CHAPTER 5
MICROSCALE STUDY

Chapter 5. Microscale Study

5.1 Introduction

The microscale component of MATES II utilized movable platforms to sample for several weeks to several-month periods at selected locations and then moved to other sites for similar sampling. The objective for this element was to determine if there were gradients in ambient levels between communities that were not otherwise captured by the fixed monitoring sites. Each microscale site is paired with the closest fixed site for comparison to determine if toxic air contaminant levels at these microscale sites statistically exceed a neighboring fixed site.

Since the sampling periods for the microscale sites are limited, annual averages for measured substances cannot be calculated. However, by comparing the levels from the microscale sites to those from the nearest fixed site during the timeframe that the microscale site was operating can yield insights on potential community gradients.

5.2 Site Selection

The microscale sites utilized the SCAQMD's mobile monitoring platforms and were situated near air toxic emission sources. As in MATES II, due to the limited number of mobile monitoring platforms, each microscale site study lasted for a shorter duration than the overall study for approximately two to several months

Microscale sites were selected with the input of the Technical Advisory Group and used criteria including the following:

- Proximity to emissions source(s);
- Areas identified with environmental justice issues;
- Potential for neighborhood gradients;
- Elevated risks from MATES II modeling analysis;
- Community concerns; and
- Geographic equity.

Other considerations included power availability, security, accessibility to SCAQMD staff and availability of the premises for a several-month period.

A listing of the microscale sites, along with the nearest fixed site and the time periods for which samples were taken, are shown below. The locations of the sites compared to the fixed sites are shown in Figure 2-1.

5.3 Microscale Sites and Sampling Periods

Microscale Site	Fixed Site	Category	Sampling Period
Commerce	Huntington Park	VOC	November 11th 2004 - May 16th 2005
		$PM_{2.5}$	January 19th 2005 - May 16th 2005
		TSP	November 8th 2004 - May 4th 2005
		PM_{10}	November 11th 2004 - May 4th 2005
		Chromium 6	November 8th 2004 - May 16th 2005
Indio	Rubidoux	VOC	March 2nd 2005 - May 16th 2005
		$PM_{2.5}$	February 24th 2005 - June 18th 2005
		TSP	February 24th 2005 - June 18th 2005
		PM_{10}	February 27th 2005 - June 18th 2005
		Chromium 6	February 24th 2005 - June 18th 2005
San Bernardino	Fontana	VOC	October 3rd 2004 - February 15th 2005
		$PM_{2.5}$	January 16th 2005 - February 15th 2005
		TSP	September 18th 2004 - February 3rd 2005
		PM_{10}	September 18th 2004 - February 3rd 2005
		Chromium 6	September 18th 2004 - February 15th 2005
Sun Valley	Burbank	VOC	June 3rd 2005 – June 13th 2006
		$PM_{2.5}$	June 3rd 2005 - April 29th 2006
		TSP	June 30th 2005 - April 8th 2006
		PM_{10}	June 3rd 2005 - April 8th 2006
		Chromium 6	June 3rd 2005 - June 25th 2006
Santa Ana	Anaheim	VOC	September 1st 2005 - January 29th 2006
		$PM_{2.5}$	July 21st 2005 - January 26th 2006
		TSP	July 24th 2005 - January 23rd 2006
		PM_{10}	July 24th 2005 - January 23rd 2006
		Chromium 6	July 21st 2005 - January 26th 2006

The average levels measured for several toxic air contaminants are listed in the following tables. To assess the potential differences between the microscale and fixed sites, a statistical t-test was conducted for each pollutant measured, with the corresponding P-value also shown. Since multiple statistical tests were conducted, one could expect several differences to show up based on chance. The P-values greater than 0.05 are denoted as a difference between sites, with a notation of which site was higher. Caution should be used in interpreting these tests, as no correction was made for conducting multiple statistical comparisons. That is, at a P-value of 0.05, one would expect to see significant difference 5% of the time, on average.

One of the objectives of the microscale site study was to determine if some communities show higher levels of pollutants compared with those of the fixed sites. Several of such pollutants were at levels below the Method Detection Limits (MDL). While statistically significant, these differences may not be truly different, as levels below the MDL are associated with greater

uncertainty. Thus, only substances that were above the method detection limits and showed statistically higher averages for the microscale sites compared to the nearest fixed site are highlighted in Tables 5-1 through 5-5.

