

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 12, 2012

CALL TO ORDER – ROLL CALL

Chairperson Stan Hayes called the meeting to order at 9:04 a.m.

Present: Chairperson Stan Hayes; Vice-Chairperson Robert Bornstein, Ph.D.; Secretary Sam Altshuler, P.E.; and Council Members Jennifer Bard, Benjamin Bolles, Jeffrey Bramlett, M.S., C.S.P., Harold Brazil, Jonathan Cherry, A.I.A., LEED A.P., Caryl Hart, J.D., Ph.D., John Holtzclaw, Ph.D., Kraig Kurucz, Gary Lucks, J.D., C.P.E.A., Liza Lutzker, M.P.H., Kathryn Lyddan, J.D., Estes Al Phillips, Jessica Range, LEED A.P., and Murray Wood.

Absent: Council Members Rick Marshall, P.E., P.L.S., Jane Martin, Dr.P.H. and Dorothy Vura-Weis, M.D., M.P.H.

Also Present: None.

OPENING COMMENTS

Chairperson Hayes welcomed Council Member Caryl Hart (*Regional Park District*). Member Hart took the oath of office and made introductory remarks.

NOTED PRESENT: Member Altshuler was noted present at 9:06 a.m.

Chairperson Hayes welcomed Council Member Rick Marshall in absentia.

RECOGNITION

1. Recognition of Outgoing Advisory Council Member

Chairperson Hayes, on behalf of the Council, recognized outgoing Council Member Louise Bedsworth and presented a token of appreciation for her service. Dr. Bedsworth addressed the Council.

PUBLIC COMMENT

None.

CONSENT CALENDAR

2. Approval of Minutes of the July 11, 2012, Advisory Council Regular Meeting

Chairperson Hayes suggested a non-substantive revision to soften the language of the minutes of July 11, 2012. Members Bornstein and Lutzker each suggested alternate language. Member Altshuler said a revision may be in order.

Council Action:

Chair Hayes made a motion to table the minutes of July 11, 2012, for further review by the Council; Member Bolles seconded; and the motion was unanimously approved without objection.

PRESENTATION: ULTRAFINE PARTICLES

3. Ultrafine Particles: Exposure Reduction

- A. Exposure to Ultrafine Particles On and Near Roadways
Yifang Zhu, Ph.D.
Assistant Professor
Environmental Health Sciences Department
University of California, Los Angeles School of Public Health

Jean Roggenkamp, Deputy Air Pollution Control Officer, introduced Yifang Zhu, Ph.D., Assistant Professor, Environmental Health Sciences Department, University of California, Los Angeles School of Public Health, and provided a brief description of her background.

NOTED PRESENT: Member Kurucz was noted present at 9:22 a.m.

Dr. Zhu gave a presentation entitled, “Exposure to Ultrafine Particles On and Near Roadways” (a copy of which is available on the website of the Bay Area Air Quality Management District at <http://www.baaqmd.gov>).

Council Comments:

Member Lutzker asked whether the term “the fan” is relative to the fan or air conditioning. Dr. Zhu responded that both were tested separately but the contribution of air conditioning was insignificant enough to complicate drawing any unequivocal conclusions about impact.

Member Bornstein recalled that a past speaker advised against isolating one’s self and activating the air conditioner, noted that today’s presentation seemed contradictory, and asked if he may have misinterpreted the presentation. Member Bolles said he believed the information in the two presentations to be complementary. Dr. Zhu said that greater protection is achieved by turning off the air intake and that using the recirculation feature is similar, but that rolling up the windows and deactivating the fan is usually a last resort due to the discomfort resulting from carbon dioxide build up inside the vehicle and concluded that the best options are using the recirculation feature or installing a high quality cabin filter.

Member Altshuler said past presentations indicated that ultrafine particles (UFP) fall off quicker, through dispersion or coagulation, than other gases as they travel further from a source, but noted that slide 8, Near Roadways, does not show a distinct difference between particulate matter (PM) and black carbon. Dr. Zhu said aerosol science is a factor and that upwind air must be removed from an equation to accurately compare the rates of decay of particles and gasses.

