

Bay Area Air Quality Management District  
939 Ellis Street  
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## **APPROVED MINUTES**

Advisory Council Regular Meeting  
9:00 a.m., Wednesday, February 8, 2012

### **CALL TO ORDER – ROLL CALL**

Chairperson Stan Hayes called the meeting to order at 9:03 a.m.

Present: Chairperson Stan Hayes; Vice Chairperson Robert Bornstein, Ph.D.; Secretary Sam Altshuler, P.E.; and Council Members Jennifer Bard, Ken Blonski, M.S., Benjamin Bolles, Jeffrey Bramlett, Harold Brazil, Jonathan Cherry, John Holtzclaw, Ph.D., Kraig Kurucz, Gary Lucks, J.D., Liza Lutzker, Jane Martin, Dr.P.H., Estes Al Phillips, Jessica Range, and Murray Wood.

Arrived Late: Council Members Dorothy Vura-Weis, M.D., M.P.H.

Absent: Council Member Louise Bedsworth, Ph.D.

Also Present: None.

### **PUBLIC COMMENT PERIOD**

None.

### **CONSENT CALENDAR**

#### **1. Approval of Minutes of January 11, 2012, Advisory Council Retreat/Regular Meeting**

Member Bornstein and Chairperson Hayes discussed the nature of the assessment request by Susan Goldborough, Executive Director, Families for Clean Air, during the Public Comment Period.

Member Bornstein requested an amendment to the first complete paragraph on page 3, to read, "...more precise numerical models than ~~those~~the statistical models used for meteorological studies."

Member Vura-Weis requested an amendment to the end of the first paragraph on page 4, to read, "Member Vura-Weis suggested that presentations and audio recordings be posted as supplemental material..."

Members Bornstein and Altshuler discussed the accuracy of the minutes at the first paragraph of page 5, regarding the legal conclusion drawn about the possibility of presentations being broadcast into Council meetings.

Member Altshuler made a motion to approve the minutes of January 11, 2012, as amended. Member Vura-Weis seconded the motion; carried unanimously without objection.

Chairperson Hayes requested that the Clerk break up the Council Comments portions of the minutes for future meetings to provide a more accessible document for review by the Members.

## **PRESENTATION: ULTRAFINE PARTICLES**

### **2. Ultrafine Particles: Ambient Monitoring and Field Studies**

- A. Atmospheric Monitoring of Ultrafine Particles  
Philip M. Fine, Ph.D., Planning and Rules Manager  
South Coast Air Quality Management District

Jean Roggenkamp, Deputy Air Pollution Control Officer, introduced Philip M. Fine, Ph.D., Planning and Rules Manager, South Coast Air Quality Management District, and provided a brief description of his background.

Dr. Fine gave a presentation entitled, “Atmospheric Monitoring of Ultrafine Particles” (a copy of which is available on the website of the Bay Area Air Quality Management District at <http://www.baaqmd.gov>), with supplemental comments and discussion with the Council as follows:

Dr. Fine mentioned, in regard to slide 4, Ultrafine Particle Health Impacts, that health studies are still emerging but initial indications suggest that ultrafine particles (UFP) travel to and settle in the alveolar sacs, where they make their way into the blood stream and, in turn, an individual’s entire system.

Dr. Fine clarified, in regard to slide 6, Ultrafine Particle Health Impacts, that the close up images of cells provide examples of the breakdown of mitochondria, and the cell in turn, as a result of contact with UFP and studies are still underway to determine what exact process creates these results.

Dr. Fine pointed out, in regard to slide 7, Ultrafine Particle Health Impacts, that these results are from laboratory testing on rats, not in field studies with human subjects.

Dr. Fine added to slides 9 and 10, Size Cut (Source Aerosol) and Size Cut (Aged Aerosol) respectively, that since the mass of a particle is related to the volume with the volume being the cube of the radius, and measurements of mass are taken at arbitrary points along the scale, represented in the slide by the vertical colored lines, that this is really a measure of a small fraction of UFP because larger particles are going to dominate the mass.

Dr. Fine added to slide 11, Size Cut, that the mass based approach is not the best atmospheric metric for addressing the perceived issues of UFP as the higher massed particles will dominate the results.

Dr. Fine noted, as to slide 16, Condensation Particle Counters, that the optical technique utilizes laser scanning which proves problematic in that the wavelength of the laser is much larger than the size of UFP, making the particles effectively invisible without the creation of a super saturated zone with some form of working liquid that serves to cool and expand the particles, through which the laser passes and reveals the UFP.