Table 5-1. Comparison of observed concentrations for the microscale and fixed site pair of Commerce and Huntington Park

			Microscale Site Commerce				Fixed Site Huntington Park					
Pollutant	**Category**	**Units**	**AVG**	**S.D.**	**N**	**95%CI**	**AVG**	**S.D.**	**N**	**95%CI**	**P-Value**	**Statistically Significant?**
Acetaldehyde	VOC	ppb	1.69	0.83	60	0.21	1.76	0.87	63	0.21	0.65	No
Acetone	VOC	ppb	2.49	2.69	60	0.68	3.12	2.93	63	0.72	0.22	No
Benzene	VOC	ppb	0.69	0.33	62	0.08	0.93	0.52	46	0.15	0.008	Yes (fixed > micro)
Carbon Tetrachloride	VOC	ppb	0.08	0.01	62	0	0.08	0.01	46	0	0.87	No
Chloroethene (Vinyl Chloride)	VOC	ppb	0	0	62	--	0	0	46	--	--	--
Chloroform	VOC	ppb	0.03	0.01	62	0	0.04	0.02	46	0.01	0.02	Yes (fixed > micro)
Ethylbenzene	VOC	ppb	0.24	0.14	62	0.03	0.46	0.3	46	0.09	1.95E-05	Yes (fixed > micro)
Formaldehyde	VOC	ppb	3.55	1.38	60	0.25	4.05	1.65	63	0.41	0.07	No
Methyl Ethyl Ketone	VOC	ppb	0.31	0.25	60	0.06	0.4	0.3	63	0.07	0.06	No
Methyl Tertiary Butyl Ether	VOC	ppb	0.02	0.01	62	0	0.02	0.03	46	0.01	0.15	No
Methylene Chloride	VOC	ppb	0.28	0.16	62	0.04	0.39	0.45	46	0.13	0.12	No
Perchloroethylene	VOC	ppb	0.06	0.04	62	0.01	0.11	0.1	46	0.03	0.002	Yes (fixed > micro)
Styrene	VOC	ppb	0.06	0.05	62	0.01	0.09	0.06	46	0.02	0.014	Yes (fixed > micro)
Toluene	VOC	ppb	2.01	1.11	62	0.28	3.36	2.18	46	0.63	0.0003	Yes (fixed > micro)
Trichloroethylene	VOC	ppb	0.05	0.25	62	0.06	0.02	0.03	46	0.01	0.49	No
(m+p)-xylenes	VOC	ppb	0.91	0.55	62	0.04	1.75	1.13	46	0.33	1.94E-05	Yes (fixed > micro)
o-xylene	VOC	ppb	0.3	0.17	62	0.04	0.42	0.33	46	0.1	0.04	Yes (fixed > micro)
1,2-Dichlorobenzene	VOC	ppb	0	0	62	--	0	0.01	46	0	0.17	No
1,2-Dichloroethane	VOC	ppb	0.01	0.01	62	0.0016	0	0.01	46	0.0015	7.08E-12	Yes (micro > fixed)
1,2-Dichloropropane	VOC	ppb	0	0	62	--	0	0	46	--	--	No
1,4-Dichlorobenzene	VOC	ppb	0.04	0.03	62	0.01	0.08	0.06	46	0.02	4.70E-05	Yes (fixed > micro)
1,2-Dibromoethane	VOC	ppb	0	0	62	--	0	0	46	--	--	--
1,3-Butadiene	VOC	ppb	0.18	0.14	62	0.04	0.23	0.16	46	0.05	0.1	No
Arsenic	$PM_{2.5}$	ng/m^3	0.96	0.71	38	0.23	1.57	3.85	39	1.21	0.29	No
Cadmium	$PM_{2.5}$	ng/m^3	1.58	1.24	38	0.39	2.02	1.74	39	0.55	0.19	No
Lead	$PM_{2.5}$	ng/m^3	7.02	5.99	38	1.9	7.66	4.38	39	1.37	0.59	No
Chromium	$PM_{2.5}$	ng/m^3	1.21	0.89	38	0.28	2.4	3.06	39	0.96	0.02	Yes (fixed > micro)
Manganese	$PM_{2.5}$	ng/m^3	3.35	2.52	38	0.8	5.33	7.08	39	2.22	0.11	No
Vanadium	$PM_{2.5}$	ng/m^3	3.99	4.22	38	1.34	4.18	4.14	39	1.3	0.84	No
Nickel	$PM_{2.5}$	ng/m^3	2	1.38	38	0.44	2.48	2.13	39	0.67	0.24	No
Copper	$PM_{2.5}$	ng/m^3	13.72	5.52	38	1.76	41	15.25	39	4.79	5.26E-14	Yes (fixed > micro)
Elemental Carbon	$PM_{2.5}$	$\mu g/m^3$	1.89	0.91	37	0.29	2.11	1.49	39	0.47	0.44	No
Arsenic	TSP	ng/m^3	0.9	0.73	56	0.19	1.53	2.66	58	0.69	0.09	No
Cadmium	TSP	ng/m^3	1.36	0.68	56	0.18	1.54	0.93	58	0.24	0.25	No
Lead	TSP	ng/m^3	19.83	16.26	56	4.26	28.69	30.29	58	7.8	0.05	No
Chromium	TSP	ng/m^3	4.35	2.81	56	0.74	11.98	18.68	58	4.81	0	Yes (fixed > micro)
Manganese	TSP	ng/m^3	26.29	17.44	56	4.57	32.45	25.42	58	6.54	0.13	No
Vanadium	TSP	ng/m^3	4.77	3.95	56	1.03	5.6	4.84	58	1.25	0.32	No
Nickel	TSP	ng/m^3	3.79	2.29	56	0.6	7.48	7.06	58	1.82	0	Yes (fixed > micro)
Copper	TSP	ng/m^3	55.26	24.51	56	6.42	200.1	110.89	58	28.54	3.98E-14	Yes (fixed > micro)
Hexavalent Chromium	TSP	ng/m^3	0.22	0.16	62	0.04	0.24	0.18	64	0.04	0.55	No
Elemental Carbon	PM_{10}	$\mu g/m^3$	2.69	1.08	48	0.31	3.15	1.6	58	0.41	0.08	No

