



BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

## ADVISORY COUNCIL MEETING

WEDNESDAY  
JULY 11, 2012  
9:00 – 11:00 A.M.

7<sup>TH</sup> FLOOR BOARD ROOM  
939 ELLIS STREET  
SAN FRANCISCO, CA 94109

### AGENDA

#### CALL TO ORDER

Opening Comments  
Roll Call

Stan Hayes, Chairperson  
Clerk

#### PUBLIC COMMENT PERIOD

*Public Comment on Non-Agenda Items, Pursuant to Government Code Section 54954.3. The public has the opportunity to speak on any agenda item. All agendas for Advisory Council meetings are posted at the District, 939 Ellis Street, San Francisco, at least 72 hours before a meeting. At the beginning of the meeting, an opportunity is also provided for the public to speak on any subject within the Council's purview. Speakers are limited to three minutes each.*

#### CONSENT CALENDAR

1. Approval of Minutes of the June 13, 2012 Advisory Council meeting

#### DISCUSSION

2. Discussion of revised draft report on the Advisory Council's May 9, 2012 meeting on Ultrafine Particles: Exposure Assessment

*The Advisory Council will discuss the revised draft report from the May 9, 2012 meeting with Air District staff and finalize the recommendations.*

3. Report on the Annual Air & Waste Management Association (AWMA) Meeting, June 19, 2012 - June, 22, 2012.

*Advisory Council members who attended the Annual AWMA meeting from June 19, 2012 – June 22, 2012 will report on their experiences.*

#### OTHER BUSINESS

4. Council Member Comments/Other Business

*Council Members may make a brief announcement, provide a reference to staff about factual information, or ask questions about subsequent meetings.*

5. Time and Place of Next Meeting

*9:00 a.m., Wednesday, September 12, 2012, at 939 Ellis Street, San Francisco, CA 94109.*

6. Adjournment

**CONTACT EXECUTIVE OFFICE - 939 ELLIS STREET SF, CA 94109**

**(415) 749-5130**

**FAX: (415) 928-8560**

**BAAQMD homepage:**

**[www.baaqmd.gov](http://www.baaqmd.gov)**

- To submit written comments on an agenda item in advance of the meeting.
- To request, in advance of the meeting, to be placed on the list to testify on an agenda item.
- To request special accommodations for those persons with disabilities notification to the Clerk's Office should be given in a timely manner, 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 District's offices 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 District's website ([www.baaqmd.gov](http://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**

**JULY 2012**

<u>TYPE OF MEETING</u>	<u>DAY</u>	<u>DATE</u>	<u>TIME</u>	<u>ROOM</u>
<b>Advisory Council Regular Meeting</b> <i>(Meets 2<sup>nd</sup> Wednesday of each Month)</i>	Wednesday	11	9:00 a.m.	Board Room
<b>Special Meeting of the Board of Directors</b> <i>(Meets 1<sup>st</sup> &amp; 3<sup>rd</sup> Wednesday of each Month) - CANCELLED</i>	Wednesday	11	1:30 p.m.	<b><u>Meeting Location:</u></b> ConocoPhillips 1380 San Pablo Avenue Rodeo, CA 94572  <b><u>Tour Location:</u></b> ConocoPhillips 1380 San Pablo Avenue Rodeo, CA 94572
<b>Board of Directors Executive Committee</b> <i>(Meets 3<sup>rd</sup> Monday of each Month)- CANCELLED</i>	Monday	16	9:30 a.m.	4 <sup>th</sup> Floor Conf. Room
<b>Board of Directors Stationary Source Committee</b> <i>(Meets the 3<sup>rd</sup> Monday of Every Other Month)- CANCELLED</i>	Monday	16	10:30 a.m.	4 <sup>th</sup> Floor Conf. Room
<b>Board of Directors Regular Meeting</b> <i>(Meets 1<sup>st</sup> &amp; 3<sup>rd</sup> Wednesday of each Month) - CANCELLED</i>	Wednesday	18	9:45 a.m.	Board Room
<b>Board of Directors Public Outreach Committee</b> <i>(Meets Quarterly at the Call of the Chair)</i>	Thursday	19	9:30 a.m.	4 <sup>th</sup> Floor Conf. Room
<b>Board of Directors Personnel Committee</b> <i>(Meets at the Call of the Chair)</i>	Monday	23	9:30 a.m.	4 <sup>th</sup> Floor Conf. Room
<b>Board of Directors Budget &amp; Finance Committee</b> <i>(Meets the 4<sup>th</sup> Wednesday of Each Month)- CANCELLED</i>	Wednesday	25	9:30 a.m.	4 <sup>th</sup> Floor Conf. Room
<b>Special Meeting of the Board of Directors - CANCELLED</b>	Wednesday	25	1:30 p.m.	Board Room
<b>Board of Directors Mobile Source Committee</b> <i>(Meets 4<sup>th</sup> Thursday of each Month)</i>	Thursday	26	9:30 a.m.	4 <sup>th</sup> Floor Conf. Room
<b>Special Mtg. of the Board of Directors</b> <i>(Meets 1<sup>st</sup> &amp; 3<sup>rd</sup> Wednesday of each Month)</i>	Monday	30	9:45 a.m.	Board Room

## AUGUST 2012

<u>TYPE OF MEETING</u>	<u>DAY</u>	<u>DATE</u>	<u>TIME</u>	<u>ROOM</u>
<b>Board of Directors Regular Meeting</b> <i>(Meets 1<sup>st</sup> &amp; 3<sup>rd</sup> Wednesday of each Month)</i> - CANCELLED	Wednesday	1	9:45 a.m.	Board Room
<b>Board of Directors Regular Meeting</b> <i>(Meets 1<sup>st</sup> &amp; 3<sup>rd</sup> Wednesday of each Month)</i> - CANCELLED	Wednesday	15	9:45 a.m.	Board Room
<b>Board of Directors Executive Committee</b> <i>(Meets 3<sup>rd</sup> Monday of each Month)</i> - CANCELLED	Monday	20	9:30 a.m.	4 <sup>th</sup> Floor Conf. Room
<b>Board of Directors Budget &amp; Finance Committee</b> <i>(Meets the 4th Wednesday of each Month)</i> - CANCELLED	Wednesday	22	9:30 a.m.	4 <sup>th</sup> Floor Conf. Room
<b>Board of Directors Mobile Source Committee</b> <i>(Meets 4<sup>th</sup> Thursday of each Month)</i> - CANCELLED	Thursday	23	9:30 a.m.	4 <sup>th</sup> Floor Conf. Room