Dr. Fine suggested, relative to slide 17, Condensation Particle Counters (1), that a D<sub>50</sub> Min. Size (nm) of 20 may be inadequate for the detection of UFP and that although TSI is the leader among the companies manufacturing these devices, even their instruments are considered obsolete within a week of purchase.

Dr. Fine highlighted, via slides 18 and 19, Condensation Particle Counters (2) and (3) respectively, the other companies in the industry, pointing out Grimm is the leading manufacturer in Europe.

Dr. Fine indicated, in relation to slide 20, CPC Comparison, that condensation particle counters are largely research devices and generally unreliable for networking purposes due to the constant human monitoring required to prevent malfunction.

Dr. Fine suggested, pursuant to the data shown in slides 22 through 24, CPC Comparison – Precision, CPC Comparison – Accuracy, and CPC Comparison – Averaging Time respectively, that very high concentrations were detected in only some of the data tests for each and the varying results pose a significant reliability problem in terms of rising to a level necessary to draw conclusions accurate enough to impose regulations based on the same.

Dr. Fine noted, regarding slide 27, Sources of Ultrafine Particles, that any form of combustion will emit some amount of UFP, that atmospheric nucleation occurs in 15 to 60 minute bursts that occur when atmospheric conditions are just right, and laser printers during warm up and use are an example of a non-combustion source of UFP but that no health studies exist on this topic which appears to be only a quick dissipation, office exposure issue.

Dr. Fine suggested, regarding slide 29, Typical Ultrafine Concentrations, that much of these particles do not appear to make it into a typical home and that the highest exposure point in most of our daily lives is during freeway commutes.

Dr. Fine highlighted, regarding slide 30, Network Sites – Spatial Scale, that the results show UFP counts are driven by local sources that challenge generalization and, in turn, complicate the formulation of regulations.

Dr. Fine pointed out, regarding slide 33, Jet Aircraft, that the results shown are unusual in so much as the Santa Monica Airport is located in an unusually close proximity to residential use, the Ernst Residence in particular being only 100 yards from the tarmac.

Dr. Fine explained, regarding slide 35, Dependence on Source and Activity, that it shows the results of a follow up study regarding the Santa Monica Airport that asked the question whether the size or duration of the spikes in short-term fluctuations of UFP levels have detectable relations to specific events at the airport, such as the size and activities of various aircraft.

Dr. Fine noted, in regard to slide 38, South Coast AQMD Activities, that the MATES IV: 2012-2013 study will be conducted with the use of monitoring units at ten different sites for a year, despite not being particularly impressed with any of the UFP instruments currently available for this purpose.

Council Comments:

Member Altshuler asked if there are any issues with artifacts affecting the measurements and if fireworks create UFP when detonated. Dr. Fine responded in the affirmative on both counts, but that his response regarding fireworks is based on an assumption and that he has no specific data available to him on the topic.

Member Holtzclaw inquired how wind speed has an effect, if any. Dr. Fine replied that yes, it does, along with temperature, atmospheric pressure and other meteorological factors, creating a very dynamic system with sometimes counterintuitive results such as a great wind speed occasionally compressing an UFP zone rather than expanding it.

Member Bard asked Dr. Fine to elaborate on the toxicity of the components of UFP. Dr. Fine said that the composition of UFP is a combination of metals and organics, with a fairly high concentration of organics, and some speculate that the toxicity results from this combination. Member Bard followed up to ask if new motor vehicle standards for tailpipe emissions will affect the UFP levels. Dr. Fine replied that generating lower mass particles, the goal of much of these standards, may not be lowering UFP levels but perhaps the opposite as there is less matter available for the nucleation process, and that caution is recommended when working on implementing tighter controls on vehicles to this end.

Member Kurucz asked about the data provided regarding residences near an airport tarmac, specifically if there are any speculations as to why the count is so low inside the home when such significant spikes are seen outside during take offs. Dr. Fine explained that UFP behaves like a gas but that it sticks to surfaces on contact, significantly decreasing its intrusion rate into a building. Member Kurucz asked if schools were showing different data. Dr. Fine noted that HVAC systems used in many schools act to bring the higher emission exterior air into the classroom and effective filters could bring indoor levels down by as much as 80 to 90%.

Public Comments: None.

- B. Concentrations of Ultrafine Particles and Related Air Pollutants On and Near Roadways and in Other Urban Microenvironments  
Eric Fujita, Ph.D., Research Professor  
Desert Research Institute, Nevada System of Higher Education

Ms. Roggenkamp introduced Eric Fujita, Ph.D., Research Professor, Desert Research Institute, Nevada System of Higher Education, and provided a brief description of his background.

