Bay Area Air Quality Management District
Summary and Analysis of West Berkeley Air Monitoring Results
<u>April 14, 2009</u>

The Air District's West Berkeley Air Monitoring Station began operating on December 12, 2007. The sampling station is located approximately five blocks east of Interstate 80, near the northwest corner of 6th and Camelia streets (see Figure 1). After collecting data for the entire year of 2008, Air District staff reviewed the data and developed the following summary and analysis of the results.

CRITERIA POLLUTANTS

Criteria pollutants are air contaminants for which the U.S. Environmental Protection Agency (EPA) and/or the California Air Resources Board (CARB) have adopted health-based ambient air quality standards. Ambient air quality standards adopted by EPA are National Ambient Air Quality Standards, and standards adopted by CARB are State Ambient Air Quality Standards. Criteria pollutants include PM_{10}, $PM_{2.5}$, ozone, carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2) and lead. Ozone, CO, SO_2, and NO_2 are gases. PM_{10} is particulate matter with a diameter less than or equal to 10 microns, and $PM_{2.5}$ is particulate matter with a diameter less than or equal to 2.5 microns. Lead is a component of particulate matter.

Table 1 summarizes West Berkeley monitoring results for all criteria pollutants, provides a comparison to applicable National and State ambient air quality standards, and specifies locations with similar air quality.

> <u>GASES</u>: Based on one year (2008) of monitoring data, West Berkeley air quality levels were well below all applicable State and National Ambient Air Quality Standards (NAAQS) for gaseous criteria pollutants including ozone, CO, SO_2, and NO_2. West Berkeley CO and SO_2 levels were among the lowest for all Bay Area locations, while ozone levels were the lowest in the Bay Area. NO_2 levels were similar to, but somewhat lower than, levels at other urban locations, including Oakland, San Jose and San Francisco. The primary source of NO_2 emissions in West Berkeley are vehicles on Interstate 80 and other roadways.

> <u>PARTICULATE MATTER</u>: Ambient air quality standards have been established for $PM_{2.5}$ and PM_{10}. For both $PM_{2.5}$ and PM_{10}, there is a 24-hour standard based on daily concentrations, and an annual standard based on the average of all 24-hour concentrations over a one-year period. West Berkeley PM levels exceeded the 24-hour $PM_{2.5}$ NAAQS on two days, but did not exceed the 24-hour PM_{10} NAAQS, with levels similar to San Francisco. The annual average $PM_{2.5}$ and PM_{10} levels were below the NAAQS, but exceeded the more stringent annual average State standards, with levels similar to, but lower than, Napa.

> <u>LEAD</u>: West Berkeley lead levels were less than 1% of the State standard, less than 10% of the recently revised national standard, and similar to levels in San Francisco.

Table 1. **Criteria Pollutants Measured at the West Berkeley Monitoring Site Compared to State and National Ambient Air Quality Standards**

Pollutant	Averaging Time	State Standard	National Standard	West Berkeley Concentrations	Location(s) with Similar Air Quality
Ozone	1 Hour	0.09 ppm	N/A	0.053 ppm	Lowest in the Bay Area
	8 Hour	0.070 ppm	0.075 ppm	0.049 ppm	
PM_{10}	24 Hour	50 $\mu g/m^3$	150 $\mu g/m^3$	44 $\mu g/m^3$	San Francisco, San Pablo, Napa
	Annual Average	20 $\mu g/m^3$	N/A	22.5 $\mu g/m^3$	
$PM_{2.5}$*	24 Hour	N/A	35 $\mu g/m^3$	39 $\mu g/m^3$	San Francisco
	Annual Average	12 $\mu g/m^3$	15.0 $\mu g/m^3$	12.9 $\mu g/m^3$	Napa
CO	8 Hour	9.0 ppm	9 ppm	1.7 ppm	Pittsburg, Oakland
	1 Hour	20 ppm	35 ppm	2.8 ppm	
NO_2	Annual Average	0.030 ppm	0.053 ppm	0.014 ppm	San Francisco, Oakland, San Jose, Fremont
	1 Hour	0.18 ppm	N/A	0.055 ppm	
SO_2	Annual Average	N/A	0.030 ppm	0.0013 ppm	Among the lowest in the Bay Area
	24 Hour	0.04 ppm	0.14 ppm	0.004 ppm	
	1 Hour	0.25 ppm	N/A	0.014 ppm	
Lead	30 Day Average	1.5 $\mu g/m^3$	N/A	0.011 $\mu g/m^3$	San Francisco
	3 Month Average	N/A	0.15 $\mu g/m^3$ (Recently Revised)	0.009 $\mu g/m^3$	

Note: West Berkeley concentrations listed are maximum values recorded for the 1-hr, 8-hr, 24-hr, 30 day, and 3 month averaging periods.

* As measured by continuous $PM_{2.5}$ monitors.

TOXIC AIR CONTAMINANTS

Table 2 summarizes toxic air contaminant monitoring results for West Berkeley, and provides comparisons to several other sites in the Bay Area and in the South Coast AQMD (North Long Beach and Rubidoux). Sample durations were 24-hours for either a 6-day or 12-day interval schedule. Table 2 indicates the maximum concentrations for the 24-hour samples, and also all samples averaged over a 1-year period.

