



BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

# Notes from Community Air Risk Evaluation (CARE)

## Task Force Meeting

June 9, 2005

### Attendees

#### Task Force Members:

Kevin Buchan, WSPA  
Joel Ervice, RAMP  
Pam Evans, ACDEH  
Dr. Jaime Fine, USF  
Dr. Eric Fujita, DRI  
Ortensia Lopez, El Concilio SMC  
Maria Luz Torre, Parent Voices  
Dr. Shankar Prasad, Cal EPA  
Timothy Taylor, CAEC, LLC  
Cindy Tuck, Esq., CEEB

#### Interested Parties

Wafaa Aborashed, EJAQC  
Amy S. Cohen, ELJC  
Frank Gallo, MCAC  
Ken Kloc, ELJC  
Sudeep M. Rao, Deep-Solutions  
Karla Santamaria, El Concilio, SMC  
Linda Weiner, American Lung Assn.

#### BAAQMD Staff

Jack Broadbent, EO/APCO  
Peter Hess, DAPCO  
Jean Roggenkamp, DAPCO  
Brian Bateman, Dir. Engr.  
Henry Hilken, Dir. Plan.  
Janet Stromberg, Interim CARE Prog. Mgr.  
Juan Ortellado, Mgr, Grants  
Saffett Tanrikulu, Mgr. Research & Mod.  
David Fairley, Statistician

### Meeting Notes

**Agenda Item 1** – Jack Broadbent welcomed Task Force Members and others to the meeting, and provided an opportunity for brief self-introductions from everyone in the room.

**Agenda Item 2** – CARE Program Update

BAAQMD staff discussed the [CARE Program Goals and Objectives](http://www.baaqmd.gov/CARE/documents/050609-goals-objectives.pdf) (available at: <http://www.baaqmd.gov/CARE/documents/050609-goals-objectives.pdf>) emphasizing the investigative nature of much of the program. The two basic tracks of CARE Program air quality investigations involve:

- 1) Compilation and examination of toxic air contaminant emissions inventory data from point, area and on-road motor vehicle sources; and
- 2) Analysis of actual measured levels of particulate matter collected on filters to better estimate the correct proportional contribution from each major source category in general, and to get a better idea of the portion that is diesel particulate matter.

Program Objectives 2, 4 and 5 were discussed in Agenda Items 3, 4 and 5 respectively.

### **Agenda Item 3 – Report on Development of Emission Inventory Maps**

#### Presentation

The District has contracted with Sonoma Technology, Inc. (STI) to develop the deliverables for Program Objective 2: "...develop and average annual toxic air contaminant (TAC) inventory of the Bay Area....allocated on a 2 km x 2 km grid...." STI will produce a mapped TAC emission inventory using geographical information system (GIS) technology. Concurrently, District staff members are acquiring the hardware, software and training to be able to develop applications using GIS for future projects.

Dana Sullivan, Manager of Emissions Assessment at STI gave a presentation on the "[Development of a Screening-Level Emission Inventory of Toxic Air Pollutants \(TAPs\) for the Bay Area.](#)" Ms. Sullivan explained that the approach taken by STI has four steps, and proceeded to describe each one:

- 1) Begin with existing criteria air pollutant inventories;
- 2) Apply available chemical speciation profiles to determine toxic air pollutant (TAP, same as TAC) emissions;
- 3) Apply available cancer and non-cancer unit risk factors (to weight the relative importance of each TAP); and
- 4) Spatially allocate weighted TAP emissions.

#### Comments

One question asked, was why the District is not allocating area source emissions on a 1 km x 1 km grid. Staff replied that the information provided by ARB was on a 4 km x 4 km grid. The District contracted with Dr. Robert Iresen, who created a methodology to resolve the emissions into a 2 km x 2 km grid. It required a significant effort to reallocate from 4 km<sup>2</sup> to 2 km<sup>2</sup> and would be a much bigger investment to get to a finer resolution.

Another question raised was whether the Direct Travel Impact Model (used to estimate on-road motor vehicle emission) considered emissions from idling. It does. There was also a question about how/if emissions from marine vessels are counted. These are included as area sources. Various other questions concerned the completeness of the inventory. District staff agreed to include a list/description of all types of emission sources included in the point source, area source and on-road motor vehicle emission inventories in the Work Plan.

