

MATES-III

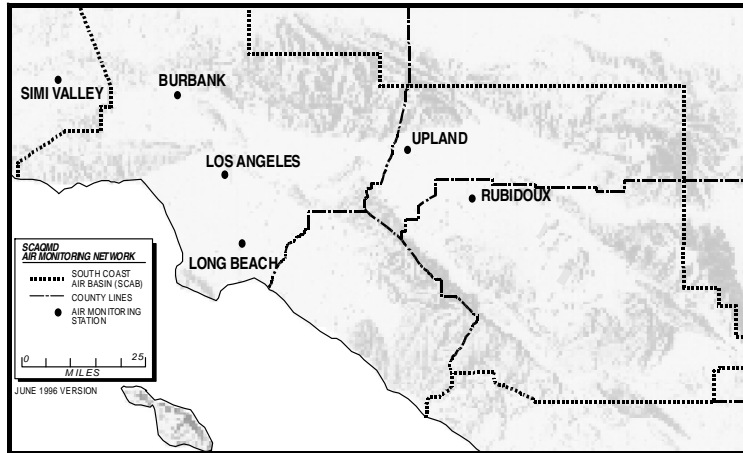
Protocol for Toxic Trends Analysis

Tom Chico
March 31, 2004

Objectives

- Analyze
 - Annual trends
 - Monthly trends
- Species apportionment
- Source apportionment
- Compare ambient concentrations to
 - Chronic RELs
 - Acute RELs

ARB Toxic Monitoring Sites



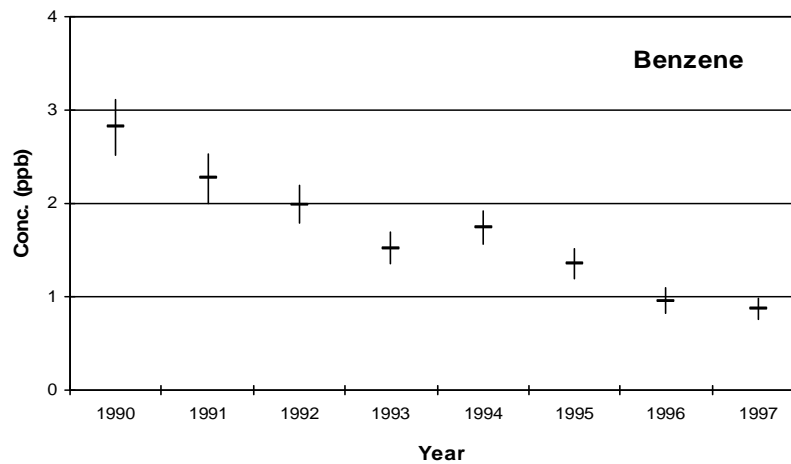
Toxics Measured

<u>Volatile Organic Compounds</u>			
Acetaldehyde	Chloroform	Formaldehyde	Perchloroethylene
Benzene	Dichlorobenzene	Methyl Bromide	Styrene
1,3-Butadiene	1,3-Dichloropropene	Methyl Chloroform	Toluene
Carbon Disulfide	Ethyl Benzene	Methyl Ethyl Ketone	Trichloroethylene
Carbon Tetrachloride	Ethylene Dibromide	MTBE	Xylene
Chlorobenzene	Ethylene Dichloride	Methylene Chloride	
<u>Polycyclic Aromatic Hydrocarbons</u>			
Benzo(a)pyrene	Benzo(g,h,i)perylene	Dibenz(a,h)anthracene	
Benzo(b)fluoranthene	Benzo(k)fluoranthene	Indeno(1,2,3-cd)pyrene	
<u>Metals</u>			
Aluminum	Chromium	Nickel	Titanium
Antimony	Cobalt	Phosphorous	Uranium
Arsenic	Copper	Potassium	Vanadium
Barium	Hexavalent Chromium	Rubidium	Yttrium
Beryllium	Iron	Selenium	Zinc
Bromine	Lead	Silicon	Zirconium
Cadmium	Manganese	Strontium	
Calcium	Mercury	Sulfur	
Chlorine	Molybdenum	Tin	

Data

- 24-hour integrated samples
- 1 in 12 day samples
- Period of record, 1990 to 2002