The Air District estimated health risks using the ambient monitoring data and health effect values [cancer potency factors and noncancer Reference Exposure Levels (RELs)] established by Cal/EPA's Office of Environmental Health Hazard Assessment (OEHHA). Four health risk summary tables are provided as follows: cancer risk, chronic non-cancer risk, 8-hour chronic non-cancer risk, and acute non-cancer risk. Note that each health risk summary table lists only the measured toxic air contaminant compounds for which a corresponding cancer or non-cancer health effect value has been adopted by OEHHA. Health risks were based on the following exposure pathways where applicable under OEHHA health risk assessment guidelines: inhalation, dermal absorption, soil ingestion, mother's milk ingestion, and homegrown produce ingestion. Non-inhalation pathway exposures were estimated based on measured pollutant concentrations and conservative default exposure assumptions established in OEHHA guidelines.

Table 3 lists the estimated cancer risk associated with lifetime exposure to the measured levels of toxic air contaminants. The total cancer risk is based on the sum of the cancer risks determined for each individual compound. Total cancer risk based on the monitoring results in West Berkeley is somewhat greater than the risk in Benicia, similar to the risk in San Francisco, and significantly less than risk in San Jose, North Long Beach and Rubidoux. A comparison of cancer risk at the different monitoring sites is illustrated in Figure 2. The compounds that contribute most significantly to cancer risk in West Berkeley are diesel PM, benzene, 1,3-butadiene, and carbon tetrachloride. This is consistent with other monitoring sites. These pollutants are emitted primarily from mobile sources, with the exception of carbon tetrachloride. There are no known local sources of carbon tetrachloride due to the phase-out of this compound as a stratospheric ozone-depleting compound. Measured levels of carbon tetrachloride in West Berkeley are consistent with global background levels observed at other monitoring sites.

Table 4 indicates the estimated chronic non-cancer risk represented by hazard quotient and hazard index. A hazard quotient is the ratio of the observed concentration of a particular compound to the compound's REL. RELs are concentrations at or below which no adverse non-cancer health effects are anticipated to occur in the general human population, including sensitive individuals. The hazard index is taken as the sum of the hazard quotients for each compound that affects the same target organ system (e.g., respiratory system, nervous system, etc.). A hazard index at or below one indicates that no adverse effects would be anticipated to occur. The chronic hazard index is less than one for West Berkeley, the other Bay Area comparator sites, and for the North Long Beach site. The hazard index is greater than one for Rubidoux. A comparison of chronic noncancer risk at the different monitoring sites is illustrated in Figure 3.

Table 5 lists the estimated 8-hour chronic non-cancer risk. The 8-hour hazard indices are based on concentrations for the normal 8-hour exposure period for workers, and for children at schools and daycare facilities, that are repeated over an annual period. Note that 8-hour monitoring data are not available, but these concentrations were conservatively estimated by assuming that the entire 24-hour sample was collected over a single 8-hour period (i.e., 8-hour concentrations were assumed to be three times the measured 24-hour concentration). The 8-hour chronic hazard index is less than one for West Berkeley, the other Bay Area comparator sites, and for the North Long Beach site. The 8-hour chronic hazard index is greater than one for Rubidoux. A comparison of 8-hour noncancer risk at the different monitoring sites is illustrated in Figure 4.

Table 6 lists the estimated acute non-cancer risk. The acute hazard indices are based on maximum concentrations for a 1-hour period. Note that 1-hour monitoring data are not available, but these concentrations were conservatively assumed to be 7.5 times the maximum 24-hour concentration (see table footnote for derivation of this adjustment factor). The acute hazard index is less than one for West Berkeley, the other Bay Area comparator sites, and for the North Long Beach site. The acute hazard index is greater than one for Rubidoux. A comparison of acute noncancer risk at the different monitoring sites is illustrated in Figure 5.