Dr. Fujita gave a presentation entitled, “Concentrations of Ultrafine Particles and Related Air Pollutants On and Near Roadways and in Other Urban Microenvironments” (a copy of which is available on the website of the Bay Area Air Quality Management District at <http://www.baaqmd.gov>), with supplemental comments and discussion with the Council as follows:

Dr. Fujita noted, in regard to slide 13, GC-MS Chromatograms of Alkanes for Fuel, Oil, and NE and HE Exhaust, with “NE” meaning “Normal Emitter” and “HE” meaning “High Emitter,” that many compounds exist in the range shown, making it difficult to discern specific contributors.

Dr. Fujita clarified, in regard to slide 16, Emission of PM Relative to Lubricating Oil and Fuel Combustion Tracers, that the table shows the results of testing a very wide range of vehicles and, in regard to slide 17, Fuel and Oil Contributions to PM Emissions by MLR, that this is not indicative of clean vehicles or even what might be expected from a total fleet, but instead from vehicles that were intentionally chosen as high emitters for a variety of reasons.

Dr. Fujita said, in regard to slide 50, Phase 3 LAX AQSAS Pollutant Gradients Downwind of Runway 25R, that the data provided is quite limited as the project is not yet complete.

Council Comments:

Member Altshuler asked what a “smoker” is by definition in terms of oil burned per mile and whether any testing has been done regarding synthetic oils. Dr. Fujita replied that the vehicle in the experiment surely was not typical but instead an exaggerated smoker, that he was not sure what would constitute a typical smoker and that, no, no work on synthetic oils had been undertaken that he knows of.

Member Holtzclaw requested clarification in regard to slide 43, Vehicle Ventilation Expt, 2008 Cadillac SRX, as to whether the gray area on the left of each category represented full ventilation. Dr. Fujita answered in the affirmative, explaining that the three columns in each time range represent Maximum, Low and Medium Ventilation Conditions in that order, each as defined in slide 42, Vehicle Ventilation Experiment. Member Holtzclaw noted the counterintuitive result between medium and low ventilation in one of the instances. Dr. Fujita replied that this is not indicative of absolute concentrations in averaged conditions but instead depends on the condition of the vehicle being followed.

Member Kurucz noted, in regard to slide 8 and 9, Exhaust PNC (particles/cm<sup>3</sup>) of Solid and Volatile Particles Normal Emitting LDGV, and Exhaust Particle Number Concentrations (particles/cm<sup>3</sup>) of Solid and Volatile Particles, CLOSE Project, respectively, that the different types of vehicles appeared to have opposite results when comparing emissions from fresh or aged oil. Dr. Fujita confirmed this observation and suggested a potential cause as some amount of oil making its way into the combustion system and the emissions that would result.

Public Comments: None.

Chairperson Hayes thanked Drs. Fine and Fujita for their presentations and recessed the meeting at 11:18 a.m.

Chairperson Hayes called the meeting back to order at 11:25 a.m.

## **PANEL DISCUSSION**

### **3. Ultrafine Particles: Ambient Monitoring and Field Studies**

Chairperson Hayes read a list of questions prepared by Gary Kendall, Advisory Council Liaison, to frame the panel discussion, including whether UFP monitoring should occur in the Bay Area and, if so, what location should it focus on; what are the major concentrations of UFP that should expect to find; what are the locations for the highest potential for UFP exposure; what are the best ways to measure UFP for ambient air quality or emissions standards; and, finally, what are the implications of UFP for the District's regulatory and legislative agenda and programs.

Member Bolles asserted that funding is a large factor in determining what projects go forward at the District and asked what the Council should request of the District Board of Directors in terms of equipment and how best to actualize that request for staff. Dr. Fujita responded affirmatively that funding is a key factor, particularly in light of the advisability of doing constant monitoring. Eric Stevenson, Director of Technical Services, replied that the Council might recommend the hiring of Drs. Fine and Fujita. Mr. Stevenson added that the District has purchased four particle counter instruments, one of which will be deployed near roadway and the other three as part of the monitoring network, the precise locations of all four are as us yet undetermined. Mr. Stevenson suggested that he report back to the Council on their locations when determined and respond to the request for specific guidance on what the Council can do to help with funding once staff has a handle on what the issue is precisely.

Member Kurucz questioned the value of data gleaned from particle counters. Dr. Fine remarked that reliable data is difficult to pinpoint at this time as toxicity tests, health studies and epidemiology studies all have helpful data but from dissimilar sources and that size distribution monitors would help to bridge the data gaps but they are generally prohibitively expensive for network purposes. Dr. Fujita explained that although health effects are as yet unknown, it is important to initiate any studies possible in order to get baseline measurements that can used in later years when circumstances have changed.