## SEPTEMBER 2012

<u>TYPE OF MEETING</u>	<u>DAY</u>	<u>DATE</u>	<u>TIME</u>	<u>ROOM</u>
<b>Board of Directors Regular Meeting</b> <i>(Meets 1<sup>st</sup> &amp; 3<sup>rd</sup> Wednesday of each Month)</i> - CANCELLED	Wednesday	5	9:45 a.m.	Board Room
<b>Advisory Council Regular Meeting</b> <i>(Meets 2<sup>nd</sup> Wednesday of each Month)</i>	Wednesday	12	9:00 a.m.	Board Room
<b>Board of Directors Executive Committee</b> <i>(Meets 3<sup>rd</sup> Monday of each Month)</i>	Monday	17	9:30 a.m.	4 <sup>th</sup> Floor Conf. Room
<b>Board of Directors Stationary Source Committee</b> <i>(Meets the 3<sup>rd</sup> Monday of Every Other Month)</i>	Monday	17	10:30 a.m.	4 <sup>th</sup> Floor Conf. Room
<b>Board of Directors Regular Meeting</b> <i>(Meets 1<sup>st</sup> &amp; 3<sup>rd</sup> Wednesday of each Month)</i>	Wednesday	19	9:45 a.m.	Board Room
<b>Board of Directors Budget &amp; Finance Committee</b> <i>(Meets the 4th Wednesday of each Month)</i> - CANCELLED	Wednesday	26	9:30 a.m.	4 <sup>th</sup> Floor Conf. Room
<b>Board of Directors Mobile Source Committee</b> <i>(Meets 4<sup>th</sup> Thursday of each Month)</i>	Thursday	27	9:30 a.m.	4 <sup>th</sup> Floor Conf. Room

BAY AREA AIR QUALITY MANAGEMENT DISTRICT  
Memorandum

To: Chairperson Hayes and Members  
of the Advisory Council

From: Jack P. Broadbent  
Executive Officer/APCO

Date: July 3, 2012

Re: Advisory Council's Draft Meeting Minutes of June 13, 2012

RECOMMENDED ACTION:

Approve attached draft minutes of the Regular Advisory Council's meeting of June 13, 2012.

DISCUSSION

Attached for your review and approval are the draft minutes of the June 13, 2012, Advisory Council meeting.

Respectfully submitted,

Jack P. Broadbent  
Executive Officer/APCO

Prepared by: Sean Gallagher  
Reviewed by: Jennifer C. Cooper

Attachment

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

**DRAFT MINUTES**

Advisory Council Regular Meeting  
9:00 a.m., Wednesday, June 13, 2012

**CALL TO ORDER – ROLL CALL**

Chairperson Stan Hayes called the meeting to order at 9:05 a.m.

Present: Chairperson Stan Hayes; Vice Chairperson Robert Bornstein, Ph.D.; Secretary Sam Altshuler, P.E.; and Council Members Jennifer Bard, Jeffrey Bramlett, Harold Brazil, Jonathan Cherry, John Holtzclaw, Ph.D., Gary Lucks, J.D., Jane Martin, Dr.P.H., Estes Al Phillips, and Jessica Range.

Absent: Council Members Louise Bedsworth, Ph.D., Benjamin Bolles, Kraig Kurucz, Liza Lutzker, Kathryn Lyddan, Dorothy Vura-Weis, M.D., M.P.H., and Murray Wood.

Also Present: None.

**OPENING COMMENTS**

None.

**PUBLIC COMMENT PERIOD**

None.

**CONSENT CALENDAR**

**1. Approval of Minutes of the May 9, 2012, Advisory Council Regular Meeting**

Member Altshuler requested an amendment to the second to last paragraph on page 9, to read, "...cited a wood smoke study ~~referenced~~provided earlier by Eric Stevenson..."

Member Holtzclaw requested an amendment to the second paragraph on page 4, to read, "...~~example~~e.g. formaldehyde as a problematic byproduct of the reaction..."

Member Holtzclaw made a motion to approve the minutes of May 9, 2012, as amended. Member Altshuler seconded the motion; unanimously approved without objection.

## **DISCUSSION**

### **2. Discussion of draft report on the Advisory Council's May 9, 2012, meeting**

Chairperson Hayes made introductory comments regarding the speakers and report drafting process. Members Cherry and Altshuler made introductory comments regarding the draft report currently under review. Member Cherry invited input from the Members on the sections within the report as follows:

#### Summary

Chairperson Hayes suggested, regarding paragraph one, line four, the insertion of an apostrophe after "Hildemann."

#### Key Points – Dr. Lynn M. Hildemann

Member Holtzclaw suggested, regarding bullet four, sub-bullet three, that range hood effectiveness is dependent upon the quality of the filter installed, such as a High Efficiency Particulate Arresting (HEPA) filter, and it venting outdoors is better. Member Altshuler questioned whether a range hood can be equipped with a HEPA filter and said that if it vents outdoors there is no need for a filter. Member Bornstein suggested the insertion of "vented." Member Bramlett said that the norm for range hoods is to vent inside so clarification is advisable. Member Cherry suggested, regarding the second-to-last line on the page, replacing "a" with "an outdoor vented."

Member Bornstein questioned, regarding bullet one, the appropriateness of grouping two types of sources with proximity. Chairperson Hayes suggested the Key Points portion of the report should reflect what was presented. Member Cherry answered that it currently reads as presented but conceded that "greatest risks" could be omitted. Member Bornstein suggested there is a better way to say what was presented in light of wind and mixing as factors. Chairperson Hayes asked if wind was a factor for indoor exposure. Member Bornstein responded that circulation applies. Member Cherry invited the forwarding of written comments or suggested revisions.

Member Bornstein suggested, regarding bullet two, replacing "that want" with "have a tendency to" and Member Cherry agreed. Member Altshuler suggested instead replacing "want" with "far more likely" and Member Cherry agreed.