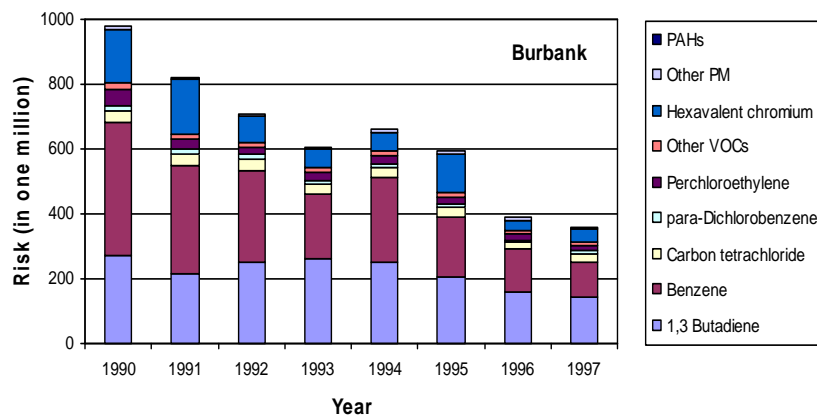
Plot Illustrating Annual Benzene Trends



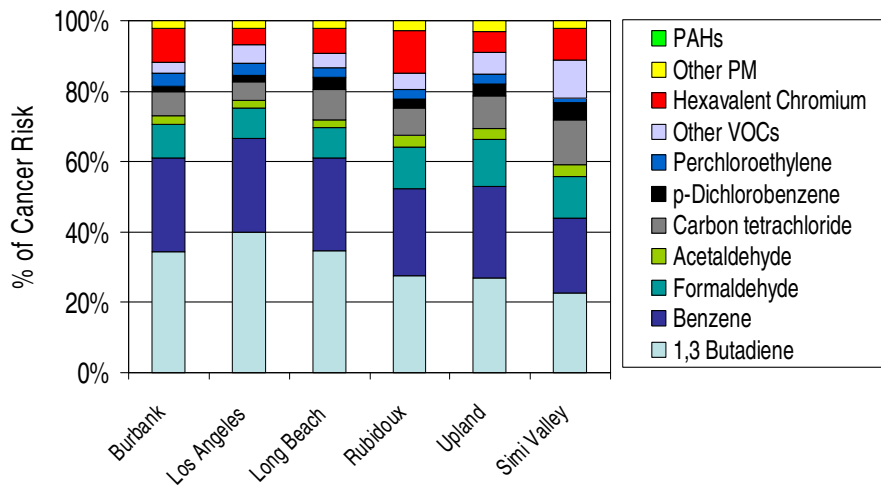
Methods & Assumptions for Calculating Cancer Risks

- 70 year lifetime exposure
- Inhalation risks only
- Latest OEHHA unit risk factors (URFs)
 - <http://www.arb.ca.gov/toxics/healthval/healthval.htm>
- Units of URF are $(\mu\text{g}/\text{m}^3)^{-1}$
 - Benzene: $2.9 \times 10^{-5} (\mu\text{g}/\text{m}^3)^{-1}$
 - Hexavalent chromium: $1.5 \times 10^{-1} (\mu\text{g}/\text{m}^3)^{-1}$
- Cancer risks are additive

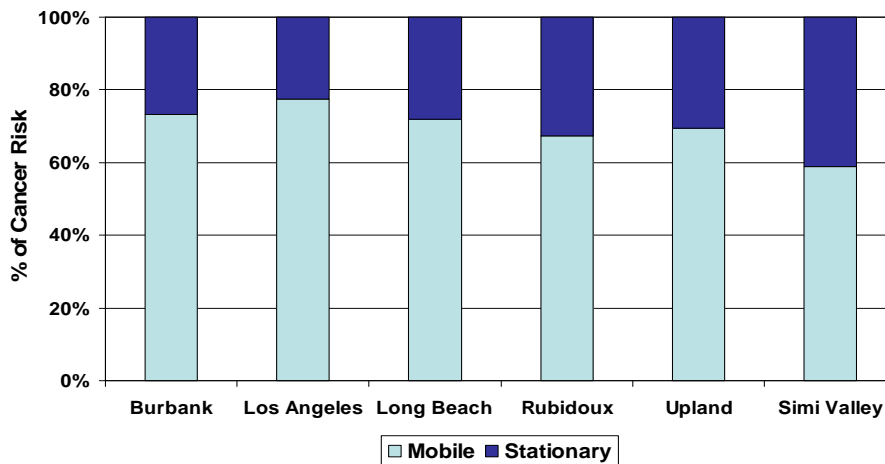
Plot Illustrating Annual Cancer Risk Trends



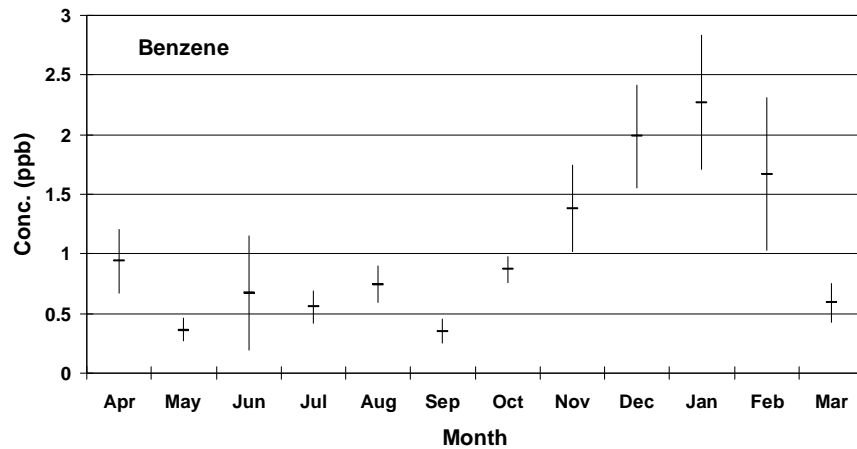
Plot Illustrating Species Apportionment



Plot Illustrating Source Apportionment



Plot Illustrating Monthly Trends in Benzene



Issues

- How to treat non-detects
 - If 90% or more of samples below the detection level then assume zero for non-detects
 - Else $\frac{1}{2}$ the detection level for non-detects
- How to estimate acute concentrations from 24-hour integrated samples
 - Use NO_x concentrations to establish relationship between 1-hr and 24-hr averages

Schedule

Task	Description	Schedule
1	Acquire air quality data from ARB	March 2004
2	Analyze air quality data	April to June 2004
3	Prepare report outline	July 2004
4	Present preliminary results	July 2004
5	Draft report	August 2004
6	Final report	October 2004