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

APPROVED MINUTES

Joint Air Quality Planning & Technical Committees
9:30 a.m., Wednesday, October 12, 2005

1. **Call to Order – Roll Call.** Chairperson Holtzclaw called the meeting to order at 9:42 a.m. Air Quality Planning Committee (AQPC) Members Present: John Holtzclaw, Ph.D., Harold Brazil, Irvin Dawid, Emily Drennen, Kraig Kurucz, Fred Glueck. AQPC Members Absent: Emily Drennen, Kevin Shanahan. Technical Committee Members Present: Sam Altshuler, P.E., Louise Bedsworth, Ph.D., Robert Bornstein, Ph.D., William, Hanna, John Holtzclaw, Ph.D. Technical Committee Members Absent: Diane Bailey, Stan Hayes, Chairperson.

2. **Public Comment Period.** There were no public comments.

3. **Approval of Joint Committee Meeting Minutes of August 16, 2005.** Chairperson Holtzclaw deferred this item until the latter part of the meeting.

4. **Update on the District's Community Air Risk Evaluation (CARE) Program.** Janet Stromberg, CARE Program Manager, stated that the CARE program objectives are to investigate exposure to air toxics emissions in the Bay Area from outdoor emissions and to reduce the risk associated with them. The focus will be on exposure to toxic air contaminants (TAC) throughout the Bay Area by evaluating the TAC inventory and evaluating supplementary particulate matter (PM) air monitoring analysis. The cumulative risk analysis for a small sub-area that was originally planned will be deferred in order to partner with the California Air Resources Board (CARB) to develop a comprehensive study of the region for all source types. Emission inventory grids will be overlayed on demographic maps in order to assess exposure.

   Ms. Stromberg introduced Steven Reid of Sonoma Technologies, Inc. Mr. Reid indicated that the first-draft of the TAC emission inventory uses readily available information for a screening-level assessment of population exposures and the subsequent selection of a study community. A "top down" method will be used that examines activities on a regional scale rather than evaluating individual emitters. The approach begins by using existing criteria pollutant emission inventories, and then applies available chemical speciation profiles along with available cancer and non-cancer unit risk factors to a spatial allocation of emissions on gridded maps.

   The study area includes the nine Bay Area counties. Various inventories will be used: the 2000 area- and non-road Total Organic (TOG) compound and PM10 emissions at a county level and an annualized level (in tons per year in a given county). On-road TOG emissions for 2000 were gridded to a 2 km x 2 km grid cell domain from a different data base that contained a summer and winter averaged inventory. These were averaged in turn to obtain an annualized total.

Another inventory for point sources contained TAC emissions by individual facility, including benzene from such point sources as petroleum processing operations and auto body shops. For area-, on- and off-road sources, the study will extrapolate from criteria to toxic emissions using chemical speciation profiles for given source types. These were obtained from CARB, the US Environmental Protection Agency (EPA) and Desert Research Institute (DRI). Once these are applied, a TAC emission inventory for all source types is created. The next step is to perform a risk weighting procedure for purposes of conducting modeling. Risk factors are used for cancer risk estimation involving a dose-response type of dynamic with a linear relationship. For non-cancer risks, reference concentrations are used: these identify a level below which no health effects are expected. There are two safety margins employed in this context: one for ranges of uncertainty, and another for expert judgment on the part of toxicologists.

The sources of information used to assemble risk factors and reference concentrations include CARB-approved risk assessment health values, EPA Office of Environmental Health Hazard Assessment (OEHHA), EPA integrated risk information system (IRIS) and risk assessment information system. Concentrations were selected, risk-weighted emissions were calculated and uncertainty ranges were identified. A database of risk-weighted emissions by TAC and source category was prepared.

The method of calculating risk-weighted emissions for a variety of compounds and variety of risks attempts to normalize the risk for modeling purposes. The calculation began with a mass-based emission for a given compound, to which a unit risk factor was applied for calculating cancer risk, or a reference concentration for calculating non-cancer risk. This method allows for weighting emissions to assess the greatest risk. Subsequently, exposure to population densities is evaluated in the context of the spatial allocation of emissions over a given area.