Member Bornstein suggested, regarding bullet four, sub-bullet two, replacing "more than 3" with "several" to accurately capture more situations. Chairperson Hayes urged the Council not to misrepresent what was said. Member Bornstein said that the Council doesn't want to change it too much or, alternately, to imply that her figure is a hard fact. Member Altshuler suggested replacing it with "significantly" and Chairperson Hayes agreed.

#### Key Points – Dr. William W. Nazaroff

Chairperson Hayes asked, regarding bullet one, if “convenience” is a good choice of words as its meaning is unclear. Member Cherry explained the use of the term and suggested replacing “convenience” with “number of.”

Chairperson Hayes suggested, regarding bullet three, sub-bullet two, replacing “managed to enter” with “infiltrated.”

Chairperson Hayes asked, regarding bullet three, sub-bullet three, about whether the use of “tendency” is ideal. Member Bornstein said there is no tendency in this case as it is an absolute. Chairperson Hayes suggested amending the phrase to read “because warm air rises in the home.”

Member Phillips suggested, regarding bullet two, replacing “intensive” with “standard.” Member Bramlett responded that the suggestion makes a good point but neither word is accurate. Member Bornstein suggested detailing the number of houses involved and methodology used and deleting “intensive.” Chairperson Hayes said that it was unclear how to accurately detail the studies and suggested that “intensive” be deleted. Member Cherry agreed and stated that the number of studies could be inserted as taken from the presentation material.

Member Range suggested, regarding bullet three, the parenthetical note be replicated and inserted relative to some of the Key Points attributed to Dr. Hildemann, particularly bullet 5, sub-bullet 2 regarding cigarette smoke and motor vehicle emissions. Member Bramlett agreed with Member Range and suggested the note be placed at the beginning of the Key Points relative to both presenters. Member Phillips said the focus on indoor environments is at odds with the reference to “outdoor studies.” Member Bramlett said the report did a good job of avoiding the problem described by Member Phillips. Member Cherry said cigarette smoke was not made a focus of the report as it is covered elsewhere and noted difficulties attendant with making generalities of this kind. Members Phillips and Range discussed the best way to summarize this aspect of the study. Member Bornstein said the language is good as it makes clear that proximity is modified by conditions.

Member Bornstein noted, regarding bullet one, that two studies are attributed to Dr. Nazaroff but there are three listed, homes, non-smoking homes and schools. Member Martin said there were only two studies, homes and schools, but that the homes study sampled both smoking and non-smoking homes. Member Bornstein said it is presented in the report as though it was three studies and suggested the parenthetical note be expanded into a complete sentence. Member Lucks suggested inserting “study” after “sample.” Member Altshuler said these were Dr. Nazaroff’s words. Member Bornstein said that the wording is of the cryptic sort found in PowerPoint presentations and suggested that it be moved up within the bullets. Member Cherry agreed.

Chairperson Hayes called out the parenthetical phrase in bullet four, sub-bullet two, as being incomplete in some way. Member Bornstein asked if a conclusion should be added. Chairperson Hayes suggested adding, “allowing infiltration of UFP” at the end of the last sentence. Member Phillips noted the lack of quantifiable data in the school study, noted his personal experience with windows and doors, and expressed his difficulty with the assumptions made in the study. Chairperson Hayes suggested, regarding bullet four, sub-bullet three, replacing “managed to enter” with “infiltrated.”



Gary Kendall, Advisory Council Liaison, asked, regarding bullet four, sub-bullet three, if the observation that “38% of UFPs contained in outdoor air managed to enter the classroom” is an accurate characterization as opposed to reporting that 38% of the total indoor ultra-fine particulate matter (UFP) are from outdoor sources. Member Bramlett suggested the report may be over generalizing and urged caution about extrapolating from the presentations when there are so many variables. Chairperson Hayes noted the presence of the note about sample size and extrapolation. Member Bornstein suggested rewriting this portion to report that concentrations are higher with windows and doors open without providing numbers. Member Holtzclaw suggested generalizing the phrase and adding, “as much as 38% in one study.”

Chairperson Hayes noted the wealth of information presented and expressed his doubt about how best to accurately convey the concept being discussed. Member Cherry disagreed with Mr. Kendall’s assessment and said he believes it reads correctly as written. Chairperson Hayes referred to the PowerPoint presentation provided by Dr. Nazaroff, which shows an average amount and a range from 16 – 51%, and suggested the average be retained and the range be inserted in parenthesis for both percentages. Member Bornstein said these are initial measurements coming from a new field of study that should not be solidified by being cited in this report and suggested replacing “38%” with “up to half” and “60%” with “increase by a factor of almost two.” Member Bard inquired about the accuracy of “and/or” relative to an HVAC system being on. Member Cherry responded that this is how it was presented. Chairperson Hayes proposed leaving the numbers as written with the addition of the range. Member Bornstein asked if the “Note by Advisory Council” might be reworded to read more like something that was presented to the Council. Member Bramlett said that Member Range suggested moving the note to the beginning of the report. Member Range said they are different notes and reiterated her suggestion that the general note be inserted early in the report.

Member Altshuler noted the absence of ventilation levels and breathing rate as variables that are generally considered in exposure studies.

Member Bramlett said the Council is struggling with standard exposure assessment categories, noted the admittedly narrow scope of the presentations, and suggested the Council stop trying to clarify in every instance how these studies are narrow in scope. Chairperson Hayes asked if there should not be a note or, if so, in which instances. Member Bramlett responded that the note should be included but the Council should resist conditioning its statements throughout the report. Chairperson Hayes explained how this can be achieved through the Key Points and Emerging Issues sections. Member Bornstein asked if the note should be inserted before Emerging Issues. Member Cherry responded that part of the note should be inserted at the beginning of the report and another part in Emerging Issues. Member Bramlett and Chairperson Hayes agreed.

### Emerging Issues

Member Altshuler asked, regarding number 3, if there is a foundation of evidence for the claim relative to insoluble UFP. Member Cherry said the question is a good one and Dr. Nazaroff said it more than once but the implication was unclear. Member Martin said she asked Dr. Nazaroff about it after the presentation and he said that terpenes are not insoluble and the topic is one which requires further work in his opinion. Member Holtzclaw said he would like to see more

explanation added. Member Bard suggested it remain but with clarification, perhaps by inserting a Key Point on the topic. Member Altshuler said it is not new information.