Table 2. Summary of Toxic Air Contaminant Ambient Air Monitoring Data

		Berkeley ($\mu g/m^3$)	Benicia ($\mu g/m^3$)	San Francisco ($\mu g/m^3$)	San Jose ($\mu g/m^3$)	Rubidoux ($\mu g/m^3$)	N Long Beach ($\mu g/m^3$)
Elemental Carbon	annual avg.	0.926	0.655	1.020	1.320	1.640	1.500
Diesel PM	annual avg.	0.963	0.681	1.061	1.373	1.706	1.560
Manganese	annual avg.	0.037	0.009	0.009	0.010	0.043	0.019
	max 24-hr	0.170	0.170	0.036	0.031	0.110	0.060
Chromium (Total)	annual avg.	0.005	0.005	0.004	0.003	0.005	0.005
	max 24-hr	0.029	0.085	0.008	0.006	0.010	0.012
Lead	annual avg.	0.007	0.005	0.007	0.010	0.010	0.009
	max 24-hr	0.018	0.025	0.017	0.050	0.060	0.030
Nickel	annual avg.	0.014	0.007	0.006	0.007	0.012	0.009
	max 24-hr	0.071	0.100	0.019	0.029	0.029	0.027
1-3 Butadiene	annual avg.	0.082	0.062	0.062	0.117	0.131	0.207
	max 24-hr	0.281	0.224	0.168	0.561	0.314	0.808
Acetaldehyde	annual avg.	1.061	0.850	0.594	1.792	2.642	1.417
	max 24-hr	3.383	2.468	1.646	4.845	8.594	4.206
Benzene	annual avg.	0.875	0.344	0.567	0.998	1.039	1.426
	max 24-hr	3.241	1.134	1.329	3.598	2.431	4.862
Carbon tetrachloride	annual avg.	0.604	0.598	0.611	0.617	0.610	0.610
	max 24-hr	0.763	0.763	0.827	0.827	0.800	0.800
Formaldehyde	annual avg.	1.645	1.296	1.147	2.530	4.748	2.754
	max 24-hr	3.739	4.486	2.991	6.231	10.842	5.110
Tetrachloroethylene	annual avg.	0.138	0.031	0.141	0.444	0.162	0.341
	max 24-hr	0.413	0.103	0.447	6.435	0.344	3.441
Trichloroethylene	annual avg.	0.041	0.035	0.038	0.079	0.063	0.106
	max 24-hr	0.218	0.164	0.109	0.218	0.164	0.273

1. Concentrations represent ambient air samples collected in 2008, except for some diesel PM, lead and nickel samples as described below.

2. Diesel PM is estimated from elemental carbon data using MATES II factor of 1.04. Elemental carbon data for Rubidoux & N Long Beach are from 2004-2006

3. Data for lead and nickel are for samples collected in 2007 for San Francisco, San Jose, Rubidoux & North Long Beach.

4. Data for carbon tetrachloride are not available for Rubidoux & North Long Beach; values represent average of Bay Area sites, which are consistent with global background levels.

Table 3. Cancer Risk Based on Ambient Air Monitoring Data in Bay Area and South Coast AQMD

		Berkeley ($\mu g/m^3$)	Benicia ($\mu g/m^3$)	San Francisco ($\mu g/m^3$)	San Jose ($\mu g/m^3$)	Rubidoux ($\mu g/m^3$)	N Long Beach ($\mu g/m^3$)
Diesel PM	annual avg.	0.963	0.681	1.061	1.373	1.706	1.560
Lead	annual avg.	0.007	0.005	0.007	0.010	0.010	0.009
Nickel	annual avg.	0.014	0.007	0.006	0.007	0.012	0.009
1-3 Butadiene	annual avg.	0.082	0.062	0.062	0.117	0.131	0.207
Acetaldehyde	annual avg.	1.061	0.850	0.594	1.792	2.642	1.417
Benzene	annual avg.	0.875	0.344	0.567	0.998	1.039	1.426
Carbon tetrachloride	annual avg.	0.604	0.598	0.611	0.617	0.610	0.610
Formaldehyde	annual avg.	1.645	1.296	1.147	2.530	4.748	2.754
Tetrachloroethylene	annual avg.	0.138	0.031	0.141	0.444	0.162	0.341
Trichloroethylene	annual avg.	0.041	0.035	0.038	0.079	0.063	0.106

	URF ($\mu g/m^3)^{-1}$	Berkeley Cancer risk (in a million)	Benicia Cancer risk (in a million)	San Francisco Cancer risk (in a million)	San Jose Cancer risk (in a million)	Rubidoux Cancer risk (in a million)	N Long Beach Cancer risk (in a million)
Diesel PM	0.0003000	288.9	204.4	318.2	411.8	511.7	468.0
Lead	0.0000509	0.4	0.2	0.4	0.5	0.5	0.4
Nickel	0.0002640	3.6	1.9	1.7	1.9	3.1	2.3
1-3 Butadiene	0.0001700	13.9	10.5	10.5	19.9	22.2	35.1
Acetaldehyde	0.0000027	2.9	2.3	1.6	4.8	7.1	3.8
Benzene	0.0000290	25.4	10.0	16.4	28.9	30.1	41.4
Carbon tetrachloride	0.0000420	25.4	25.1	25.6	25.9	25.0	25.0
Formaldehyde	0.0000060	9.9	7.8	6.9	15.2	28.5	16.5
Tetrachloroethylene	0.0000059	0.8	0.2	0.8	2.6	1.0	2.0
Trichloroethylene	0.0000020	0.1	0.1	0.1	0.2	0.1	0.2
Total Cancer risk		**371**	**262**	**382**	**512**	**629**	**595**

1. Unit Risk Factors (URFs) for diesel PM and VOCs are for inhalation pathway only.

2. URFs were adjusted where applicable for inhalation & noninhalation pathways (dermal, soil ingestion, mother's milk, homegrown produce ingestion) using cancer potency factors & HARP default exposure factors.

3. Lifetime residential cancer risk is estimated assuming potential exposure occurs 24 hours per day, 350 days/year, over a 70-year lifetime.