Member Altshuler noted, regarding slide 4, Particle Regional Deposition for Light Exercise, the deposition of PM in the lungs and asked if it is theory based on air flow predictions or measurements. Dr. Zhu responded that the curves were pulled from modeling work.

Chairperson Hayes noted, regarding slide 8, Near Roadways, the sharp increases in particle mass and number on or near freeways and asked if this is primarily UFP. Dr. Zhu said it is mostly PM. Chairperson Hayes asked if on and near roadway exposures is, or should be, predominantly what UFP exposure studies focus on. Dr. Zhu said yes, however UFP generally have secondary aerosol formations that should be kept in mind.

Member Hart noted the lack of roadside vegetation as a component of the presentation and asked if any study has been conducted regarding its effect on UFP. Dr. Zhu responded that she knows of studies by others regarding dispersion modeling and so far the results seem to indicate that roadside vegetation serves to elevate the plume where it then decays. Dr. Zhu likened the effect to that seen in tunnels, which contain the emissions to a certain extent. Member Hart said she is most interested in the deposition factor and types of vegetation. Dr. Zhu noted that vegetation is not emission free and can result in particle formations through the emission of volatile particles, a complication that shows there is a great deal of work to be done in the area.

Member Bard asked Dr. Zhu to elaborate on her earlier statement that asthmatics tend to retain more particles due to reduced lung function. Dr. Zhu said the study showed a higher deposition level among asthmatics than in healthy human subjects. Member Bard asked, regarding slides 14 through 16, In-Cabin on Roadway, if the 2005 PT Cruiser afforded a higher level of protection from the other vehicles because of special equipment or by virtue of its age. Dr. Zhu said it is because it is a newer vehicle.

Member Holtzclaw noted that the Los Angeles area enjoys offshore air in the night and onshore air in the day, a system that results in a higher level of background concentrations than that seen in the Bay Area, whereas in San Francisco the wind is always offshore and enjoys a lower background level as a result. Dr. Holtzclaw asked if there are any studies on concentrations found on sidewalks and in bike lanes. Dr. Zhu said a project is underway which looks at street-users' exposure to UFP, namely reductions brought about by mixed-use streets. Member Holtzclaw asked about preliminary conclusions. Dr. Zhu responded that motor vehicle operators experience lower exposure and others have increased exposure, highlighting the environmental justice component of this field of study. Member Holtzclaw asked if the complete streets model has an effect. Dr. Zhu said the complete streets model has yet to be released. Member Holtzclaw suggested paying non-drivers for filtering the air for the region.

Member Phillips recalled that past presenters have explained the complications involved in the accurate measurement of UFP, suggested there is no direct correlation between higher PM count and UFP, and asked for comments on either aspect. Dr. Zhu responded that there generally is a direct correlation between PM and UFP counts but that it is a very dynamic process. Member

Phillips said the data suggested the correlation is not constant. Dr. Zhu asked if this was based on mass concentration. Chairperson Hayes responded yes. Dr. Zhu said this is absolutely right and noted slide 3, Atmospheric Aerosols: Particulate Matter Size Distribution, showing the relationship between particle mass and count.

Member Altshuler noted, regarding slide 8, Near Roadways, that the study is dated 2002 and that a great deal has happened in the diesel world since then and asked if there is any new data. Dr. Zhu said another paper is coming out this month based on a study last year, which shows a general improvement through diesel technology, sulfur fuel contents, overall passenger vehicle improvements, and various state-funded programs to incentivize retirement of clunkers, showing overall that air quality policies seem to be doing a great job.

Public Comments: None.

B. Policy Strategies to Reduce Health Effects from Particulates
Rajiv Bhatia, M.D., M.P.H.
Director of Occupational and Environmental Health
San Francisco Department of Public Health
Assistant Clinical Professor
University of California, San Francisco

Ms. Roggenkamp introduced Dr. Bhatia and provided a brief description of his background.

Dr. Bhatia gave a presentation entitled, “Policy Strategies to Reduce Health Impacts from Urban Particulate Pollution” (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 from and discussion with the Council as follows:

Dr. Bhatia noted at the outset that he is not an expert in UFP but instead brings a perspective that is relevant to the Council’s regulatory focus and made introductory comments relative to the same.

