

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

APPROVED MINUTES

Joint Air Quality Planning & Technical Committee  
9:30 a.m., Wednesday, June 8, 2005

1. **Call to Order – Roll Call.** Chairperson Holtzclaw called the meeting to order at 9:40 a.m. Air Quality Planning Committee (AQPC) Members Present: John Holtzclaw, Ph.D., Harold Brazil, Irvin Dawid, Emily Drennen, Fred Glueck, Kraig Kurucz. Air Quality Planning Committee Members Absent: Kevin Shanahan. Technical Committee Members Present: Sam Altshuler, P.E., Diane Bailey, Louise Bedsworth, Ph.D., William Hanna, John Holtzclaw, Ph.D., Norman Lopera, Jr. Technical Committee Members Absent: Stan R. Hayes, Chairperson, Robert Bornstein, Ph.D.
2. **Public Comment Period.** There were no public comments.
3. **Approval of Minutes.**
  - A. **Air Quality Planning Committee – April 4, 2005.** Mr. Glueck moved approval of the minutes; seconded by Ms. Drennen; carried.
  - B. **Technical Committee – April 13, 2005.** Dr. Holtzclaw requested that at the bottom of page two on item five, after “this” insert “absorbed energy is remitted as” and delete “is absorbed and re-emitted” in the same sentence. In line three of paragraph four on page three, insert “of” after “development.” Mr. Lopera moved approval of the minutes as corrected; seconded by Mr. Altshuler; carried.
4. **Continuing Review of Climate Change.** Henry Hilken, Planning Division Director, presented a memorandum entitled “Draft: District Climate Protection Activities.” He noted that the Advisory Council resolution on climate change that it adopted on May 11 was endorsed by the Board Executive Committee on May 20, 2005 and adopted by the Board on June 1, 2005. Several Board members emphasized the importance of linking climate change to the mission of the District to reduce criteria pollutants, as well as to establish a connection between climate protection and citizen actions. He added that the District is part of the California Climate Action Registry and is developing a greenhouse gas (GHG) emission inventory. Jean Roggenkamp, Deputy Air Pollution Control Officer, added that the District’s FY 05-06 budget provides funding for a climate change protection program.

Mr. Altshuler stated that the relationship of fine carbon to global warming as explained by Professor Mark Jacobson to the Council a few years ago should be considered. Mr. Hanna added that some experts have spoken of the difficulty in tracing the impact of individual actions to slow global warming given how slowly global temperatures increase over time.

- 5. Community Air Risk Evaluation (CARE) Program.** Janet Stromberg, CARE Program Manager, distributed a memorandum entitled “Goals and Objectives” for the CARE program. The goals include staff consultation with the Advisory Council and Care Task Force, development of an average annual toxic air contaminant emission inventory, contracting with Sonoma Technologies to develop appropriate emissions maps, and embarking on a two-pronged review of emissions for toxic air contaminant and diesel particulate matter (PM). The first assessment will be based on the District’s emissions inventory for stationary source emissions. The area selected for the pilot project will be reviewed in greater detail. The Council’s input on the selection of the neighborhood is welcome. A health risk assessment will then be conducted in the pilot project area. The results at each step will be brought to the Advisory Council and the CARE Task Force for review. Peter Hess, Deputy APCO, indicated that staff would like for the Council to suggest criteria for neighborhood selection.

Dr. David Fairley, District Statistician, presented “Sources of Bay Area Fine Particles,” noting that ten years ago the District conducted a study of wintertime particles in the Bay Area, and more recently the Central California Ozone Study studied data from some Bay Area sites. Analysis of data from filters loaded with ambient PM is compared with the emission inventory to estimate contributions from more specific sources. Information gaps can, in part, be filled by using Carbon 14 measurement and organic speciation.

Dr. Fairley showed a slide distinguishing PM<sub>10</sub> and PM<sub>2.5</sub> size fractions, and noted that the health effects associated with PM exposure include asthma exacerbation, chronic bronchitis, hospitalizations for respiratory and cardiovascular effects. For the San Francisco Bay Area in the year 2000, there were 1,400 deaths associated with PM exposure and 500 to motor vehicle accidents. Notwithstanding uncertainty, this is an order of magnitude difference.