Table 4. Chronic Non-Cancer Risk Based on Ambient Air Monitoring Data in Bay Area and South Coast AQMD

		Berkeley	Benicia	San Francisco	San Jose	Rubidoux	N Long Beach	Chronic REL
		($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
Manganese	annual avg.	0.037	0.009	0.009	0.010	0.043	0.019	0.090
Diesel PM	annual avg.	0.963	0.681	1.061	1.373	1.706	1.560	5
Nickel	annual avg.	0.014	0.007	0.006	0.007	0.012	0.009	0.050
Acetaldehyde	annual avg.	1.061	0.850	0.594	1.792	2.642	1.417	140
Formaldehyde	annual avg.	1.645	1.296	1.147	2.530	4.748	2.754	9
1-3 Butadiene	annual avg.	0.082	0.062	0.062	0.117	0.131	0.207	20
Benzene	annual avg.	0.875	0.344	0.567	0.998	1.039	1.426	60
Carbon tetrachloride	annual avg.	0.604	0.598	0.611	0.617	0.610	0.610	40
Tetrachloroethylene	annual avg.	0.138	0.031	0.141	0.444	0.162	0.341	35

		Berkeley	Benicia	San Francisco	San Jose	Rubidoux	N Long Beach	target organ system
Manganese	Hazard Quotient	0.411	0.097	0.102	0.109	0.476	0.208	nervous
Diesel PM	Hazard Quotient	0.193	0.136	0.212	0.275	0.341	0.312	respiratory
Nickel	Hazard Quotient	0.276	0.146	0.126	0.144	0.234	0.178	respiratory, blood
Acetaldehyde	Hazard Quotient	0.008	0.006	0.004	0.013	0.019	0.010	respiratory
Formaldehyde	Hazard Quotient	0.183	0.144	0.127	0.281	0.528	0.306	respiratory
1-3 Butadiene	Hazard Quotient	0.004	0.003	0.003	0.006	0.007	0.010	reproductive
Benzene	Hazard Quotient	0.015	0.006	0.009	0.017	0.017	0.024	blood, nervous, development
Carbon tetrachloride	Hazard Quotient	0.015	0.015	0.015	0.015	0.015	0.015	alimentary, nervous, development
Tetrachloroethylene	Hazard Quotient	0.004	0.001	0.004	0.013	0.005	0.010	kidney, alimentary, liver
CHRONIC HAZARD INDEX		**0.66**	**0.43**	**0.47**	**0.71**	**1.12**	**0.81**	HI for respiratory system

1. A chronic inhalation hazard quotient (HQ) is the ratio of the annual average concentration to the chronic inhalation REL. A noninhalation HQ is the ratio of the estimated non-inhalation dose to the oral REL. The HQ for each compound is the sum of the chemical specific inhalation HQ and non-inhalation HQ. For these compounds, only nickel has an established chronic oral REL, but the non-inhalation pathway was not significant.

2. A Hazard Index (HI) is the sum of the hazard quotients (HQ) for all compounds that affect a particular target organ system. The highest target organ specific HI is the overall HI.

3. Adverse health effects are not expected to occur, even for sensitive members of the population, for hazard indices less than one. An exceedance of one does not indicate that adverse effects will occur; rather, it is an indication of the erosion of the margin of safety, and an increased likelihood that adverse health effects will occur.

Table 5. 8-hour Chronic Non-Cancer Risk Based on Ambient Air Monitoring Data in Bay Area & South Coast AQMD

		Berkeley	Benicia	San Francisco	San Jose	Rubidoux	N Long Beach	8-hr REL
		(μg/m^3)	(μg/m^3)	(μg/m^3)	(μg/m^3)	(μg/m^3)	(μg/m^3)	(μg/m^3)
Manganese	annual avg.	0.037	0.009	0.009	0.010	0.043	0.019	
Manganese	est. 8-hr avg.	0.111	0.026	0.028	0.029	0.128	0.056	0.17
Acetaldehyde	annual avg.	1.061	0.850	0.594	1.792	2.642	1.417	
Acetaldehyde	est. 8-hr avg.	3.182	2.551	1.783	5.376	7.927	4.251	300
Formaldehyde	annual avg.	1.645	1.296	1.147	2.530	4.748	2.754	
Formaldehyde	est. 8-hr avg.	4.935	3.888	3.440	7.590	14.245	8.263	9

		Berkeley	Benicia	San Francisco	San Jose	Rubidoux	N Long Beach	target organ system
Manganese	8-hr HQ	0.653	0.154	0.162	0.173	0.755	0.330	nervous
Nervous System Hazard Index		**0.653**	**0.154**	**0.162**	**0.173**	**0.755**	**0.330**	**nervous**

		Berkeley	Benicia	San Francisco	San Jose	Rubidoux	N Long Beach	
Acetaldehyde	8-hr HQ	0.011	0.009	0.006	0.018	0.026	0.014	respiratory
Formaldehyde	8-hr HQ	0.548	0.432	0.382	0.843	1.583	0.918	respiratory
Respiratory System Hazard Index		**0.559**	**0.441**	**0.388**	**0.861**	**1.609**	**0.932**	**respiratory**

		Berkeley	Benicia	San Francisco	San Jose	Rubidoux	N Long Beach
8-HOUR Hazard Index		**0.65**	**0.44**	**0.39**	**0.86**	**1.60**	**0.93**

1. In order to estimate maximum 8-hour chronic exposure, it was conservatively assumed that all the pollutants for a 24-hour sample were collected within an 8-hour period. Therefore, an adjustment factor of 3 (24 hr/8 hr) was applied to the annual average concentrations (averages of multiple 24-hr samples).