Dr. Bhatia added, regarding slide 5, Estimated Cumulative Fine Particulate Matter (PM_{2.5}) Concentration, that he suspects there are not any or many residential lots in exceedence of the state standard.

Dr. Bhatia noted, regarding slide 6, Pre-mature Mortality Attributable to Cumulative PM_{2.5} in San Francisco, that a noticeable jump in health effects is found as low as 8 ug/m³.

Dr. Bhatia said, regarding slide 8, Local PM_{2.5} Risk Reduction Strategies, local solutions that are deemed effective by the Air District should not be shared as best practices but instead required by regulation and San Francisco is the only U.S. city regulating enhanced ventilation systems for new residences in areas with high fine particulate levels or high cancer risks.

Dr. Bhatia noted, regarding slide 11, Thoughts for Regional Air Pollution Policy, that traffic corridors were passed over legislatively when they were not designated as emission sources similar to large refineries and that freeway management practices seem to counterintuitively

result in expanded traffic corridors as the solution to air quality issues, as evidenced by recent developments regarding Interstate 710.

Dr. Bhatia said, regarding slide 12, Speed and Flow Controls Reduce Roadway Particulate Emissions, the Netherlands is a great example of a region that has urban areas and freeways intersecting and who effectively implemented lowered/variable speed limits with photo enforcement as an air quality regulatory strategy that resulted in reductions in nitrogen dioxide and PM_{2.5} by as much as 30%, as well as significant amounts of greenhouse gases, and noted a staff proposal by the Metropolitan Transportation Commission (MTC) to lower the speed limit on Bay Area freeways to 55 mph as a good one that unfortunately lacked support.

Council Comments:

Member Altshuler said the Air District does not address noise pollution and asked how closely linked it is to air pollution. Dr. Bhatia responded that in urban areas like San Francisco, traffic is 90% of the variation in noise and most of the variation in air quality from area to area and noted there is a difference in the dispersion of the two forms of pollution which creates additional variation.

Member Bornstein said anyone who believes highway expansion is a solution to congestion is behind the times, noted that dense placement of tall buildings resulted in a loss of natural ventilation in Hong Kong and Tel Aviv, and asked if anyone in the permitting department is looking at this phenomenon relative to air quality management. Dr. Bhatia said the issue was raised in reference to the Planning Department's Eastern Neighborhoods Plan along with a suggestion that it will result in increased pollution levels but that it was not studied or addressed. Dr. Bhatia suggested smart growth is not necessarily smart, noting that greenfield development was considered healthy in the 1950s, as smart growth is now pursuing a path of infill development with a narrow and limited set of objectives that will create unintended externalities and continue to fall short because of a lack of the holistic vision required to find real and lasting solutions.

Member Holtzclaw asked Dr. Bhatia about the effect on intake positioning for taller buildings. Dr. Bhatia responded that although the San Francisco model is a street level one, staff implemented a policy of positioning intakes at the point of the lowest air pollution levels possible. Member Holtzclaw clarified that Member Bornstein's statement and inquiry were meant to say that the buildings themselves are serving to create a barrier to the natural dispersion of air. Member Bornstein responded yes and while there are undoubtedly environmental efficiencies of scale in the construction of such large buildings, they collectively shape the weather patterns in their immediate vicinity. Dr. Bhatia noted studies by Professor Jonathan Levy which show an increase in ground level pollutants of approximately 30% in New York City because of the street canyon effect.

Member Brazil thanked Dr. Bhatia for his support of MTC's 55mph proposal and asked, regarding slide 6, Pre-mature Mortality Attributable to Cumulative PM_{2.5} in San Francisco, what would be required to generate a similar set of data on a regional scale. Dr. Bhatia said that slide 5, Estimated Cumulative PM_{2.5} Concentration, was created using Air District data and computers

and suggested the Air District could create a similar map for the entire Bay Area, if they have not done so already. Dr. Bhatia said the real work is identifying and checking all of the sources in the inventory.

Public Comments: None.

PANEL DISCUSSION

4. Ultrafine Particles: Exposure Reduction

Chairperson Hayes provided background on the goals and past work of the Council as context for the panel discussion.