Member Holtzclaw said the Council previously reported that particulate matter (PM) levels are indicative of UFP levels in an as yet to be determined way but that Drs. Hildemann and Nazaroff suggested otherwise and asked if something to this effect should be captured in the report to counter the earlier Council report. Member Altshuler disagreed and said the previous Council report concluded that focusing on fine particulate matter (PM<sub>2.5</sub>) is a good strategy for addressing UFP and they were not characterized as being surrogates for each other. Member Holtzclaw suggested including in the report a retraction. Member Altshuler responded that a retraction may not be accurate. Member Holtzclaw recalled that Dr. Hildemann said when one goes up, the other goes down and vice versa, resulting in a reciprocal relationship of some sort. Member Bornstein said this is an important new fact and suggested that something on this topic should be included in the report. Member Range said the report is meant to separate any conclusions about indoor and outdoor monitoring as the relationship between PM<sub>2.5</sub> and UFP was not a focus of the presentations. Chairperson Hayes said that he imagines a pie chart representing all health risk from PM exposure with only a portion of that pie falling within the Air District's regulatory territory and suggested the report needs to tie the information in the presentations to the mission of the Air District or, in other words, monitoring of and regulations relating to outdoor air quality, because readers may dismiss the report if it is solely focused on indoor air quality. Jean Roggenkamp, Deputy Air Pollution Control Officer, stated that the Council is grappling with something that is truly an emerging issue and while it is correct that the Air District does not have regulatory authority over indoor air pollution sources, the authority exists relative to indoor sources that affect the public air quality, such as wood stoves, fireplaces and water heaters. Ms. Roggenkamp added that if an emerging issue is identified as affecting the public in a significant way, the Board of Directors will take interest. Member Lucks recalled a time about ten years ago when the State Legislature entertained a bill to establish indoor ambient air quality standards with a focus on indoor sources and the question arose then relative to where the authority to regulate the same would lie.

Chairperson Hayes suggested recasting numbers 1 and 2. Member Bornstein suggesting moving number 4 to the number 2 position. Chairperson Hayes suggested moving number 2 to the number 1 position to highlight the source issue. Member Cherry suggested expanding it so as to help bridge the information with the Air District's authority to regulate. Member Bramlett said the changes are fine but shouldn't an additional Emerging Issue be added to provide context in terms of prioritization of issues for the Air District. Member Bornstein asked if it is more appropriate in Emerging Issues or Recommendations and Member Bramlett responded that either is fine. Chairperson Hayes suggested it be in both sections. Member Bornstein suggested it be placed in Emerging Issues with the implications therefrom serving to formulate a Recommendation. Ms. Roggenkamp clarified that past practice is to include it in both sections.

Member Bard suggested the addition of two additional items in Emerging Issues, studies on indoor air quality in regards to HVAC effectiveness and the issue of UFP from outdoor tobacco smoking being higher than that of automobile traffic, and noted the Board of Directors has considered regulation of tobacco smoke in the past. Member Bramlett suggested, regarding the HVAC effectiveness item, noting a review of existing studies and a suggestion for additional study as needed. Member Cherry said that it is in Recommendations. Member Bornstein suggested that the complicated role of HVAC should be added to Emerging Issues. Chairperson

Hayes agreed. Member Lucks added that tobacco smoke contains toxic air contaminants that would provide some jurisdictional basis for the Air District.

Eric Stevenson, Director of Technical Services, said the speakers scheduled for the September meeting of the Council may address some aspects of the proposed Emerging Issues by Member Bard in the course of their presentations on limiting exposure. Member Bard stated that Emerging Issues should not be limited by the Council's perceived authority of the Air District. Member Range stated her disagreement with including an Emerging Issue relative to the tobacco smoke and roadway exposure comparison as there were a number of issues with the study. Member Altshuler agreed and expressed his discomfort with the data presented. Member Bard expressed her appreciation for other members' caution but urged that it be included with a qualifying statement rather than being left out entirely. Member Bramlett said the inquiry was a good one that seems to justify a further study but noted its problems include the erroneous description of some of the locations and expressed his discomfort with passing the information along as an Emerging Issue. Member Holtzclaw said that either or both of the suggested Emerging Issues may be important and should not be ignored at this stage. Member Cherry stated that the study was not discounted, as it is included in Key Points, noted that none of the findings from any of the studies were including in Emerging Issues, and asked if some point was lost that should make its way into Emerging Issues. Chairperson Hayes suggested it may be wise to wait until the September meeting when more is heard on the topic. Member Bard said it could be included in Recommendation number 1.c and Member Bornstein agreed and suggested the Council revisit it. Chairperson Hayes asked if the Council intends to recommend action by the Air District as that is how he sees the role of Recommendations. Member Bornstein suggested that it be Recommended for tracking. Member Lucks said that air toxics are within the jurisdiction of the Air District and further study and understanding of this issue is important despite the source not being a stationary one.

Brian Bunger, District Counsel, noted that tobacco smoke is an air toxic, all of which are within the jurisdiction of the Air District, but jurisdiction is limited to air toxics that emit from stationary sources, making regulation of tobacco smoke problematic. Member Lucks suggested otherwise. Mr. Bunger said the Air District lacks the necessary air toxics control measure and his uncertainty about whether the California Air Resources Board even has the authority. Member Lucks said that may be true but tobacco smoke having been recognized as an air toxic makes this a valuable piece of information. Member Bornstein suggested the Council acknowledge that Dr. Hildemann is shedding light on a topic worth watching for further developments.

Chairperson Hayes asked if there are any suggestions for Emerging Issues. Member Bramlett suggested leaving them as is with the addition to number 1 of "relative risk." Chairperson Hayes agreed and reiterated the suggestion to move number 2 to the number 1 position. Member Altshuler noted that, regardless of the numbers, there is a clear correlation between outdoor and indoor air quality, the numbers provided indicate there is room for improvement in outdoor air quality, and asked how the Air District's recommendation to occasionally shelter-in-place would play out with tobacco smoking indoors. Chairperson Hayes suggested a need exists to identify the relative risk of sources regardless of Air District regulatory authority and this is the single most significant Emerging Issue. Member Bard asked if the subject matter for the presentations in September is second hand smoke (SHS). Mr. Stevenson responded in the negative and said it is instead about exposure mitigation. Member Bard asked if the Air District wants the Council to delve into SHS exposure. Ms. Roggenkamp said that many cities and agencies are grappling with

SHS and unless the topic is presented as a significant, regional issue that is going unnoticed, the Air District is not likely to act. Member Altshuler noted that a number of cities were working on wood smoke before it became part of an Air District effort so perhaps SHS should be targeted by the Air District for the same reason. Ms. Roggenkamp noted that wood smoke comes from a source the Air District may regulate. Member Bornstein said that SHS is an Emerging Issue regardless of whether it becomes a Recommendation and that HVAC design and use, in addition to the lack of correlation between PM<sub>2.5</sub> and UFP, are Emerging Issues. Member Bornstein suggested, regarding number 1, that Dr. Hildemann's comment be moved to Key Points.