2. An 8-hr hazard quotient (HQ) is calculated by dividing the 8-hour average concentration (e.g., for a worker or student or child at daycare that is repeated over an annual period) by the 8-hr REL.

3. A Hazard Index (HI) is the sum of hazard quotients for all compounds that affect a particular target organ system. The greatest target organ specific HI is the overall HI.

4. Adverse health effects are not expected to occur, even for sensitive members of the population, for hazard indices less than one. An exceedance of one does not indicate that adverse effects will occur; rather, it is an indication of the erosion of the margin of safety, and an increased likelihood that adverse health effects will occur.
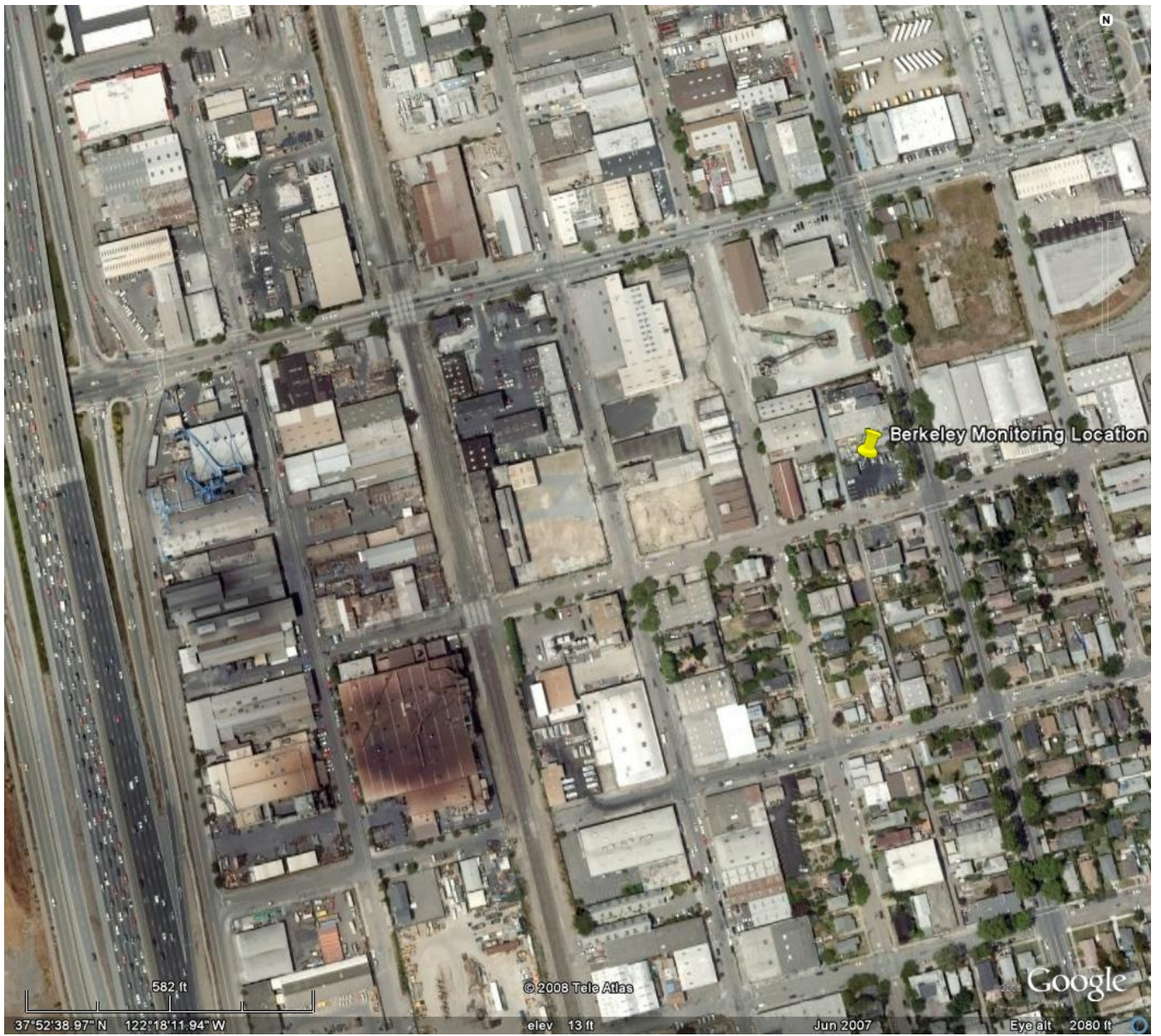
Table 6. Acute Non-Cancer Risk Based on Ambient Air Monitoring Data in Bay Area and South Coast AQMD