Table 5-2. Comparison of observed concentrations for the microscale and fixed site pair of Indio and Rubidoux

Pollutant	Category	Units	Microscale Site - Indio AVG	S.D.	N	95%CI	Fixed Site - Rubidoux AVG	S.D.	N	95%CI	P-Value	Statistically Significant?
Acetaldehyde	VOC	ppb	1.01	0.41	33	0.41	1.33	0.68	36	0.22	0.11	No
Acetone	VOC	ppb	1.38	0.67	33	0.23	1.33	0.55	36	0.18	0.77	No
Benzene	VOC	ppb	0.21	0.1	26	0.04	0.39	0.23	26	0.09	0.0006	Yes (fixed > micro)
Carbon Tetrachloride	VOC	ppb	0.08	0.01	26	0.0034	0.08	0.01	26	0.0029	0.002	Yes (fixed > micro)
Chloroethene (Vinyl Chloride)	VOC	ppb	0.01	0.04	26	0.02	0	0	26	--	0.33	No
Chloroform	VOC	ppb	0.02	0.02	26	0.01	0.03	0.01	26	0	0.7	No
Ethylbenzene	VOC	ppb	0.07	0.04	26	0.02	0.16	0.12	26	0.04	5.00E-04	Yes (fixed > micro)
Formaldehyde	VOC	ppb	1.94	0.9	33	0.31	2.85	1.3	36	0.42	0.13	No
Methyl Ethyl Ketone	VOC	ppb	0.22	0.11	33	0.04	0.24	0.12	36	0.04	0.63	No
Methyl Tertiary Butyl Ether	VOC	ppb	0.02	0.06	26	0.02	0.01	0.01	26	0	0.42	No
Methylene Chloride	VOC	ppb	0.08	0.03	26	0.01	0.21	0.09	26	0.03	6.40E-08	Yes (fixed > micro)
Perchloroethylene	VOC	ppb	0.01	0.02	26	0.01	0.03	0.03	26	0.01	0.05	No
Styrene	VOC	ppb	0.01	0.02	26	0.01	0.04	0.04	26	0.02	0.0004	Yes (fixed > micro)
Toluene	VOC	ppb	0.53	0.33	26	0.13	1.35	0.88	26	0.34	0.0001	Yes (fixed > micro)
Trichloroethylene	VOC	ppb	0	0.02	26	0.01	0	0.01	26	0	0.85	No
(m+p)-xylenes	VOC	ppb	0.23	0.14	25	0.05	0.57	0.37	26	0.14	1.00E-04	Yes (fixed > micro)
o-xylene	VOC	ppb	0.09	0.05	26	0.02	0.11	0.09	26	0.03	0.26	No
1,2-Dichloroeenzene	VOC	ppb	0.01	0.06	26	0.02	0	0	26	--	0.33	No
1,2-Dichloroethane	VOC	ppb	0.01	0.02	26	0.01	0	0	26	--	0.15	No
1,2-Dichloropropane	VOC	ppb	0.01	0.04	26	0.02	0	0	26	--	0.33	No
1,4-Dichlorobenzene	VOC	ppb	0.02	0.06	26	0.02	0.05	0.03	26	0.01	0.054	No
1,2-Dibromoethane	VOC	ppb	0.01	0.04	26	0.02	0	0	26	--	0.33	No
1,3-Butadiene	VOC	ppb	0.08	0.06	26	0.02	0.06	0.05	26	0.02	0.39	No