Member Holtzclaw said the health risks of smoking are well known and it is understood that regulation cannot be promulgated to stop smoking, the effect of SHS on others can be, and today's discussion goes to the persistent question of the dangers of SHS regardless of where it comes out in relation to motor vehicle exhaust and wood smoke and suggested the Air District has a responsibility, or at least an opportunity, to relay important health information even if regulation is not an option.

Member Lucks suggested an additional Recommendation in the form of an amendment to the Air District's California Environmental Quality Act (CEQA) Guidelines (Guidelines) regarding the inclusion of outdoor infiltration considerations when doing air quality analyses. Chairperson Hayes asked that the suggestion be held for the Council discussion on Recommendations.

Chairperson Hayes summarized the discussion about SHS.

Member Phillips asked what the final decision was regarding number 3. Member Cherry responded that the item will be moved to Dr. Nazaroff's Key Points and the Council will seek clarification from the source of the information, if needed. Member Phillips asked if the volume of indoor UFP from outdoor sources is so greatly diminished during infiltration that the Air District will be prevented from regulating it. Chairperson Hayes responded that the Air District can regulate outdoor sources and it is a potential issue if there is infiltration by as much as 50% of the levels found outdoors. Member Phillips asked if it is a health hazard. Chairperson Hayes and Member Bramlett responded that the hazard question highlights the need to determine relative risks.

### Recommendations

Chairperson Hayes commended number 1. Member Bramlett agreed but suggested that gentler language be adopted throughout Recommendations until relative risk is firmly established. Member Bramlett suggested adding cigarette smoke to number 1.c, replacing "Work with" with "Encourage" in number 2, inserting "share its" after "The Air District should" in 2.a, inserting "Encourage regional agencies to" at the beginning of number 2.b, and inserting "Continue to investigate and, where appropriate," at the beginning of number 3. Chairperson Hayes agreed but expressed a concern that the Council is delivering a number of pieces of a puzzle rather than a big picture view and that although this is an important issue, perhaps it is premature to be suggesting drastic changes in Air District priorities, and suggested changing or removing number 2.b as it seems too far advanced. Member Bornstein agreed with removing number 2.b. Member Altshuler suggested deleting the last part of the sentence in number 2.b., starting at "including" and Chairperson Hayes agreed.

Member Holtzclaw asked for the identity of the regional partners in number 2. Member Bramlett responded that he was unsure of their identities but agencies exist to whom this topic falls as a primary responsibility. Member Bornstein suggested replacing “Work with regional partners” with “Encourage regional cooperation.” Member Lucks suggested the insertion of a list of example agencies. Member Holtzclaw asked if it should be expanded to include engineering societies. Chairperson Hayes asked if the report is becoming overly specific. Ms. Roggenkamp said it is important not to use the phrase “regional agencies” as it has a very specific meaning that is inaccurate. Member Bard asked if “local governments” is more accurate. Ms. Roggenkamp said she is unsure and the best approach is being vague. Member Bornstein suggested merely “Encourage cooperation.” Member Bramlett said the U.S. Environmental Protection Agency (EPA) study based on information from the eastern United States urged caution with any attempts at specificity. Member Bard said encouraging further research of UFP from fireplaces, woodstoves, barbeques and campfires should be added to Recommendations if it has not been made a Recommendation in a prior report. Member Bornstein asked if it should be inserted as number 1.c. Member Bard responded in the affirmative and suggested adding a Recommendation to track studies or information on the relative risk of outdoor UFP exposure, including SHS, which could be added to number 1.c or as a new number 1.d or 1.e, depending on the wording chosen. Chairperson Hayes suggested number 1.d may become overly broad and asked if it should be focused on SHS. Member Bard responded in the negative and said that the suggestion goes to an understanding of the relative risk of all the exposures. Member Bornstein said Chairperson Hayes is correct that the introductory portion of number 1 should include language about relative risk and number 1.d should focus solely on SHS. Member Bard agreed and suggested the insertion of “and outdoor” after “indoor” in number 1. Member Bornstein suggested “indoor and outdoor interactions” as that would retain the focus on indoor air quality but bring in the aspect of outdoor infiltration. Chairperson Hayes suggested instead that “indoor” be deleted. Member Bramlett said the meaning of number 1 will change in unintentional ways with the suggested revision. Member Bornstein said it is not advisable to delete “indoor” in light of the focus of the studies and suggested instead the insertion of “and outdoor interactions.” Chairperson Hayes said that number 1 is recommending further research to obtain data on relative risks. Member Bornstein suggested replacing “outdoors” with “outdoor infiltration” in number 3 and deleting “indoor” in number 1. Chairperson Hayes agreed.

Member Altshuler said that number 3.c does not read as a recommendation and it makes a claim regarding exceedences that may not be supported by the evidence. Member Bard suggested it may be an Emerging Issue. Member Cherry responded that it is a component of the public education Recommendation and that is why it is worded as a statement rather than a recommendation. Chairperson Hayes agreed. Member Altshuler agreed and said that SHS is a bigger problem than PM exposure and this may justify it being its own subject.