Each inventory is handled differently. Spatial allocation factors are used for area and non-road sources. For on-road mobile sources, a gridded emissions inventory was already available, and for point sources the geographic coordinates of facilities were also readily available. For the spatial allocation factors, geographic information systems (GIS) databases were used, including demographic data/population density, land-use/land-cover data sets to distinguish residential from agricultural use, line length (railroad tracks), facility locations and other GIS information. All of these were assembled and overlaid on a gridded domain. With each polygon in the grid, it is then possible to assign emissions to a grid cell based on an appropriate spatial surrogate.

The next step involved the application of the risk-weighted inventory on the gridded map for all source types. For cancer risk weighted emissions in the entire study domain, an estimated 16 pounds per day for all TAC species is emitted, 90% of which is chromium and diesel PM. However, there is a large uncertainty associated with this estimate of chromium insofar as the data assumes it is entirely the more toxic (VI) rather than more benign (III) type. Primary sources of chromium include fugitive dust from construction as chromium is a constituent in cement. Ambient measurements suggest that the allocation of chromium VI and III is approximately 30/70%, respectively. Mr. Reid added that aircraft are also a large source of chromium.

In discussion, Dr. Bornstein cautioned that taking a conservative approach for chromium may produce overly-dramatic data. Mr. Kurucz urged that chemical speciation profiles be accurate, taking into account regulatory work in this region. Peter Hess, Deputy Air Pollution Control Officer, noted that these will be accounted for in the Quality Assurance-Quality Control

(QA/QC) phase. Mr. Reid displayed a map showing where hot spots are for diesel PM emissions from heavy-duty truck traffic near shipping lanes and primary road networks. For the estimated 25 tons per day of chronic risk-weight emissions, acrolein (which derives mainly from aircraft, on-road sources and combustion processes), phosphorous and formaldehyde constituted approximately 2/3 of the risk-weighted emissions. Source types include on-road mobile sources, construction and demolition, construction equipment, aircraft, livestock waste, fugitive windblown dust, paved road dust and farm equipment.

The strength of the TAC inventory for on-road mobile sources are that estimates were made with EPA-recommended methods and California-specific chemical speciations. Emissions from point sources were directly reported and spatial allocations applied to the modeling grid at a 2km x 2km resolution. Potential weaknesses of the TAC inventories include omission of some TACs, the extent to which uncertainty emerges from the application of chemical speciation profiles which themselves contain uncertainties, and the application of conservative assumptions about chromium emissions as being exclusively the more toxic VI than the benign III type.

Recommendations from these preliminary results include the prioritization of TACs, continued emission inventory development, adding emissions for any omitted TACs, and further investigation of emissions of chromium VI and IV from sources of fugitive dust.

Other geographic analyses can be conducted, such as emission inventory-based site evaluation in which diesel PM is selected and assessed in terms of specific population in a grid. The location of roadways and schools can be plotted for an initial analysis of a sub-region.

Dr. Saffet Tanrikulu, Modeling & Planning Section Manager, stated that staff will investigate the completeness of the data to ensure that all sources and source categories are included. Staff will perform QA/QC of the data, and will look at seasonal variations, annual averages and data variations. Staff will also evaluate uncertainty in the upper and lower bounds in the emission inventory and thereby improve the emission inventory.

Cuong Tran, Atmospheric Modeler, member of the staff's emission inventory evaluation group, provided examples of QA/QC for the distribution of wood burning fireplace emissions, and on-road exhaust $PM_{2.5}$ in the Bay Area. He compared a plot of $PM_{2.5}$ emissions from fireplaces in the nine Bay Area counties using survey data and CARB methodology with a second plot based on 2000 Census data concerning homes where the primary heating fuel is wood. The two plots are at rather considerable variance. A separate illustration of different plots of exhaust $PM_{2.5}$ emissions from on-road sources leads to the conclusion that the use of the same vehicle miles traveled (VMT) fleet mix for all roadway links is suspect. It is necessary to improve VMT analysis of roadway types. Ms. Stromberg added that six months have been allocated to staff for QA/QC.