Arsenic	$PM_{2.5}$	ng/m^3	0.48	0.65	38	0.21	0.5	0.66	37	0.21	0.94	No
Cadmium	$PM_{2.5}$	ng/m^3	1.2	1.12	38	0.36	1.67	1.79	37	0.58	0.18	No
Lead	$PM_{2.5}$	ng/m^3	3.73	2.46	38	0.78	6.16	6	37	1.93	0.03	Yes (fixed > micro)
Chromium	$PM_{2.5}$	ng/m^3	1.18	1.24	38	0.39	1.27	3.5	37	1.13	0.88	No
Manganese	$PM_{2.5}$	ng/m^3	2.83	2.1	38	0.67	3.1	2.63	37	0.85	0.62	No
Vanadium	$PM_{2.5}$	ng/m^3	1.05	0.87	38	0.28	3.17	2.36	37	0.76	5.99E-06	Yes (fixed > micro)
Nickel	$PM_{2.5}$	ng/m^3	1.47	2.56	38	0.81	1.53	1.61	37	0.52	0.91	No
Copper	$PM_{2.5}$	ng/m^3	8.5	5.86	38	1.86	16.29	5.12	37	1.65	4.13E-08	Yes (fixed > micro)
Elemental Carbon	$PM_{2.5}$	$\mu g/m^3$	0.79	0.46	39	0.14	1.21	0.83	37	0.27	8.00E-03	Yes (fixed > micro)
Arsenic	TSP	ng/m^3	0.54	0.54	35	0.18	0.56	0.48	37	0.15	0.87	No
Cadmium	TSP	ng/m^3	1.51	0.87	35	0.29	1.61	0.74	37	0.24	7.43E-09	Yes (fixed > micro)
Lead	TSP	ng/m^3	5.85	2.6	35	0.86	9.61	7.03	37	2.27	0	Yes (fixed > micro)
Chromium	TSP	ng/m^3	2.99	2.12	35	0.7	3.55	2.48	37	0.8	0.3	No
Manganese	TSP	ng/m^3	56.58	34.63	35	11.48	38.71	22.43	37	7.23	0.01	Yes (micro > fixed)
Vanadium	TSP	ng/m^3	4.3	2.89	35	0.96	5.53	3.25	37	1.05	0.1	No
Nickel	TSP	ng/m^3	2.09	1.2	35	0.4	3.67	4.39	37	1.42	0.04	Yes (fixed > micro)
Copper	TSP	ng/m^3	15.45	6.76	35	2.24	26.85	10.9	37	3.51	1.34E-06	Yes (fixed > micro)
Hexavalent Chromium	TSP	ng/m^3	0.12	0.09	35	0.03	0.32	0.41	38	0.13	0.01	Yes (fixed > micro)
Elemental Carbon	PM_{10}	$\mu g/m^3$	1.06	0.49	34	0.17	1.92	1.16	34	0.39	2.00E-04	Yes (fixed > micro)

Manganese showed higher levels in PM_{10} at Indio. Manganese levels are in general higher in the eastern portion of the District, and may reflect contributions from geologic sources. No difference was found in $PM_{2.5}$ levels.

Table 5-3. Comparison of observed concentrations for the microscale and fixed site pair of San Bernardino and Fontana