Member Lucks reiterated his suggestion for a Recommendation to amend the Guidelines, said it has value as a factor in making informed decisions in future projects and increasing the risk awareness, and provided example language. Chairperson Hayes asked if it is already included in part. Ms. Roggenkamp said that the Guidelines are intended to be helpful to cities and counties in analyzing issues, not a venue to assign research projects for the Air District’s benefit, and the Air District does not proceed in the way that Member Lucks is suggesting. Member Lucks said the impacts of climate change were disregarded for too long for similar reasons. Ms. Roggenkamp said that the Air District needs to be able to provide or suggest the necessary tools for grappling with an issue. Member Lucks suggested the Recommendation will drive the Air District to do the

necessary studies and perhaps the answer doesn't need to be definitive in order to amend the Guidelines. Member Range disagreed, said the Air District has the responsibility to establish the justification for concluding there is a definitive health impact, it is clear from today's discussion that too much is left undetermined, and a Recommendation would put a huge burden on the Air District, cities and counties to grapple with these issues without any tools.

Member Phillips suggested pollens are the primary culprit for respiratory ailments and they should be included in number 1.c and the different types of barbeque grill fuels should be called out because barbeque regulation in broad strokes will be very problematic. Chairperson Hayes agreed but suggested that specifics do not need to be called out. Member Phillips said that one never knows where research will lead.

Member Bard said barbeques producing smoke is an appropriate clarification, that barbeques, as well as wood burning generally, are ongoing issues that should be included in Recommendations, she appreciates the Guideline amendment suggestion, the Surgeon General has stated that no level of SHS is safe and that the effect on indoor air quality by SHS from outdoor sources is a real issue, particularly in multi-unit housing, and suggested the Air District condition grants to local governments on their having policies relating to smoke-free outdoor and multi-unit housing.

Chairperson Hayes called for the completion of the discussion regarding CEQA. Member Lucks suggested that if the climate change dialogue had advanced sooner then limited resources would not have been expended by local governments in defending themselves from unnecessary lawsuits and suggested a Recommendation to amend the Guidelines even if the amendment is imperfect. Chairperson Hayes agreed with Member Range and said that the Council does not have the ability to quantify the issue in a manner appropriate to amending the Guidelines. Member Lucks said climate change was the same. Chairperson Hayes said climate change took years to figure out and suggested the Council is at least as uninformed on UFP infiltration as it was on climate change and it is premature to recommend amendment to the Guidelines. Member Lucks said it is not merely UFP, but also ozone and other regulated ambient air components, infiltrating and the Air District has the authority to regulate. Member Range said the degree of information needed for regulating UFP is lacking. Member Lucks said that it is lacking in regards to other substances in CEQA. Member Range agreed but noted that the science behind climate change is of a more conclusive variety. Chairperson Hayes asked if the Council would prefer to add the Guidelines amendment to Recommendations. Member Brazil asked if it can be in Emerging Issues instead. Member Bramlett said that he lacks the understanding necessary to make a Recommendation but it is an important matter that should be tracked, perhaps by adding a Recommendation that the Air District consider studying the matter. Member Bornstein asked if it should be an Emerging Issue. Member Bramlett asked if there is even a basis for its inclusion there. Chairperson Hayes said it is premature and should be excluded. Member Bard said it should be included but was unsure of how best to do so. Chairperson Hayes directed Member Lucks to prepare proposed language for consideration at the next Council meeting. Ms. Roggenkamp suggested the topic may be adequately covered in Recommendations number 2.a.

Mr. Kendall clarified that the percentages provided by Dr. Nazaroff are an estimate of measurements of how much outdoor UFP infiltrates indoors.

The Council discussed the logistics of the delivery and Council consideration of the proposed language from Member Lucks regarding a Recommendation concerning the Guidelines.

Member Range noted a Recommendation from last year that was included in the Community Risk Reduction Plan and suggested that perhaps the topic of UFP would be better advanced via this avenue than through the Guidelines.

Member Bornstein suggested, regarding number 2, replacing “Bay Area climate” with “range of Bay Area climates” and suggested, regarding number 2.a, that “types and uses” be included somewhere.

Member Altshuler noted that UFP measurement is still evolving, conclusions about cause and effect and the health effects are still being formulated, and the Council does not want to issue Recommendations prematurely.

Chairperson Hayes said that it is important to consider the implications of Council Recommendations on current Air District work and the importance of integrating the identified UFP indoor and outdoor effects issues into the Air District’s PM<sub>2.5</sub> strategy as a Recommendation and recommended that it be inserted as number 2.

Member Bornstein suggested the Glossary include “mμ” and amending the definition of “UFP” to include a measurement in microns.

Member Holtzclaw suggested the Glossary include “Second Hand Smoke (SHS)” and that “nm” include “(1 – 5 atomic diameters)” to provide a sense of scale for readers.

Council Comments: None.

Public Comments: None.

## **OTHER BUSINESS**

### **3. Council Member Comments/Other Business**

Chairperson Hayes explained that the next meeting of the Council, on July 11, 2012, must adjourn by 11 a.m. to accommodate other Air District business.

Member Bard reported that the EPA will be issuing a revised PM<sub>2.5</sub> standard on Thursday, June 14, 2012, and welcomed input on a car sharing program launch in her neighborhood.

Chairperson Hayes mentioned that the Air and Waste Management Association Annual Conference is next week and listed the Council members that will attend.

Chairperson Hayes, on behalf of the Council, and Ms. Roggenkamp, on behalf of staff, recognized Mr. Kendall for his years of service. Member Altshuler expressed his personal gratitude to Mr. Kendall for his contribution to the Council. Mr. Kendall addressed the Council and staff.

### **4. Time and Place of Next Meeting:** Wednesday, July 11, 2012, Bay Area Air Quality Management District Office, 939 Ellis Street, San Francisco, CA 94109 at 9:00 a.m.

**5. Adjournment:** The meeting adjourned at 11:26 a.m.

Sean Gallagher  
Clerk of the Boards



BAY AREA AIR QUALITY MANAGEMENT DISTRICT  
Memorandum

To: Chairperson Stan Hayes and Members  
of the Advisory Council

From: Jack P. Broadbent, Executive Officer

Date: July 5, 2012

Re: Discussion of revised draft report on the Advisory Council's May 9, 2012  
Meeting on Ultrafine Particulate: Exposure Assessment

The attached revised draft report on the May 9, 2012 Advisory Council Meeting on Ultrafine Particulate: Exposure Assessment was prepared by Advisory Council members Jonathan Cherry, Jessica Range, Murray Wood, Sam Altshuler, and Jeffrey Bramlett.

The revised draft report will be discussed and finalized by the Advisory Council at its July 11, 2012 meeting.