Member Phillips affirmed that Dr. Fine's slides regarding UFP health impacts were the result of an in vitro study and discussed with Dr. Fine how real exposure studies would be performed and what the definitive health impacts are according to the current research.

Chairperson Hayes requested that District staff provide copies of the meeting material from the meetings in 2011 to all new members of the Council.

Member Brazil and Dr. Fujita discussed the meaning of BTEX as benzene, toluene, ethylbenzene and xylenes.

Member Vura-Weis asked, in looking at instrumentation possibilities including the less expensive model that provides information on speciation, whether the District should be utilizing a combination of different technology to gather data on emissions rather than only air concentrations. Dr. Fine explained that it should all be done if the funding exists because there is a value in collecting UFP data of all sorts, that speciation provides valuable data but the volume is low, that he leans towards continuous count methods generally. Member Vura-Weis followed up to inquire about whether readings from the filters will be available at various points during a 24-hour period or be lost in a series of chemical interactions over that time. Dr. Fine replied that periodic readings should be available if done correctly. Dr. Fujita added that the composition of UFP doesn't vary much day-to-day so some have suggested the supplementation of data by speciation.

Member Bornstein mentioned the San Jose Airport study conducted in conjunction with the District, in response to complaints by neighbors about air quality issues they attributed to the airport, and pointed out that in the Santa Monica Airport study, some of the residential yard data showed spikes of UFP at higher levels than that found on the tarmac and asked for speculations about the cause. Dr. Fine recounted that various environmental factors may affect the result, such as wind, and discussed with Member Bornstein the possibility of convective forces as a cause. Member Bornstein asked what time period the peaks in the charts represent. Dr. Fine shared his recollection that they are one-minute intervals. Member Bornstein aired that District studies showed that surface concentration levels fell off beyond the perimeter of the airport but that the study may be missing something by not going far enough beyond the perimeter in the data collection.

Member Bard mentioned the results of the buffer research and analysis as being positive and listed the Council emissions reductions recommendations, asking what recommendations are being made to the South Coast Air Quality Management District (SCAQMD). Dr. Fine recounted that the SCAQMD is essentially at the same point as the District in that more data, analysis and public process is needed before any regulations may be formulated, admitting that it is his opinion that UFP should be included in any emissions standards that are established but warned that simplifying the matter may lead to certain levels of data being lost, as one can find in the approach by Europe to emissions regulations. Member Bard responded that initial data, later cast in doubt, indicated that diesel truck regulations had proven effective in lowering UFP levels. Member Bard asked if the Carl Moyer Memorial Air Quality Standards Attainment Program and California Air Resources Board Assembly Bill 118 have been effective in reducing UFP and should be extended. Dr. Fujita reported that UFP levels seem to be declining over time but more measurements taken over time really are needed as there is no baseline in terms of data comparison.

Member Lutzker asked about the effectiveness of minimum efficiency reporting value (MERV) filters. Dr. Fine said there are a number of different MERV filters used and nothing unique to any one of them, noting that if the filter's mesh is too fine then there can be pressure issues and HEPA filters are great but prohibitively expensive in many instances, suggesting however that newer and more expensive systems often have sensors that detect when filter changes and maintenance are needed, thereby lowering the cost for unnecessary maintenance and parts. Member Lutzker followed up, advising that a great deal of work is being done in the Bay Area and at the state level regarding diesel emissions and asked what SCAQMD is doing in terms of incentivizing the use of these filters; establishing programs to deal with oil burners during

mandatory smog checks; addressing the wood smoke issue in terms of education and regulation; and work on the development of an education program regarding the ideal ventilation of cars on the roadway. Dr. Fine shared his perception that it is more appropriate to work to decrease emissions and promote filters as a way to further improve conditions, else one fall into a situation where filters be implemented in place of emissions reduction efforts; that no incentives are provided for filtration but that information is made available on their website; and that the best mitigation strategies overall are maintaining a distance from major sources of emissions and creating buffer zones in the resulting space.

Member Altshuler asked Drs. Fine and Fujita to rank various emitters on a scale of one to ten, with ten being the worst, such as a roadway. Dr. Fujita asserted that an airport is ten or higher depending on conditions. Dr. Fine explained that Santa Monica Airport is an exception to the norm in terms of its proximity to other uses and roadways are more important in light of the number of the population affected by them, finally ranking an airport as a seven or eight. Dr. Fine communicated that SCAQMD does not regulate indoor air but an outdoor BBQ is very high but still below that of an airport. Dr. Fujita agreed with Dr. Fine and added that the self-cleaning function of an oven is particularly bad and should only be run when weather allows total ventilation of the home. Dr. Fujita asserted that wood smoke is very high but that most communities have regulations governing particularly bad times and that two-stroke engines are not common but, individually, are gross polluters.