		Berkeley ($\mu g/m^3$)	Benicia ($\mu g/m^3$)	San Francisco ($\mu g/m^3$)	San Jose ($\mu g/m^3$)	Rubidoux ($\mu g/m^3$)	N Long Beach ($\mu g/m^3$)	Acute REL ($\mu g/m^3$, 1-hr avg.)
Nickel	max 24-hr	0.071	0.100	0.019	0.029	0.029	0.027	
Nickel	est. 1-hr avg.	0.533	0.750	0.143	0.218	0.218	0.203	6
Acetaldehyde	max 24-hr	3.383	2.468	1.646	4.845	8.594	4.206	
Acetaldehyde	est. 1-hr avg.	25.370	18.513	12.342	36.341	64.454	31.541	470
Benzene	max 24-hr	3.241	1.134	1.329	3.598	2.431	4.862	
Benzene	est. 1-hr avg.	24.309	8.508	9.967	26.983	18.231	36.463	1300
Formaldehyde	max 24-hr	3.739	4.486	2.991	6.231	10.842	5.110	
Formaldehyde	est. 1-hr avg.	28.041	33.649	22.432	46.734	81.317	38.322	55
Tetrachloroethylene	max 24-hr	0.413	0.103	0.447	6.435	0.344	3.441	
Tetrachloroethylene	est. 1-hr avg.	3.097	0.774	3.355	48.260	2.581	25.807	20,000
Carbon tetrachloride	max 24-hr	0.763	0.763	0.827	0.827	0.800	0.800	
Carbon tetrachloride	est. 1-hr avg.	5.724	5.724	6.200	6.200	6.000	6.000	1900

		Berkeley	Benicia	San Francisco	San Jose	Rubidoux	N Long Beach	target organ system
Nickel	Acute HQ	0.089	0.125	0.024	0.036	0.036	0.034	respiratory, immune
Acetaldehyde	Acute HQ	0.054	0.039	0.026	0.077	0.137	0.067	sensory irritation: bronchi, eyes, nose, throat
Benzene	Acute HQ	0.019	0.007	0.008	0.021	0.014	0.028	reproductive, development
Formaldehyde	Acute HQ	0.510	0.612	0.408	0.850	1.478	0.697	sensory irritation: eyes
Tetrachloroethylene	Acute HQ	0.00015	0.00004	0.00017	0.00241	0.00013	0.00129	nervous, respiratory, eyes
Carbon tetrachloride	Acute HQ	0.003	0.003	0.003	0.003	0.003	0.003	reproductive, development
Acute Hazard Index		**0.56**	**0.65**	**0.43**	**0.93**	**1.62**	**0.77**	**sensory irritation: eyes**

1. An acute hazard quotient is the value of the maximum 1-hour average concentration divided by the acute REL.

2. A hazard Index (HI) is the sum of the hazard quotients (HQ) for all compounds that affect a particular target organ system. The greatest target organ specific HI is the overall HI.

3. Adverse health effects are not expected to occur, even for sensitive members of the population, for hazard indices less than one. An exceedance of one does not indicate that adverse effects will occur; rather, it is an indication of the erosion of the margin of safety, and an increased likelihood that adverse health effects will occur