The District does not attain the state standards for PM<sub>10</sub> and PM<sub>2.5</sub> but does attain the national annual and 24-hour standards. However, the latter will be modified, and it is not clear whether the attainment status will continue under the revised standards.

The goal of the District’s present study of PM is to estimate the contributions of various sources to Bay Area PM<sub>2.5</sub> whether derived from direct emissions from woodsmoke, motor vehicle exhaust and road dust or through secondary formation from gases in the atmosphere and undergo chemical reactions to form ammonium nitrate. There are two approaches to estimating PM sources. The first is the emissions inventory with engineering calculations for a relatively complete set of sources even though ambient concentrations may not be reflected within it, and secondary PM is omitted from it. The second is chemical mass balance (CMB) analysis of PM filter samples: this reflects actual PM and includes secondary PM. However, only certain sources can be measured and it is difficult to distinguish among some sources.

CMB analysis begins with an ambient filter sample, and the aim is to find, measurement by measurement, the mix of sources that best represents the PM on the filter. Available PM<sub>2.5</sub> speciation studies include the California regional Particulate Air Quality Study (CREPAQS) which addressed data from three Bay Area sites (Bethel island, Livermore, San Francisco); the Speciated Trends Network which evaluated San Jose data, and the Interagency Monitoring of Protected Visual Environments in Point Reyes.

The chemical species measured were divided in arrays of higher molecular weight elements, ranging from aluminum through zirconium, and then ions such as nitrates, sulfates, ammonium, sodium, chloride, soluble potassium, and then by elemental and organic carbon. In evaluating PM<sub>2.5</sub> species from annual averages, there is ample evidence of large amounts of secondary PM in the Bay Area. In terms of sodium and chloride concentrations, which derive from sea salt in marine air, the Point Reyes monitor registers the greatest amount. Organic and elemental carbon are found in the greatest abundance at the Livermore and San Jose stations. Geologic dust does not register very much in the data. As for peak PM<sub>2.5</sub> measurements, Point Reyes registered considerable quantities of sea salt but less sulfate.

The sources used in the CMB analysis include those that are directly emitted such as road dust, motor vehicle exhaust, tire and break wear, wood smoke, meat cooking, and marine air, as well as those from secondary formation in the atmosphere such as ammonium nitrate and ammonium sulfate. According to the analysis, tire and break wear are minor sources.

With regard to annual PM<sub>2.5</sub> contributions in sources such as ammonium sulfate, ammonium nitrate, marine air, road dust, fossil fuels and woodsmoke and fires, for six Bay Area sites, the data indicate that at Point Reyes marine air and ammonium sulfate predominate. For the same sites, peak PM<sub>2.5</sub> contributions differ somewhat in that there is a significantly more ammonium nitrate than in the annual averages, though it is significant in the annual measurements as well. Ammonium nitrate is a large contributor to Bay Area PM<sub>2.5</sub> in both annual averages and peak concentrations, while ammonium sulfate contributes more to the annual level than to peak concentrations. In both scenarios, fossil fuels contribute a great deal to PM<sub>2.5</sub>, but road and geological dust, and tire and break wear, contribute insignificantly.

The CMB analysis provides information on source categories more than individual sources. It can be combined with the emissions inventory to estimate contributions from specific sources and assess contributions to secondary PM from nitric oxide (NO<sub>x</sub>) and sulfur dioxide (SO<sub>2</sub>). Dr. Fairley showed a slide with estimates of the percentage total contribution to annual PM<sub>2.5</sub> concentrations from various sources including wood burning, cooking, on-road, off-road, refining, power plants, aircraft, marine air, and others. On- and off-road combustion directly or indirectly contributed nearly 50% to the total. For peak PM<sub>2.5</sub>, wood burning is a large source that contributes 25% to the total and off- and on-road sources 20%. Other substantial sources of Bay Area PM are refineries, commercial cooking, aircraft and power plants. Almost all Bay Area PM derives directly or indirectly from combustion.