Member Lucks requested information regarding publications dealing with mitigation measures. Dr. Fine indicated that there are a few but they lack much detail and that three reports are expected out in the next year which will provide more insight. Dr. Fujita relayed that he read vegetation proves a more effective tool than solid sound barriers.

Member Holtzclaw mentioned that one study suggests that metals in UFP are the speculated cause of health problems and inquired as to whether that is still a valid assumption. Dr. Fujita revealed that he can't speculate on the health side but a study is nearing conclusion that will likely shed some light on this topic. Dr. Fine remarked that the conclusion is still pending whether it is metals, organics, some combination thereof, or if the UFP is merely a delivery system for something else.

Member Range suggested that retrofitting existing homes seems unnecessary based on the presentations. Dr. Fine replied that it depends on a number of variables that, when taken together, preclude any wholesale recommendation at this time.

Member Kurucz shared his desire to explore airport mitigation methods further, expressed his assumption that the emissions dissipate quickly and inquired if any studies exist regarding emissions changes relative to operational changes, such as throttling of aircraft at different levels. Dr. Fine replied that there are APEX I and II studies regarding aircraft emissions, but that aircraft are manufactured such that full throttle is required for lift off and proposed that most recommendations for emissions reductions are of a different nature, such as runway placement and reformulation of airport logistics. Member Kurucz asked if noise reduction efforts may be at odds with emissions reduction efforts and discussed with Dr. Fine his observation that aircraft seem to vary in use and protocol from one airport to another. Member Kurucz inquired as to whether any recommendations have come out of the APEX study relative to aircraft emissions levels, to which Drs. Fine and Fujita answered in the negative, at least in relation to UFP.



Member Bard asked Dr. Fine to summarize the size distribution detailed in slide 4, Ultrafine Particle Health Impacts, to which Dr. Fine replied that approximately 20% of UFP that makes it into the upper- and mid-respiratory systems remains residually and as much as 60% in the lower-respiratory system, with most fine particulate matter being exhaled instead.

In closing, Chairperson Hayes asked if the presenters if they each had one piece of advice to pass to the Council. Dr. Fine replied that there are a number of studies out there and if you roughly know what you're going to find, do not expend efforts putting another monitor next to a roadway or airport but instead work on action, regulation and other responses. Dr. Fujita answered that unless one's home is next to a freeway, the question becomes one of identifying the contributing risks and finding solutions to each or, in other words, working to identify the threats and deal with them, to complement our instinctual self-preserving behavior such as getting out from behind a smoking car.

## **OTHER BUSINESS**

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

Chairperson Hayes announced the resignation of Jonathan Ruel from the Advisory Council due to scheduling issues and that the recruitment process for his replacement will commence on February 8, 2012, with the District accepting applications through February 24, 2012, after which time the Board of Directors Personnel Committee will convene in March to consider how to proceed.

Member Kurucz inquired as to the criteria for the position and Chairperson Hayes replied the position is for the agriculture category and invited the Members to pass along the information as they feel appropriate.

Chairperson Hayes declared that the Air & Waste Management Association 2012 Annual Conference and Exhibition will be held in June and if Members are interested in attending they should contact him.

Member Blonski suggested the creation of a reader for new Council Members, and perhaps for posting to the internet for the public, that would include material from the prior year for anyone interested in getting up to speed quickly.

Mr. Kendall responded that new Members have been provided the material already that it is the District's intent to post presentations on the internet from this time forward.

Chairperson Hayes and Mr. Kendall discussed the final composition of the work group for today's presenters as being composed of Members Altshuler, Bolles, Kurucz and Phillips, asked that input be forwarded to the work group as soon as possible, with a final deadline of February 13, 2012.

Member Lucks announced that he sifted through all of the California environmental legislation for 2011 and is finishing an article summarizing same, with an informal lunchtime presentation tentatively set after the Council meeting on April 11, 2012.

5. **Time and Place of Next Meeting:** Wednesday, March 14, 2012, at 939 Ellis Street, San Francisco, CA 94109 at 9:00 a.m.
6. **Adjournment:** The meeting adjourned at 12:25 p.m.

*/s/ Sean Gallagher*

Sean Gallagher  
Clerk of the Boards