Pollutant	Category	Units	Microscale Site San Bernardino AVG	S.D.	N	95%CI	Fixed Site Fontana AVG	S.D.	N	95%CI	P-Value	Statistically Significant?
Acetaldehyde	VOC	ppb	2.23	1.44	41	0.44	1.25	0.81	44	0.24	0.0003	Yes (micro > fixed)
Acetone	VOC	ppb	2.38	2.82	41	0.86	1.58	1.04	44	0.31	0.09	No
Benzene	VOC	ppb	0.73	0.38	45	0.11	0.51	0.28	46	0.08	0.013	Yes (micro > fixed)
Carbon Tetrachloride	VOC	ppb	0.08	0	45	0.001	0.07	0.01	46	0.003	6.45E-06	Yes (micro > fixed)
Chloroethene (Vinyl Chloride)	VOC	ppb	0	0	45	--	0	0	46	--	--	--
Chloroform	VOC	ppb	0.03	0.01	44	0	0.03	0.01	45	0	0.9	No
Ethylbenzene	VOC	ppb	0.27	0.16	45	0.05	0.22	0.14	46	0.04	0.10	No
Formaldehyde	VOC	ppb	3.37	1.79	41	0.55	2.38	1.56	44	0.46	0.008	Yes (micro > fixed)
Methyl Ethyl Ketone	VOC	ppb	0.42	0.33	41	0.1	0.28	0.17	44	0.05	0.02	Yes (micro > fixed)
Methyl Tertiary Butyl Ether	VOC	ppb	0.05	0.04	44	0.01	0.01	0.02	46	0	6.05E-09	Yes (micro > fixed)
Methylene Chloride	VOC	ppb	0.24	0.18	45	0.05	0.16	0.11	46	0.03	1.00E-02	Yes (micro > fixed)
Perchloroethylene	VOC	ppb	0.04	0.03	45	0.01	0.04	0.03	46	0.01	0.39	No
Styrene	VOC	ppb	0.1	0.09	45	0.03	0.08	0.07	46	0.02	0.43	No
Toluene	VOC	ppb	2.51	1.63	45	0.48	1.73	1.15	46	0.33	0.01	Yes (micro > fixed)
Trichloroethylene	VOC	ppb	0.02	0.07	45	0.02	0.01	0.01	46	0	0.6	No
(m+p)-xylenes	VOC	ppb	0.98	0.61	45	0.18	0.82	0.54	46	0.16	0.20	No
o-xylene	VOC	ppb	0.35	0.23	45	0.07	0.19	0.14	46	0.04	0.0002	Yes (micro > fixed)
1,2-Dichlorobenzene	VOC	ppb	0	0	45	--	0	0	46	--	--	--
1,2-Dichloroethane	VOC	ppb	0.01	0.01	45	0.00191	0	0	46	--	1.95E-09	Yes (micro > fixed)
1,2-Dichloropropane	VOC	ppb	0	0	45	--	0	0	46	--	--	--
1,4-Dichlorobenzene	VOC	ppb	0.07	0.05	45	0.02	0.03	0.02	46	0.01	2.69E-05	Yes (micro > fixed)
1,2-Dibromoethane	VOC	ppb	0.01	0.08	45	0.02	0	0	46	--	0.32	No
1,3-Butadiene	VOC	ppb	0.12	0.08	45	0.02	0.1	0.06	46	0.02	0.13	No
Arsenic	$PM_{2.5}$	ng/m^3	1.24	0	11	0	1.24	0	11	0	0.28	No
Cadmium	$PM_{2.5}$	ng/m^3	1.46	0.5	11	0.3	2.14	1.57	11	0.93	0.19	No
Lead	$PM_{2.5}$	ng/m^3	3.72	3.08	11	1.82	9.92	14.28	11	8.44	0.19	No
Chromium	$PM_{2.5}$	ng/m^3	1.35	0.37	11	0.22	2.59	3.3	11	1.95	0.24	No
Manganese	$PM_{2.5}$	ng/m^3	3.15	2.62	11	1.55	5.41	3.39	11	2	0.09	No
Vanadium	$PM_{2.5}$	ng/m^3	1.35	0.37	11	0.22	1.35	0.37	11	0.22	0.99	No
Nickel	$PM_{2.5}$	ng/m^3	1.24	0	11	0	1.58	0.8	11	0.47	0.19	No
Copper	$PM_{2.5}$	ng/m^3	15.99	6.88	11	4.07	22.65	16.01	11	9.46	0.23	No
Elemental Carbon	$PM_{2.5}$	$\mu g/m^3$	1.42	1.01	11	0.59	1.67	1.07	11	0.63	0.4	No
Arsenic	TSP	ng/m^3	0.74	0.68	43	0.2	0.64	0.53	42	0.16	0.44	No
Cadmium	TSP	ng/m^3	1.37	0.59	43	0.18	1.6	0.85	42	0.26	0.13	No
Lead	TSP	ng/m^3	12.48	8.2	43	2.45	12.2	9.34	42	3.23	0.89	No
Chromium	TSP	ng/m^3	4.59	3.27	43	0.98	4.56	3.96	42	1.2	0.97	No
Manganese	TSP	ng/m^3	37.11	22.53	43	6.73	40.07	30.73	42	9,29	0.62	No
Vanadium	TSP	ng/m^3	3.93	4.03	43	1.2	4.49	5.04	42	1.52	0.57	No
Nickel	TSP	ng/m^3	2.93	2.12	43	0.63	3.03	2.84	42	0.86	0.85	No
Copper	TSP	ng/m^3	32.93	14.54	43	4.34	40.2	24.21	42	7.32	0.10	No
Hexavalent Chromium	TSP	ng/m^3	0.2	0.09	51	0.03	0.21	0.1	48	0.03	0.89	No
Elemental Carbon	PM_{10}	$\mu g/m^3$	2.75	1.13	46	0.33	2.47	1.22	43	0.37	0.27	No

San Bernardino showed higher levels of several pollutants associated with vehicle emissions, including benzene, 1,3-butadiene, toluene and aldehydes, and may reflect the influence of nearby traffic. Also the solvents methyl ethyl ketone and methylene chloride were higher.