However, some gaps remain in the ability to distinguish fossil fuel sources from wood burning and cooking. Carbon-14 analysis can assist in differentiating between “new” carbon (i.e., woodsmoke, cooking, wildfire) and “fossil” carbon (i.e., gasoline, diesel, natural gas). Preliminary results from Carbon-14 analysis, when compared with the CMB analysis, indicate that at San Jose 4<sup>th</sup> Street, San Francisco, Livermore and Bethel Island there is considerably more new than old carbon. On weekdays, two of the sites had more new than old carbon, while the others had as much new as old carbon. However, in the summer, levels of new carbon far exceed old carbon. Mr. Brazil observed that the Reid Vapor Pressure in reformulated fuel might be responsible for the latter phenomenon.

Dr. Fairley stated that the University of Arizona will use Carbon 14 methodology to analyze samples of District PM<sub>10</sub> filters obtained in 2004, to quantify new and fossil carbon on an annual basis. The District is contracting with Desert Research Institute to speciate organic carbon for a range of PM<sub>2.5</sub> filters collected at the San Jose Jackson Street site to evaluate individual sources using organic markers for meat cooking, motor vehicle emissions, wood smoke, and secondary organic aerosol. No unique marker exists for diesel emissions. Ms. Bailey noted that some diesel fuels have a dye which may serve as a potential tracer. Mr. Hanna added that tax payments on red dye diesel are not required. In reply to a question on the high levels of Bay Area ammonia, Gary Kendall, Technical Division Director, stated that the exhaust from the five million Bay Area vehicles may be the primary ammonia.

Dr. Holtzclaw observed that PM concentrations are highest at their sources—highways, ports and freight yards—and their concentrations fall off rapidly downwind. He opined it would be important to sample PM at the sources and at two or nearby downwind sites. Dr. Fairley responded that the District has mobile samplers and could conduct this kind of monitoring.

6. **Hydrogen Highway Blueprint.** Michael Murphy, Advanced Projects Advisor, presented “Update on the California Hydrogen Highway Blueprint.” He noted that through the Transportation Fund for Clean Air (TFCA) the District is sponsoring three hydrogen fuel demonstration projects: (1) an AC Transit fuel cell bus that will go into revenue service in September 2005; (2) one of three Santa Clara VTA/SAMTRANS fuel cell buses that is already in revenue service, and (3) the leasing and fueling of two Honda fuel cell vehicles for San Francisco.

The TFCA will support a fuel cell project at Pleasant Hill BART station, involving a stationary fuel cell that will in turn generate fuel for vehicles. The District recently joined the California Hydrogen Business Council and also participates in the California Stationary Fuel Cell Collaborative. A District chemist participates in the American Society for Testing and Materials (ASTM) Hydrogen Fuel Cell Committee which will be developing fuel standards. District staff will also participate in the Santa Clara County Hydrogen Working Group, as well as in a DaimlerChrysler & BP F-Cell three-year vehicle demonstration project. These vehicles will have 100 mile range on 2 kilograms of hydrogen fuel.

The Blueprint initially focuses on Southern California and the Bay Area, and on stationary fuel cells to produce fuel for vehicles. The 2005-2006 state budget proposes \$9.5 million for the Blueprint, with 15 staff positions and \$1 million for contracts. Mr. Murphy noted that a possible District role is to work with local planning and safety departments on the fueling network, and apply its incentive funding toward fuel cell vehicle projects and the development of refueling stations that rely on renewable resources. Adopting a policy that directs support exclusively for projects approved of, or supported by, the Blueprint is also possible. Mr. Altshuler noted that different sources of hydrogen fuel produce fuel with varying efficiency. Those that produce fuel from renewable sources are the most energy-efficient.

7. **Committee Member Comments/Other Business.** In response to Ms. Bailey’s question on SB 656, Ms. Roggenkamp indicated that staff would be providing a presentation to the full Advisory Council at the July 13 meeting on the District’s mobile source incentive program.

**8. Time and Place of Next Meeting.** AQPC - 9:30 a.m., Wednesday, August 10, 2005.  
Technical Committee - at the call of the Chair, 939 Ellis Street, San Francisco, CA 94109.

**9. Adjournment.** 11:59 a.m.

*James N. Corazza*

James N. Corazza  
Deputy Clerk of the Boards