Member Lutzker noted that San Francisco is unique in many ways and asked how translatable the work by Dr. Bhatia is to other regions. Dr. Bhatia responded that innovation happens in many places and it is the job of regional or state agencies to absorb and generalize innovation that is deemed effective; said the job of a regional air district job seems to be assessing levels of air quality throughout its jurisdiction; suggested the work is not necessary, efficient and possible for all local jurisdictions but likely is for regional and state agencies; and recalled that San Francisco worked with its partners to collect data and shared his belief that regional and state agency resources are huge, if not targeted, and certainly adequate to create a health impact model for the entire state that accounts for vulnerability.

Member Lutzker asked staff how the Air District might enact variable speed limit traffic corridors. Ms. Roggenkamp said the Air District has regulatory authority over what are called stationary sources of air pollution; the current regulatory structure dictates that the state regulates vehicles and fuels but it seems clear that is not an adequate solution to the problem; and there has been some discussion over the years of freeways as indirect sources that attract traffic and therefore create emissions, but noted that a freeway with no vehicles has no emissions. Member Lutzker said an inactive factory does not have emissions either and asked where the authority lies to redefine traffic corridors as a stationary source subject to Air District regulations. Ms. Roggenkamp said it has been done indirectly through tools like the CEQA Guidelines and general advice to cities and counties. Chairperson Hayes said the structure of air pollution laws does not lend itself very easily to this approach, as the Air District is generally charged with meeting federal or state ambient air quality standards, both of which are attained in the models presented today, and that today's discussion is focused instead on incremental improvements to public health. Dr. Bhatia noted that this model was done in one of the cleaner air cities in the U.S. and very different results have been and would be generated elsewhere. Eric Stevenson, Director of Technical Services, said that it appears circumstances are moving in the suggested direction as the U.S. Environmental Protection Agency (EPA) is now requiring near-roadway monitoring that will result in the identification of isolated non-attainment areas within the larger region. Member Lucks said that some Air Districts are focused on indirect air quality and payment of impact fees for major sources that will attract a great deal of traffic and recalled that the appellate courts upheld this strategy.

Member Cherry asked about the relevancy of indoor sources of UFP, whether the data exists, and if a different set of questions, policies and strategies apply. Dr. Zhu responded that indoor UFP is very important in light of the average person spending 80% of their time indoors and indoor UFP

falls in two categories, emissions from outdoor sources that infiltrated and from indoor sources; UFP are all very different depending on the source so the current state of science makes it difficult to say which have greater risks or how best to mitigate them; the question of how to regulate them is a complex issue coupled with the difficulties inherent with regulating cooking habits or the purchase and use of computer printers; and said there is clearly a lot to do in the future. Dr. Bhatia said there is evidence that both indoor and outdoor air quality are independently associated with health effects; one study suggests that further studies of the dynamics of outdoor/indoor air quality is important; improvements to ventilation standards improve health and wellbeing; that building design is essential and the inclusion of some requirements for new buildings into retrofit programs would be beneficial; and the level of regulations around fresh air ventilation is increasing in the building code in San Francisco.

Chairperson Hayes conducted a time check.

Member Bard said the EPA is looking at revising downward the standard for PM_{2.5} and California is looking at a low carbon fuel standard despite the huge push back to weaken the standard, and asked if and how the impact maps affected support during the planning process. Dr. Bhatia said their single biggest contribution was to provide spatially relevant air pollution data because people do not think of their air quality in terms of regions; he believed it was very well received by planning staff; that while the Air District may not be able to install variable speed corridors on Bay Area freeways tomorrow, it can place monitors next to them so as to inform the public despite the lack of authority to regulate them. Member Range said Dr. Bhatia's information was extremely useful to planning staff, in that there is a clear sense of situation and process, and asked Dr. Bhatia's initial thoughts about removing freeways. Dr. Bhatia suggested it will require an earthquake. Member Range said that a topic that has been absent from the discussion for the last couple of years is the viability and effect of removing portions of U.S. Route 101 and Interstate 280. Dr. Bhatia said that an informed response would require political prognosticating but that we can be reasonably sure that as more people with more means move into those areas and become a force for change, there may be opportunities to remove some of these freeway appendages, however the elimination of U.S. Route 101 is unlikely under the current transportation model and that widening freeways as a solution seems completely illogical.