4. Max. 1-hr concentrations were assumed to be 7.5 times the max. 24-hr concentration. This adjustment factor was determined by multiplying a 1-hr to 24-hr meteorological persistence factor of 1 / 0.4 = 2.5 ("Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised, October 1992, EPA-454/R-92-019, page 4-16), by an emission rate scalar of 3 (24 hr/8 hr), that accounts for temporal differences in emissions over the 24-hour period.
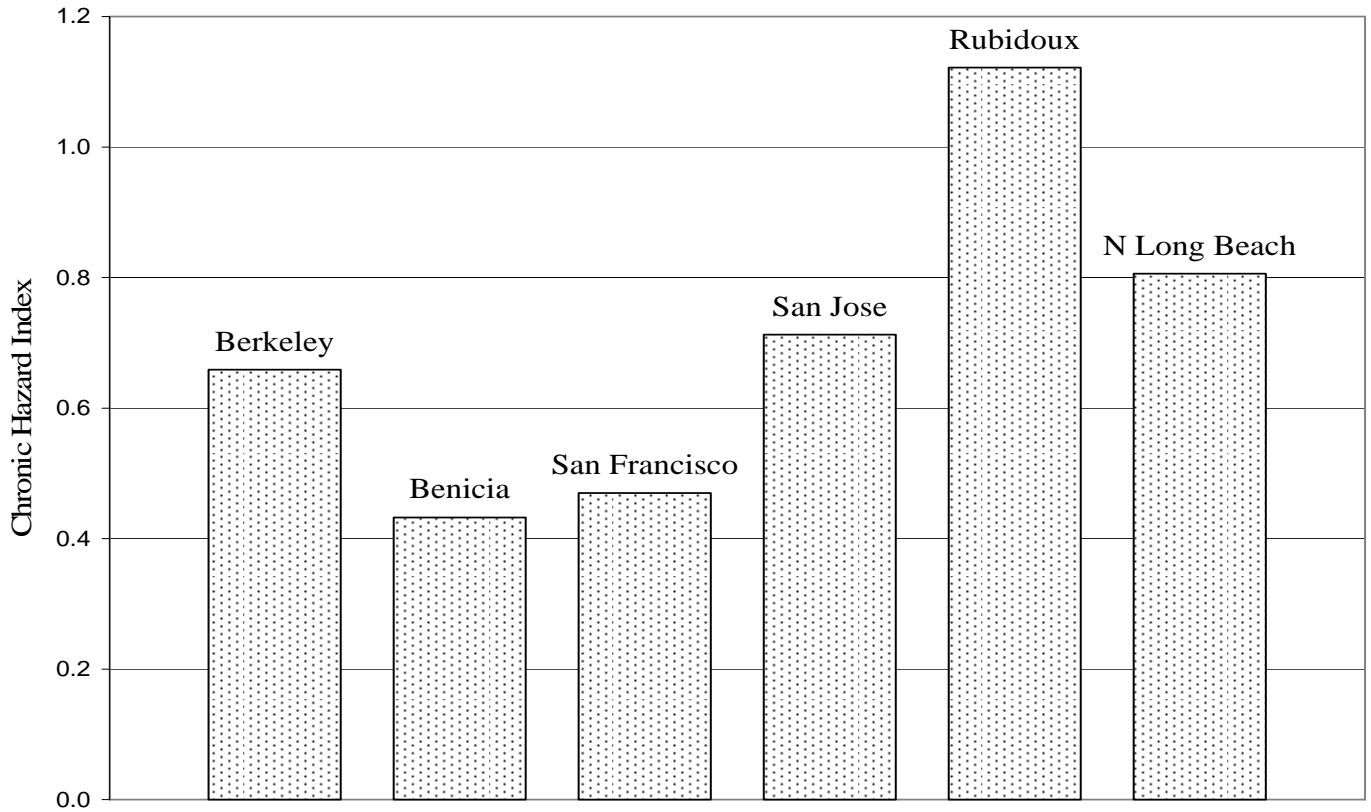
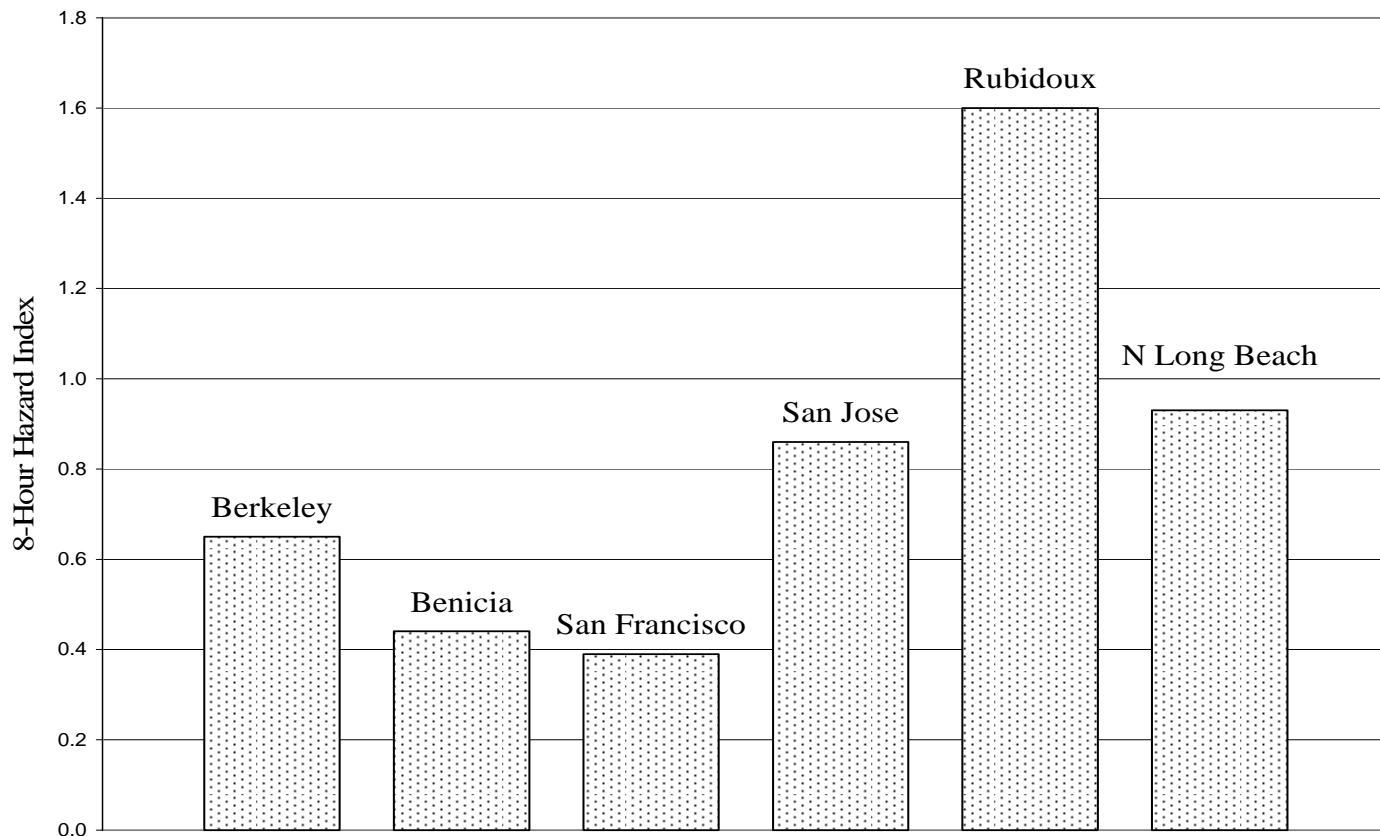**Figure 1. Location of the Air District's West Berkeley Air Monitoring Station**