Table 5-4. Comparison of observed concentrations for the microscale and fixed site pair of Sun Valley and Burbank

			Microscale Site - Sun Valley				Fixed Site - Burbank					
Pollutant	**Category**	**Units**	**AVG**	**S.D.**	**N**	**95%CI**	**AVG**	**S.D.**	**N**	**95%CI**	**P-Value**	**Statistically Significant?**
Acetaldehyde	VOC	ppb	1.74	0.79	96	0.16	2.01	0.85	100	0.17	0.02	Yes (fixed > micro)
Acetone	VOC	ppb	2.35	2.04	96	0.41	1.86	2.5	100	0.49	0.13	No
Benzene	VOC	ppb	0.52	0.23	91	0.05	0.75	0.46	101	0.09	2.29E-05	Yes (fixed > micro)
Carbon Tetrachloride	VOC	ppb	0.07	0.01	91	0.0018	0.09	0.01	101	0.0017	3.08E-28	Yes (fixed > micro)
Chloroethene (Vinyl Chloride)	VOC	ppb	0	0	91	0	0	0	101	0	0.7	No
Chloroform	VOC	ppb	0.04	0.02	91	0	0.05	0.03	101	0.01	0.002	Yes (fixed > micro)
Ethylbenzene	VOC	ppb	0.22	0.11	91	0.02	0.38	0.26	101	0.05	1.57E-07	Yes (fixed > micro)
Formaldehyde	VOC	ppb	4.04	1.82	96	0.36	3.96	1.68	100	0.33	0.74	No
Methyl Ethyl Ketone	VOC	ppb	0.3	0.17	96	0.03	0.3	0.22	100	0.04	0.96	No
Methyl Tertiary Butyl Ether	VOC	ppb	0.03	0.03	91	0.01	0	0.01	101	0	1.09E-12	Yes (micro > fixed)
Methylene Chloride	VOC	ppb	0.29	0.15	91	0.03	0.37	0.35	101	0.07	0.050	No
Perchlororoethylene	VOC	ppb	0.09	0.06	91	0.01	0.1	0.1	101	0.02	0.48	No
Styrene	VOC	ppb	0.16	0.15	28	0.05	0.24	0.17	30	0.06	0.06	No
Toluene	VOC	ppb	1.77	0.86	91	0.18	2.69	1.76	101	0.34	8.03E-06	Yes (fixed > micro)
Trichloroethylene	VOC	ppb	0.03	0.03	91	0.01	0.02	0.03	101	0.01	0.34	No
(m+p)-xylenes	VOC	ppb	0.86	0.47	90	0.1	1.35	0.93	101	0.18	5.77E-06	Yes (fixed > micro)
o-xylene	VOC	ppb	0.27	0.14	91	0.03	0.35	0.37	101	0.07	0.03	Yes (fixed > micro)
1,2-Dichlorobenzene	VOC	ppb	0.79	3.2	91	0.66	0	0.01	101	0	0.004	Yes (micro > fixed)
1,2-Dichloroethane	VOC	ppb	0.01	0.01	91	0.0011	0	0	101	0.0004	2.6E-16	Yes (micro > fixed)
1,2-Dichloropropane	VOC	ppb	0	0	91	--	0	0	101	0	0.32	No
1,4-Dichlorobenzene	VOC	ppb	0.03	0.02	91	0	0.03	0.02	101	0	0.78	No
1,2-Dibromoethane	VOC	ppb	0	0	91	--	0	0	101	--	--	--
1,3-Butadiene	VOC	ppb	0.22	0.17	91	0.04	0.13	0.13	101	0.03	2.75E-05	Yes (micro > fixed)
Arsenic	$PM_{2.5}$	ng/m^3	0.22	0.48	110	0.09	0.3	0.66	108	0.12	0.29	No
Cadmium	$PM_{2.5}$	ng/m^3	1.3	1.59	110	0.3	1.45	2.26	108	0.43	0.57	No
Lead	$PM_{2.5}$	ng/m^3	5.06	4.76	110	0.89	4.94	3.81	108	0.72	0.84	No
Chromium	$PM_{2.5}$	ng/m^3	5.87	21.56	110	4.03	3.77	16.37	108	3.09	0.41	No
Manganese	$PM_{2.5}$	ng/m^3	3.82	7.62	110	1.42	3.11	6.37	108	1.2	0.45	No
Vanadium	$PM_{2.5}$	ng/m^3	2.88	2.84	110	0.53	3.94	4.07	108	0.77	0.03	Yes (fixed > micro)
Nickel	$PM_{2.5}$	ng/m^3	3.46	5.72	110	1.07	3.45	4.88	108	0.92	0.99	No
Copper	$PM_{2.5}$	ng/m^3	16.16	5.79	110	1.08	26.72	12.55	108	2.37	1.87E-13	Yes (fixed > micro)
Elemental Carbon	$PM_{2.5}$	$\mu g/m^3$	1.83	0.91	109	0.17	2.18	1.27	111	0.24	0.02	Yes (fixed > micro)
Arsenic	TSP	ng/m^3	0.6	0.53	84	0.11	0.72	0.58	81	0.13	0.18	No
Cadmium	TSP	ng/m^3	1.62	0.92	84	0.2	1.46	0.79	81	0.17	0.21	No
Lead	TSP	ng/m^3	9.05	6.44	84	1.38	10.09	5.41	81	1.18	0.26	No
Chromium	TSP	ng/m^3	2.42	1.81	84	0.39	4.41	3.43	81	0.75	8.40E-06	Yes (fixed > micro)
Manganese	TSP	ng/m^3	23.52	13.94	84	2.98	23.58	16.35	81	3.56	0.98	No
Vanadium	TSP	ng/m^3	4.32	3.81	84	0.82	5.28	4.37	81	0.9	0.13	No
Nickel	TSP	ng/m^3	2.57	1.81	84	0.39	3.66	2.07	81	0.45	0.00	Yes (fixed > micro)
Copper	TSP	ng/m^3	51.51	26.68	84	5.71	50.28	24.98	81	5.44	0.76	No
Hexavalent Chromium	TSP	ng/m^3	0.17	0.17	122	0.03	0.13	0.1	126	0.02	0.01	Yes (micro > fixed)
Elemental Carbon	PM_{10}	$\mu g/m^3$	2.01	0.87	97	0.17	2.33	1.14	99	0.22	0.03	Yes (fixed > micro)