Mr. Tran displayed maps plotting population groups most sensitive to poor air quality (over age 64 and under age 18, and homes with incomes less than 185% of the federal poverty level) based on 2000 Census data. The areas with the greatest concentration of sensitive receptors are San Francisco, San Jose and a few areas in the East Bay. When income is included, some parts of East Bay are prominent, and again in the Chinatown and Tenderloin areas of San Francisco. Emission density data for various TACs will be superimposed on these demographic maps in order to study the impact of TACs on public health in the Bay Area.

Mr. Altshuler suggested that the modeling in the study be compared with ambient measure-ments. Ms. Stromberg replied that this will occur when further analysis is conducted of the District's PM filters by DRI, which is in the process of obtaining new equipment that can read filters for their hydrocarbon content. Gary Kendall, Technical Division Director, stated that the map plotted for San Francisco on $PM_{2.5}$ emissions from woodsmoke, based on survey data and the CARB methodology with its assumptions on the amount of wood burned, showed San Francisco with the highest concentration, whereas PM filter samples show San Francisco contributing little to filter mass from wood combustion. The observations do not corroborate estimates on the emission density map. A more extensive survey will be conducted this winter on wood burning in the Bay Area. Mr. Altshuler inquired about whether the program will address asthma, and Mr. Hess replied that the data will be submitted to county health officers.

In reply to questions, Amir Fanai, Senior Atmospheric Modeler, stated that the fleet mix for the motor vehicle emission inventory is not the same for every link in the Bay Area. According to available data, San Francisco has the highest truck level activity in the Bay Area. When areas of secondary concentration are opened up in further detail on the maps, additional areas of interest emerge, and provide a clearer idea of vehicle activity.

Chairperson Holtzclaw noted that elected officials from San Francisco and Oakland ought to take particular note of these preliminary results, as it suggests diesel bus emissions may be of greater importance than hitherto known. Mr. Altshuler replied that the installation of particulate traps, which reduce soot emissions, may also create an acute health problem with nitric oxide emissions on streets. Recent literature published in "Atmospheric Environment" has addressed this issue. This may be a subject for future Advisory Council discussion.

3. **Approval of Joint Committee Meeting Minutes of August 16, 2005.** Mr. Dawid requested that "clean diesel and hybrids" replace "diesel hybrids" in paragraph two on page five. Dr. Bedsworth requested that "severity" be replaced with "potency" in line eight of paragraph four on page two, with the sentence to end at "measured." Chairperson Holtzclaw requested that "Dr. Wittenberg stated that" be inserted after "Registry" on line two of paragraph six on page three. Mr. Dawid moved adoption of the minutes, as corrected; seconded by Dr. Bedsworth; carried; with Mr. Altshuler abstaining.

5. **Committee Member Comments/Other Business.** Mr. Dawid noted that AB 694 was passed by the Legislature. It allows the District's Transportation Fund for Clean Air (TFCA) funds to be allocated to private fleets. He added that Council member Drennen has asked the Council to look into how the TFCA process could better support walking and non-motorized transportation. Mr. Kurucz stated that this month the 2006 Dow Jones Sustainability Index Review identified Intel as a leader for semi-conductors in the field of environmentalism and pollution prevention.

6. **Time and Place of Next Meeting.** Air Quality Planning & Technical Committees Joint Meeting, 9:30 a.m., Wednesday, December 14, 2005, 939 Ellis Street, San Francisco, CA 94109.

7. **Adjournment.** The meeting was adjourned at 11:46 a.m.

/s/*James Corazza*
James N. Corazza
Deputy Clerk of the Boards

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