On another track, there was concern raised over the assumptions made in the use of unit risk factors as a measure of the relative toxicity of different compounds. Specifically, Dr. Fine asked why a linear function of dose/response is assumed. Dr. Prasad commented that this methodology underestimates effects other than cancer due to toxic emissions. It was generally acknowledged that there are many uncertainties in calculating the health risks of exposure to toxics. Ms. Sullivan drew an example of a dose response curve, pointed out that the specific curves for each compound would be different, and stated that a linear approach using weighted values should be acceptable for comparison purposes over a large region like the Bay Area. Ms. Stromberg commented that the inventory will be expressed as an estimate of annual average emissions rather than as a precise determination, which should be reasonable for the purposes of the CARE Program.

**Agenda Item 4 – Sources of Bay Area Fine Particles**Presentation

Dr. David Fairley, the District's Statistician, provided a [PowerPoint® presentation](#) of his paper, [Sources of Bay Area Fine Particles: A Chemical Mass Balance Analysis](#), an investigation of various approaches used to estimate the contributions from sources such as wood smoke and motor vehicle exhaust to Bay Area ambient fine particulate matter pollution (PM<sub>2.5</sub>). He discussed what has been learned from chemical measurements of ambient PM from several Bay Area sites and what new information may be gained from two upcoming studies.

The chemical mass balance (CMB) analysis indicates:

- 1) Ammonium nitrate is a large contributor to both annual and peak PM<sub>2.5</sub>.
- 2) Ammonium sulfate is a significant contributor to annual PM<sub>2.5</sub> but not peak PM<sub>2.5</sub>.
- 3) Road dust/geological dust/brake and tire wear are insignificant sources of PM<sub>2.5</sub> in the Bay Area.

The CMB analysis also suggests:

- 1) On-road and off-road combustion directly or indirectly contribute nearly 50% of Bay Area PM<sub>2.5</sub>.
- 2) Wood smoke is the other large source, contributing at least 20% on an annual basis and 25% to peak PM<sub>2.5</sub>.
- 3) Other substantial sources of PM<sub>2.5</sub> may include refineries, commercial cooking, aircraft and power plants.
- 4) Almost all Bay Area PM<sub>2.5</sub> derives directly or indirectly from combustion.

Dr. Fairley pointed out that CMB analysis modeling provides information on emissions from source categories, but not from individual sources. Emission inventory information provides information on direct emissions from individual sources, but no information on secondary PM from NO<sub>x</sub> and SO<sub>2</sub>. An assumption was made that SO<sub>2</sub> emissions are proportional to contributions to ammonium sulfate and that NO<sub>x</sub> emissions are proportional to contributions to ammonium nitrate.

The presentation closed with an acknowledgement of gaps in our understanding and a description of additional analyses the District is undertaking. Specifically, additional PM filters will be analyzed for Carbon-14 content to get a sense of the annual average breakdown of PM from fossil fuel combustion and other types of combustion (such as wood smoke, cooking, agricultural burning, etc.). Also, some filters will be analyzed for the presence of specific hydrocarbons that may help distinguish the relative contributions of wood smoke, cooking, gasoline and other fossil fuels.

Comments

A question was raised about the effect of upset conditions. In general, the dates associated with the filters were not correlated with events at permitted facilities. However, it was pointed out that the filters examined for C-14 were chosen for days when high levels of PM might be expected, because the overall level of C-14 is likely to be undetectable on a single average filter. The new test for C-14 will be performed on multiple filters collected throughout a one-year period to ensure a level high enough for detection.

Other questions concerned whether or not ship and aircraft emissions were included. Emissions from these source categories are included in the off-road vehicle emissions.

Appreciation was expressed for the District's plan to obtain hydrocarbon analysis of particulate matter filters. Task Force members requested that the Workplan include a list of the source categories included in the inventory. District staff agreed to do this.

**Agenda Item 5** – Discussion of available data for pilot project area selection

Comments

One Task Force member suggested that the pilot project include a study of a comparator area. Another member replied that it was important to first better define the question [objective], followed by another member who said the focus is on learning how to do a cumulative risk analysis. This characterization was supported by a second Task Force member who also supported the idea of a study of a comparator area.

On the subject of population characteristics, a Task Force member asked how well we understand our communities already and suggested partnering with existing groups for community 'walk throughs.' The West Oakland Environmental Indicators Project Report was mentioned as an example to consider for its list of population attributes.

**Wrap-up**

The Task Force members as well as interested parties in attendance were all afforded the opportunity to make comments integrated in a give and take format. A few suggestions were made for the next meeting including:

- See if ARB representatives can come to the next meeting and report on their experience doing neighborhood assessments
- Provide longer lead time for setting the meeting date
- Provide meeting notes to everyone
- Schedule a longer time period for the next meeting
- Try again to tape the meetings and have District staff transcribe and distribute the contents

Respectfully submitted by

Janet Stromberg, Interim CARE Program Manager