Chairperson Hayes said he is struggling with knowing the health significance of the data that clearly indicates high levels of UFP persist near high traffic roadways and asked what "high" means exactly in terms of being a health concern or something that otherwise needs to be urgently addressed. Dr. Zhu said it is a difficult question that she does not have a clear answer to as the work related to UFP, particularly in regards to epidemiology, is quite limited but health studies focusing on near-freeway impacts have a spatial cut off of significant health impacts at 100 to 150 meters from the source. Chairperson Hayes asked if UFPs are primarily a near-roadway issue. Dr. Zhu said for primary UFP, yes, but for secondary UFP it could be a regional issue as the toxicities of particles vary widely and are found in regions not generally considered to be highly impacted by major roadway emissions.

Member Bolles said the issue of elevated versus surface air quality has arisen in his own professional past and asked if this is something the speakers have encountered. Dr. Zhu responded absolutely and has measured pollutants at different heights at fixed down-wind locations from Interstate 405, where you generally see the pollutants rise gradually and then decrease gradually, creating a system where there the highest level of pollutants is above street

level. Member Bolles noted the citing of expensive housing along Interstate at the 80 Bay Bridge in San Francisco and inquired what the pollution level and corresponding filtration systems look like. Dr. Bhatia said it depends on how the filtration system has been designed. Member Bolles asked if the higher risks for these buildings is at street level or the upper floors. Dr. Bhatia said some buildings are several hundred feet tall and speculated that the risk at the freeway level is higher than that of the ground level as there is dilution with distance. Member Bornstein agreed.

Member Kurucz asked, regarding Dr. Zhu's slide 31, Filtration, why all three filters follow the same general trend in terms of efficiency in relation to particle size. Dr. Zhu responded that this has to do with aerosol dynamics. Dr. Zhu said that the filtering of smaller particles is controlled by Brownian diffusion, whereby smaller, more active particles are collected more easily by filters by virtue of their movement and the larger particles are collected through a mechanism called impaction, whereby air flow is forced to make a sharp turn through a filter and the particles are dislodged from the air flow via inertia and, thereby, captured in the filter.

Member Bornstein asked how pore size affects the minimum range of filtration performance. Dr. Zhu said pore size does not have a direct correlation with collection.

Member Kurucz noted various presentations regarding changes in particle size as they travel from the emission source and asked where the peak number of particles reside in terms of exposure for automobile passengers. Dr. Zhu said it is somewhere between 20 to 50 nm.

Chairperson Hayes conducted a time check and asked for recommendations from the speakers.

Dr. Zhu noted that her presentation was focused on mitigating exposures in microenvironments on and near roadways but from an Air District perspective the priority should be working on emissions and the important work of improving fuel economy, engine technology, public education, and urban planning to reduce vehicle miles travelled, so that while the Air District works on emissions reductions, the public is empowered to mitigate individual exposures and more fully participate in emission reduction efforts. Dr. Zhu said the question of regulating freeways versus individual tailpipes is an intriguing topic for discussion.

Dr. Bhatia said the Council's focus for two years has been on UFP and the important thing about the UFP knowledge is to not create a new separate world program focus for UFP, but to instead fold it into a bigger picture approach to air quality management; added that the Council has learned that vehicle/traffic emissions are the cause of multiple ills and UFP should be considered another argument to act on the source of the emissions; suggested that the land use/planning component has been neglected largely because of its political immunity but also because of disciplinary fragmentation and recommended thoughtful consideration of the tools available to the Air District while considering UFP as another dimension of the bigger problem.

OTHER BUSINESS

5. Council Member Comments/Other Business

Ms. Roggenkamp said that Ana Sandoval, Acting Manager, Executive Operations, is filling in for Jennifer Cooper while she is out on maternity leave; the Air District is hosting a workshop on Friday, September 14, 2012, at 9 a.m., regarding its draft PM Report, as prompted by federal air

planning requirements and because PM is the biggest air quality concern in this region, and the report is based in many respects on work previously done by the Council; staff will be presenting new regulatory provisions related to cement kilns at the Board of Directors meeting on September 19, 2012; and the purchase by MTC of the new office building at 390 Main Street is complete, the Air District will purchase the portion for its use with a tentative move date in early 2014, the independent audit is complete, and the building tenants will be MTC and the Air District, perhaps the Association of Bay Area Governments, and maybe later the Bay Conservation and Development Commission, provided they can obtain a waiver of the requirement that all State agencies be housed in State buildings.