Respectfully submitted,

Jack P. Broadbent  
Executive Officer/APCO

Prepared by: Gary Kendall  
Reviewed by: Eric Stevenson

Attachment

**DRAFT REPORT ON THE MAY 9, 2012 ADVISORY COUNCIL MEETING ON ULTRAFINE PARTICLES: EXPOSURE ASSESSMENT FOR DISCUSSION BY THE ADVISORY COUNCIL AT THE JULY 11, 2012 MEETING**

SUMMARY

The following presentations were made at the May 9, 2012 Advisory Council meeting on Ultrafine Particles: Exposure Assessment:

1. ***Indoor Exposure to Particles from Cooking, Cleaning and Smoking*** by Lynn M. Hildemann, Ph.D. Dr. Hildemann is an Associate Professor at Stanford University in the Environmental Engineering and Science Program of the Department of Civil and Environmental Engineering Department. Professor Hildemann's research interests include atmospheric chemistry, characterization of source emissions, dispersion modeling, and indoor air pollutants. She is currently studying the sources, chemistry and fate of organic pollutants, with a focus on aerosols. Major areas of research include investigating the sources and size distributions of indoor particulate matter (including allergens), and characterizing the uptake of water by organic aerosols. She has published more than 30 articles on her research.
2. ***Toward Understanding Ultrafine Particle Exposures in Indoor Environments*** by William W. Nazaroff, Ph.D. Dr. Nazaroff is a Professor of Engineering in the Department of Civil and Environmental Engineering at the University of California, Berkeley. Professor Nazaroff's research group studies the physics and chemistry of air pollutants in proximity to people, especially in indoor environments, in the domain of exposure science, stressing the development and application of methods to better understand mechanistically the relationship between emission sources and human exposure to pollutants. Professor Nazaroff presently serves as editor-in-chief of Indoor Air, as president of the American Association for Aerosol Research (AAAR), as president of the Academy of Fellows in the International Society of Indoor Air Quality and Climate (ISIAQ), and as a member of the California Environmental Protection Agency's Scientific Review Panel on Toxic Air Contaminants. He has published 130+ articles on his research.

## DISCUSSION MEETING

At the June 13 meeting, the Council discussed the presentations and the materials received at the May 9, 2012 meeting, and the draft report. On July 11, 2012, Council will discuss and finalize the report.

## KEY POINTS

Note: The studies presented represent small samples. Broad extrapolation is not warranted. The studies did not follow occupants in their activities outside of the home or school, so it is not possible to know how in-home or in-school exposures compared to exposure levels in other locations throughout the rest of a typical day (including in transit or outdoors).

### Dr. Lynn M. Hildemann

- Dr. Hildemann presented study results on three aspects of indoor air quality that she posed as the **greatest exposure risks** related to indoor Ultrafine Particles (UFPs; See Glossary for all acronyms): use of scented cleaning products, presence of combustion sources, and proximity of human receptors to sources.
- Three “**ingredients**” for **high UFP exposures** are: The presence of gaseous pollutants (from combustion or chemical reactions) that are likely to condense, low ambient PM<sub>2.5</sub> concentrations (so gases will form UFP rather than condensing on larger PM), and fresh UFP emissions that have not yet coagulated with larger PM.
- **Scented cleaning products:** Products containing citrus-scented limonene or other terpenes (often pine-scented) can chemically react in the presence of moderate ozone levels (from the outdoors) to form UFP. If used, these products should be used during off-ozone peaks (morning or evening), and windows should be opened and rooms vacated afterwards.
- **Indoor combustion sources** studied were clothes dryers, cigarette smoking, and cooking:
  - Clothes dryers can contribute to indoor UFP levels due to imperfect venting, especially at startup. These elevated UFP levels can persist in air for a couple hours.
  - In one particular study of casino air quality, particle number concentrations of UFP were more than 3 times greater in indoor smoking areas than outdoors. UFP concentrations in nonsmoking areas indoors varied greatly based on the extent to which the location was influenced by outdoor air or drift from adjoining rooms.
  - In studies of cooking various foods on an electric cooktop, UFP number concentrations were detected at levels up to 10 times greater than the

ambient indoor air. UFP emissions from some foods were comparable to emissions from cigarette smoking. The hot cooktop itself when turned on generated initial UFP levels almost as high as the food. In the absence of a range hood vented to the outdoors, elevated UFP levels from food persisted for an hour or more.

- UFP exposure levels are generally correlated with **proximity to the source**, but micro environmental factors can influence exposure levels:
  - **Air circulation patterns** in an indoor environment affect dilution levels and can have a greater effect than distance. (For example, a nonsmoker can have nearly the same exposure as a smoker, depending on position and air circulation.) In general, mechanical ventilation systems tend to more effectively promote vertical mixing and dilution of indoor air than simply opening windows.
  - In outdoor studies **comparing cigarette smoke exposure to motor vehicle emissions exposure**, subjects on the sidewalk of an arterial road within 1.5m of a smoker were exposed to high UFP levels while a cigarette was being smoked. In the two studies presented, traffic-related UFP from roadways with a high proportion of heavy-duty vehicles generated UFP levels of similar magnitude as UFP from cigarette smoke. Along roadways with fewer heavy-duty trucks, UFP generated from cigarette smoke was much greater than UFP generated by traffic

#### Dr. William W. Nazaroff

- Dr. Nazaroff presented results of two studies that characterized indoor UFP and co-pollutant levels in a small number of typical East Bay **homes and schools**.
- Studies involved monitoring and occupant surveys to characterize indoor air quality and also **quantify exposure of occupants** based on time and duration of occupancy.
- Study in seven non-smoking **houses**:
  - A variety of indoor sources contributed to UFP levels, with both gas and electric cooking appliances (stoves and ovens) contributing UFPs in all cases. Other sources (though not contributing in all cases) included gas clothes dryers, gas furnaces, toasters or toaster ovens, irons, incense, and candles.
  - Approximately half the UFPs contained in outdoor air infiltrated into homes. Over the course of the day and night, these outdoor-origin particles contributed ~30% of the average study resident's indoor exposure to UFPs, with the remaining 70% of daily indoor UFP exposure associated with indoor sources. The vast majority of these indoor sources were associated with peak events that occurred when the residents were home and awake (i.e. cooking or other activities under residents' control).