The Sun Valley site showed higher levels of hexavalent chromium that Burbank. This may reflect the operation of near by used of hexavalent chromium such as plating operations. Also levels of dichlorobenzene and 1,3-butadiene were relatively higher.

Table 5-5. Comparison of observed concentrations for the microscale and fixed site pair of Santa Ana and Anaheim

			Microscale Site - Santa Ana				Fixed Site - Anaheim					
Pollutant	**Category**	**Units**	**AVG**	**S.D.**	**N**	**95%CI**	**AVG**	**S.D.**	**N**	**95%CI**	**P-Value**	**Statistically Significant?**
Acetaldehyde	VOC	ppb	1.87	0.91	47	0.26	1.62	0.67	50	0.19	0.12	No
Acetone	VOC	ppb	1.82	1.92	47	0.55	2.61	3.01	50	0.83	0.13	No
Benzene	VOC	ppb	1.04	0.6	47	0.17	0.61	0.4	46	0.12	8.77E-05	Yes (micro > fixed)
Carbon Tetrachloride	VOC	ppb	0.07	0.01	47	0.0019	0.09	0.01	46	0.0026	4.35E-14	Yes (fixed > micro)
Chloroethene Vinyl Chloride	VOC	ppb	0	0	47	--	0	0	46	--	--	--
Chloroform	VOC	ppb	0.04	0.02	47	0.01	0.04	0.02	46	0.01	0.3	No
Ethylbenzene	VOC	ppb	0.45	0.29	47	0.08	0.31	0.25	46	0.07	0.01	Yes (micro > fixed)
Formaldehyde	VOC	ppb	3.66	1.44	47	0.41	3.56	1.47	50	0.41	0.73	No
Methyl Ethyl Ketone	VOC	ppb	0.21	0.15	47	0.04	0.22	0.14	50	0.04	0.61	No
Methyl Tertiary Butyl Ether	VOC	ppb	0.03	0.02	47	0.01	0	0.01	46	0	2.21E-08	Yes (micro > fixed)
Methylene Chloride	VOC	ppb	0.8	2.31	47	0.66	0.31	0.2	45	0.06	0.15	No
Perchloroethylene	VOC	ppb	0.07	0.05	47	0.02	0.08	0.08	46	0.02	0.62	No
Styrene	VOC	ppb	0.13	0.16	47	0.05	0.58	1.01	46	0.29	0.005	Yes (fixed > micro)
Toluene	VOC	ppb	3.25	2.01	47	0.57	2.18	1.66	46	0.01	0.01	Yes (micro > fixed)
Trichloroethylene	VOC	ppb	0.02	0.02	47	0.006	0.01	0.02	46	0.005	0.001	Yes (micro > fixed)
(m+p)-xylenes	VOC	ppb	1.82	1.29	47	0.37	1.02	0.81	46	0.23	6.00E-04	Yes (micro > fixed)
o-xylene	VOC	ppb	0.6	0.41	47	0.12	0.33	0.34	46	0.1	9.00E-04	Yes (micro > fixed)
1,2-Dichloro Benzene	VOC	ppb	0	0	47	--	0	0	46	0	0.32	No
1,2-Dichloro Ethane	VOC	ppb	0.01	0.01	47	0	0	0	46	--	3.5E-13	Yes (micro > fixed)