Figure 2. Cancer Risk Based on Ambient Air Monitoring Data
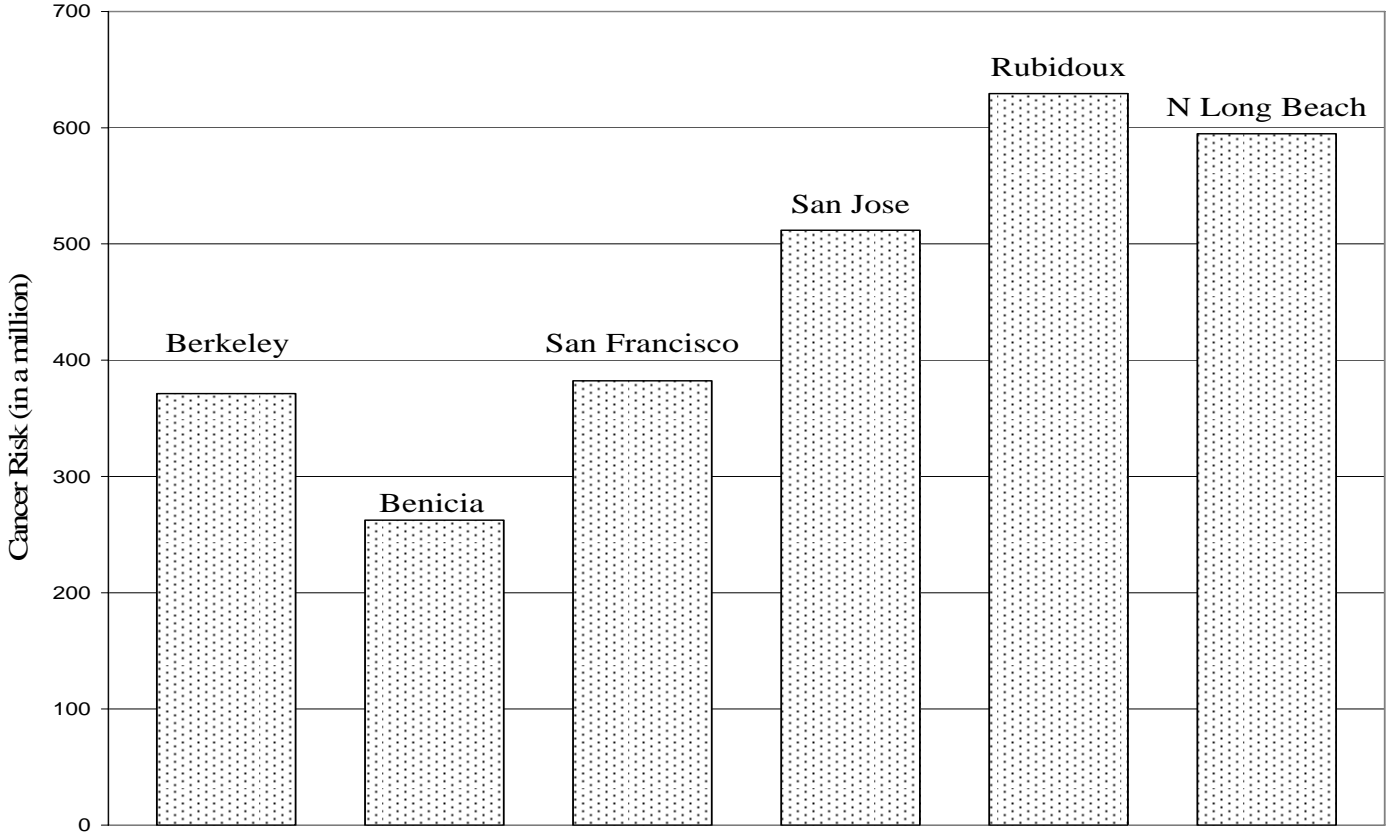
Figure 3. Chronic Noncancer Risk Based on Ambient Air Monitoring Data

Figure 4. 8-Hour Noncancer Risk Based on Ambient Air Monitoring Data

Figure 5. Acute Noncancer Risk Based on Ambient Air Monitoring Data