- In some cases particle counts were actually higher upstairs away from UFP sources, because warm air rises, carrying UFPs with it.
- Study in six classrooms in four **schools**:
  - Compared to homes, which have more indoor sources of UFP, there was not as strong a correlation of indoor occupancy to high UFP exposure (exceptions in study: cooking pancakes, custodial activities).
  - During outdoor peak UFP periods, particle counts within classrooms were somewhat lower than outdoors. However, UFP counts in the classroom during occupied periods generally tended to fluctuate along with outdoor UFP counts, because classroom windows tended to be open when the rooms were occupied.
  - When doors were closed and HVAC off, an average of 38% (ranging from 16% to 51%) of the UFPs contained in outdoor air infiltrated into the classroom. When doors/windows were open and/or HVAC on, an average of 60% (ranging from 51% to 76%) of the UFPs contained in outdoor air infiltrated into the classroom.
  - There are other air quality issues at schools besides PM counts, but this suggests an opportunity for effective air filtration and ventilation techniques, as well as greater attention to custodial practices, to help improve air for children at school. A more detailed cost-effectiveness evaluation of air filtration should be performed.

#### EMERGING ISSUES FROM THE ADVISORY COUNCIL

1. Dr. Hildemann and Dr. Nazaroff agreed that **much of a typical person's total UFP exposure occurs indoors**, since that is where most people spend their time and indoor concentrations of UFP in residential settings can in some cases be significantly higher than outdoors. According to Dr. Hildemann, the average Californian spends 89% of their time indoors.
2. The **apportionment of indoor and outdoor sources** of indoor UFPs can be highly variable depending on factors such as location, building type, building ventilation system, and occupant behavior. There is a need to better understand the relative contribution of indoor and outdoor UFP sources to indoor UFP levels.
3. Similar to UFPs in outdoor environments, indoor UFPs can exhibit high **spatial and temporal variability** due to micro environmental factors, presenting challenges to the use of traditional measurement techniques.
4. In terms of **health impacts**, not all UFPs are created equal. Although the science is still evolving and there is not yet enough data, it has been suggested that insoluble particles may be a greater health concern than highly soluble UFPs.

5. Despite these uncertainties, and although we can not totally eliminate UFP exposure, it is possible to **mitigate exposure** from both indoor and outdoor sources through a combination of source reduction, managing proximity to sources, and effective ventilation and air filtration to reduce both ambient and episodic UFP levels. Additional information is needed regarding effective mitigation techniques, including ventilation and filtration.

#### ADVISORY COUNCIL RECOMMENDATIONS

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

1. Encourage **further research** on indoor UFP exposures, health effects, and the interaction of indoor and outdoor UFP sources that considers issues such as:
  - a. Better define the health impacts and relative risks from different types of UFPs as well as different exposure levels (e.g. episodic exposures vs. average exposures)
  - b. Use of a total exposure methodology (considering duration and peak levels of exposure) can help identify priorities for mitigation and public education, and help integrate research on indoor UFP exposure with research on outdoor UFP exposure. Attention should be given to existing research on occupational exposures (e.g. cleaning products) and cumulative exposure to secondhand smoke, as well as exposures expected from different types of commute patterns (car, bike, mass transit).
  - c. Assess variations in UFP from seasonal air quality impacts associated with ozone and smoke (e.g. fireplaces, wood stoves, campfires, charcoal grills) and their effect on indoor exposures to UFPs.
2. Encourage regional partners to determine **ventilation and filtration methods** most effective at removing UFPs in different building types, while being energy efficient and cost effective in the range of Bay Area climates.
  - a. The Air District should share findings with regional planning and public health departments in order to provide uniform guidance so that those involved with designing, building, and maintaining buildings are aware of **best practices** in reducing occupant exposure to UFPs (through ventilation, high MERV value or HEPA filtration, building siting, custodial practices, etc.).
  - b. Prioritize adoption of best practices for ventilation and filtration in **schools**.
3. Integrate information on indoor UFP exposure into existing **Public Education and Outreach** efforts. Concepts for integration may include awareness about individuals' ability to reduce UFP levels in the home, as well as the potential to reduce or mitigate exposures in schools, the workplace, and outdoors:

- a. Terpene cleaning products (e.g., citrus and pine scented products) can react with ozone in the air to form UFPs as well as formaldehyde; Encourage the use of unscented cleaning products and urge those with any degree of respiratory impairment to avoid use of cleaning products and air fresheners with **limonene or other terpene** scenting agents; Educate those with occupational exposures to cleaning products (including domestic workers) about these ingredients; Use the right amount of cleaning products, open windows, and try to leave the room afterwards; If using such products, disposing of damp paper towels outside could cut exposure in half; Avoid using these products mid-day or other times when ozone levels are high, but be aware that even moderate ozone levels can cause these chemical reactions.
- b. Build on existing awareness about the health effects of cigarette smoke to give advice about **good cooking and ventilation practices**: Turn on the ventilation hood when the stove or oven are in use; Limit the time that children with asthma or adults with lung or heart disease spend in the kitchen while cooking, and ventilate and vacate the kitchen for a while after cooking; Encourage the adoption of quieter stove hood fans and avoid use of recirculating fans; Educate the public about high UFP levels from older stoves or ovens with pilot lights.
- c. **Secondhand smoke can contribute significantly to indoor or outdoor UFP concentrations.** Living with a smoker can expose you to levels of PM2.5 that exceed the AAQS.

FOR DISCUSSION AT JULY 11th MEETING:

*Consider development of planning tools that assess UFP exposure for use by local governments and regional partners.*

## **GLOSSARY**

AAQS: Ambient Air Quality Standard

HEPA: High-Efficiency Particulate Arresting

HVAC: Heating, Ventilation, and Air-Conditioning

MERV: Minimum Efficiency Reporting Value

Micrometer, or micron: One millionth of a meter; used as measure of particle diameter

nm: nanometer: One billionth of a meter; used as measure of particle diameter; generally 1-5 atomic diameters

PM: Particulate matter, typically PM smaller than 10 or 2.5 microns; largest PM2.5 is 25 times larger than diameter of the largest UFP

UFP: Ultra Fine Particulate, smaller than 100 nm (or 1/10<sup>th</sup> of a micron)

DRAFT