Member Lucks asked for an update on recent changes to the California Environmental Quality Act (CEQA) Guidelines. Ms. Roggenkamp asked if Member Lucks is referring to changes or the lawsuit. Member Lucks said the lawsuit. Ms. Roggenkamp said the Air District is appealing the decision but is unable to provide more detail on pending litigation.

Member Wood asked, regarding Dr. Bhatia's slide 4, Limits of Regional Air Pollutant Monitoring, what plans the Air District has for filling in the somewhat sparse monitoring system currently in place. Mr. Stevenson said the important thing to recognize is the network is set up to provide information on ambient air quality standards, and in that regard the Air District meets all requirements, but the Air District is installing equipment not required for monitoring ambient air quality standards by developing additional near roadway and general aviation airport sites. Member Wood asked if there is a long-term budget. Mr. Stevenson said there is a 5-year plan, not a budget, because much of the monitoring budget is tied to EPA funds that are unpredictable.

Ms. Roggenkamp said that Dr. Bhatia made a sweeping statement about the Air District monitoring network not supplying sufficient data for good policy and this was said in the context of neighborhood work. Ms. Roggenkamp said that while this is somewhat true in terms of some neighborhoods, the Air District network is very good overall and helps the Air District to make good policy towards reaching ambient air quality standards throughout the region, as evidenced by the tremendous progress that has been made. Ms. Roggenkamp added that there is a great deal of work remaining at the neighborhood level and the Air District is committed to doing that work despite the lack of state and federal requirements. Chairperson Hayes agreed there has been amazing progress and the cost of monitoring is such that there is never enough money to attain the ideal. Member Bornstein noted the network is generally sparsest where regional problems do not exist.

Chairperson Hayes called for volunteers for the report drafting committee. Chairperson Hayes and Members Holtzclaw, Bard and Altshuler volunteered, with Member Holtzclaw as lead author. Member Bornstein volunteered to perform a review of the proposed final report.

Mr. Stevenson noted the need for the report drafting committee to take clear and meaningful notes during the editing process so they may faithfully make any revisions discussed in meetings. Member Altshuler said that receiving the minutes a week or two after the meeting would be helpful. Mr. Stevenson said staff will make every effort to get the minutes out as quickly as possible.

Chairperson Hayes directed the Council to submit all comments to Mr. Stevenson by Monday, September 17, 2012, who will route them to the report drafting committee.

Member Bramlett said it would be helpful for Council members to receive copies of presentation requests that go to speakers in advance of meetings. Mr. Stevenson said that can be provided to the extent it is known by staff. Member Bramlett said staff is not expected to control the presentations, as that is actually the Council's job, but having this component would be helpful in accomplishing that task. Mr. Stevenson said staff will continue to prepare and issue the flier and forward copies of staff letters to speakers. Member Bramlett commended the flier and noted its effectiveness. Member Bornstein also commended the flier but suggested the Council provide names to staff who can then distribute the fliers in the future.

Member Holtzclaw and Chairperson Hayes discussed how the request-to-speak system works.

Member Holtzclaw recalled the discussion about state, regional and city authorities, noted the difficulty of granting more power to government in the current political climate, and speculated about the development of software applications that build understanding based on the sharing of air quality data, much like the weather, and asked how the Air District might get software application developers interested. Chairperson Hayes said the South Coast Air Quality Management District has a software application along those lines. Mr. Stevenson said the Air District is currently working on developing similar resources.

Member Bornstein suggested to Member Altshuler possible revisions to the minutes of July 11, 2012.

Member Altshuler said the Health Effects Institute is doing a complete health assessment of UFP and it is due out in 2013. Chairperson Hayes asked staff to track this matter and provide an update to the Council.

6. Time and Place of Next Meeting: Wednesday, October 10, 2012, Bay Area Air Quality Management District Office, 939 Ellis Street, San Francisco, CA 94109 at 9:00 a.m.

7. Adjournment: The meeting adjourned at 12:21 p.m.

15/ Sean Gallagher
Sean Gallagher
Clerk of the Boards