dr. Ayala said DPF number 3 is an active technology, where the control technology involved a school that require you to plug it in, to clean it up, and to regenerate the catalyst. Typically, this control technology is useful for captive fleets, for example buses, vehicles that leave and comes back to the same point. He agreed that this particular technology has a bare filter and has no oxygenation catalyst, no reliance on NO₂ for regeneration or any external fuel injection to burn off the trapped soot. He said if you are only looking at particles you are correct, this does not form very small particles, but the technology that gave the highest metric in terms of the toxicity acids was DPF number 3 and the reason is that there is no oxidation in this particular device, no control of PAHs.

Mr. Lucks asked Mr. Kendall and Mr. Stevenson if there was value in to reinventing the wheel and exploring some collaboration with South Coast Air Quality Management District (SCAQMD) both on science and policy, recognizing they have different demographics and other factors as they are a multi-county agency. He also asked if they would recommend bringing speakers from (SCAQMD) who could share with Council where they are, where they came from and where they are going.

Mr. Stevenson responds saying one of the speakers they hope to have next year is Dr. Phillip Fine, who is from SCAQMD and is performing a number of these studies. Mr. Stevenson said the Air District conducts more PM speciation in the Bay Area. In the South Coast their focus is on near roadway exposures, as their concentrations are much higher and they are able to locate those stations in a way that gets them much higher and better defined composition.

Dr. Bornstein said Dr. Ayala demonstrated the need for saturation monitoring, so is there movement to develop remote sensing technology. We have LIDAR systems that look upward and give us boundary layer structure, can we have horizontal looking instruments, can we have downward looking LIDAR systems mounted on roofs so that one measurement device is measuring over a large area and that takes the place of saturated monitoring.

Mr. Stevenson said he is trying to coordinate efforts with various technologies that are available, not quite as accurate or robust as we would like them to be but it is the balancing act of getting large amounts of data versus not getting any data.

Dr. Bornstein asked what kind of regulation would the Air District need and Dr. Kleinman mentioned the nature of technology and impacts in the evolution of standards on particles, but we should consider the evolution in measuring gases in the same manner. As initially there were dirty emissions coming out of tailpipes and we said clean them up. Now this is more sophisticated and we started controlling individual pollutants because we realized individual pollutants and gases are a problem.

Dr. Ayala said saturation monitoring is not the answer, and the future is bright. He said NASA is currently refining the satellite signals so that we can look at the signal and get an idea in terms of PM pollution. He said although that is further down the line, but efforts that are currently being done and promoting these efforts will generate better tools for everyone to understand this issue. He also said the one concept that has been talked about specifically for particles are that we need to think in terms of the ultrafine particle potential from a system. Not just the engine, but engine, fuel and oil along with the application of that particular vehicle points to the fact that what we are probably concerned about the precursors. The things in the emissions that are components of this thing we call PM that eventually generate OC fractions that cause the health impacts communities are finding are of concern.

Mr. Altshuler asked if CO is falling off the same as PM, is it 1 for 1 or is PM really falling off more than CO. Dr. Ayala said this is a good marker for vehicle emissions and does follow the trajectory of those things that vehicles emit. He said when you look at black carbon and PM, you are looking at the regional contributions and those are about the same.

After a lengthy discussion Chairperson Blonski thanked the speakers for coming.

Mr. Kendall thanked the speakers for coming and that the Council asked if it better, worse or the same in terms of looking at control technology. In addition, he said CRC holds its meeting in San Diego each year and what was shared regarding CO, NO_x and VOC is ten percent of fleet emits fifty percent of emissions. He asked “Is this true for particles that maybe ten percent of fleet is responsible for fifty percent of particles?” Dr. Ayala said he does not think so, and wishes it were simple, and makes the argument that vehicle operation is a strong determinant.

Chairperson Blonski thanked both Mr. Kendall and Mr. Stevenson for providing the speakers, and each session continues to get better and better with more understanding.

4. Council Member Comments / Other Business

Chairperson Blonski stated that November 16, 2011 is the presentation to the Board of Directors.

Mr. Hayes said November 16, 2011 the Air & Waste Management Association (AWMA) will hold its Climate Conference in San Francisco, California to be held at Fisherman’s Wharf. He also mentioned that Mr. Broadbent will chair a keynote panel.

Chair Blonski thanked everyone for their time.

- 5. Next meeting:** The next meeting of the Advisory Council will be held on Wednesday, November 9, 2011 at 9:00 a.m. at 939 Ellis Streets, San Francisco, CA 94109
- 6. Adjournment:** Chair Blonski adjourned the meeting at 12:10 p.m.

Vanessa Johnson
Executive Secretary II