1,2-Dichloro Propane	VOC	ppb	0	0	47	--	0	0	46	0	0.32	No
1,4-Dichloro Benzene	VOC	ppb	0.07	0.05	47	0.015	0.02	0.02	46	0.006	4.44E-07	Yes (micro > fixed)
1,2-Dibromo Ethane	VOC	ppb	0	0	47	--	0	0	46	--	--	--
1,3-Butadiene	VOC	ppb	0.5	0.39	47	0.11	0.08	0.09	46	0.02	2.19E-09	Yes (micro > fixed)
Arsenic	$PM_{2.5}$	ng/m^3	0.18	0.38	62	0.09	0.3	0.59	64	0.14	0.15	No
Cadmium	$PM_{2.5}$	ng/m^3	1.39	1.71	62	0.42	1.71	2.2	64	0.54	0.37	No
Lead	$PM_{2.5}$	ng/m^3	3.88	3.44	62	0.86	3.74	2.54	64	0.62	0.79	No
Chromium	$PM_{2.5}$	ng/m^3	13.67	35.61	62	8.86	6.11	19.24	64	4.71	0.14	No
Manganese	$PM_{2.5}$	ng/m^3	5.59	11.61	62	2.89	3.28	6.58	64	1.61	0.18	No
Vanadium	$PM_{2.5}$	ng/m^3	7.18	5.56	62	1.38	7.46	5.29	64	1.3	0.78	No
Nickel	$PM_{2.5}$	ng/m^3	7.34	10.64	62	2.65	5.81	6.59	64	1.61	0.34	No
Copper	$PM_{2.5}$	ng/m^3	18.62	11.65	62	2.9	14.5	7.56	64	1.85	0.02	Yes (micro > fixed)
Elemental Carbon	$PM_{2.5}$	$\mu g/m^3$	1.9	1.24	63	0.31	1.92	1.3	64	0.32	0.95	No
Arsenic	TSP	ng/m^3	0.47	0.42	52	0.12	0.42	0.37	57	0.1	0.56	No
Cadmium	TSP	ng/m^3	2.1	3.25	52	0.88	1.54	0.84	57	0.22	0.23	No
Lead	TSP	ng/m^3	8.28	8.98	52	2.44	7.66	7.57	57	1.97	0.7	No
Chromium	TSP	ng/m^3	2.8	2.51	52	0.68	2.77	2.54	57	0.66	0.96	No
Manganese	TSP	ng/m^3	22.73	19.33	52	5.25	21.12	14.82	57	3.85	0.63	No
Vanadium	TSP	ng/m^3	12.73	21.12	52	5.74	9.26	5.48	57	1.42	0.26	No
Nickel	TSP	ng/m^3	5.16	6.37	52	1.73	4.4	2.05	57	0.53	0.42	No
Copper	TSP	ng/m^3	45.73	34.51	52	9.38	40.8	22.08	57	5.73	0.38	No
Hexavalent Chromium	TSP	ng/m^3	0.12	0.09	60	0.02	0.12	0.08	62	0.02	0.78	No
Elemental Carbon	PM_{10}	$\mu g/m^3$	1.87	0.98	53	0.26	1.91	1.17	60	0.3	0.84	No

Several pollutants associated with vehicle emissions, including benzene, 1,3-butadiene, toluene, xylene and ethylbenzene show relatively higher levels at the Santa Ana site compared to Anaheim. This likely reflects the influence of nearby traffic. Copper in $PM_{2.5}$ was also higher, but copper was not higher in PM_{10}.