Sonoma Technology, Inc.
Air Quality Research and Innovative Solutions

EIGHTH QUARTERLY REPORT OF AMBIENT AIR QUALITY MONITORING AT SUNSHINE CANYON LANDFILL AND VAN GOGH ELEMENTARY SCHOOL

(August 25, 2009–November 30, 2009)

Quarterly Report
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ES.1 BACKGROUND

Continuous monitoring of meteorological and air quality parameters began at the Sunshine Canyon Landfill and at Van Gogh Elementary School in the nearby community of Granada Hills in fall 2007. PM_{10} (particulate matter less than 10 microns in aerodynamic diameter) is measured hourly, and wind speed, wind direction, and black carbon (BC, a surrogate for diesel particulate matter) are measured as 5-minute averages and reported as hourly averages. The collected data undergo quarterly validation and are evaluated for completeness. PM_{10} concentrations are compared with federal and state PM_{10} standards and with the historical, regional, and annual ambient PM_{10} concentrations. The PM_{10} and BC data undergo analysis to characterize the impact of landfill operations on ambient air quality on a neighborhood scale. The validated hourly data and a summary of the analytical results and field operations are reported to the Planning Department of the City of Los Angeles.

ES.2 STATISTICS

Data capture for the August 25 through November 30, 2009, monitoring period was 100% at the Landfill monitoring site and only slightly lower at the community monitoring site at Van Gogh Elementary School. There was one exceedance of the 150 $\mu g/m^3$ 24-hr federal PM_{10} standard, occurring on the same day at both monitoring sites. This exceedance was accompanied by high regional PM_{10} concentrations. The more stringent 24-hr California state standard (50 $\mu g/m^3$) was exceeded on 14% of the days at the community monitor and 19% of the days at the landfill monitor. At the Landfill monitoring site, the average 24-hr BC concentrations were lower than those measured during the parallel time period in 2008, while BC concentrations measured at the Van Gogh School were slightly higher than those measured in the 2008 period. Compared to the baseline year (2001-2002) quarter, BC concentrations were lower at both sites.

ES.3 ESTIMATES OF LANDFILL IMPACTS ON AMBIENT PM_{10} AND BC

Data from this quarterly period completes a second full year of continuous monitoring, and allows direct year-to-year comparisons between the baseline year (2001-2002) and the two recent years completed in 2008 and 2009. Average annual PM_{10} concentrations are about 50% lower at the School monitor compared to the Landfill monitor, and lower than the 6-year average PM_{10} concentration reported for the South Coast Air Quality Management District (SCAQMD) Santa Clarita station. The annual average landfill contribution to PM_{10} concentrations in the community has been just over 5 $\mu g/m^3$ and for each of the last two years. The landfill contribution to PM_{10} concentrations measured at the landfill has increased. This has been driven by short term spikes associated with high wind speeds and locally derived fugitive dust.

The landfill contribution to BC concentrations measured at the Landfill site decreased substantially in the last year compared to previous years. The landfill contribution to BC concentrations measured at the School site, already small, also decreased. This represents an apparent reduction in landfill-associated BC contributions, leading to improved local ambient air

quality. BFI's ongoing effort to introduce improved emission controls on their equipment and trucks is likely an important contributor to this improvement. Future data will be able to confirm this supposition.

ES.4 SEASONAL CHARACTERISTICS OF PM_{10} AND BC

Seasonal characteristics of PM_{10} and BC are described by box-whisker plots of 24-hr data, displayed by month for the baseline year and the two recently completed sampling years. Highest average ambient PM_{10} and BC concentrations occur in summer and fall.

ES.5 LANDFILL GAS SAMPLING

Landfill gas (LFG) sampling was conducted on September 1, 2009. Methane concentrations were reported as lower than global ambient levels in three of the four samples, indicating that errors in sampling and/or laboratory analysis occurred. The cause of the error has not been conclusively determined, but dilution of the sample in the preparation for GC/FID analysis is suspected. Except for two compounds in one sample, non-methane organic compounds (NMOC) were either below the Method Detection Limit (MDL) or were within the normal range of values for the Los Angeles area. The 8:00 a.m. sample at the Van Gogh School showed a spike in benzene and trichloroethene (an industrial solvent).

ES.6 MONITORING INFRASTRUCTURE

BFI is funding several infrastructure upgrades for the two monitoring sites. These improvements include purchase and installation of new air conditioning units, application of roof sealant and additional insulation to trailer interior walls and ceiling, purchase and installation of new data acquisition systems, including new hardware and software, upgrading and service of the Aethalometer™ black carbon monitors, and purchase and installation of new wind monitors. The work is expected to be completed in the first few months of 2010.

1. INTRODUCTION

Data from this quarterly period completes a second full year of continuous monitoring at the Landfill and School monitoring sites and allows direct year-to-year comparisons between the baseline year (2001-2002) and the two recent years 2008 and 2009. Both 2008 and 2009 have been characterized by high data capture rates with a high proportion of valid data.

This report provides a summary of data completeness, PM_{10} exceedances, average and maximum black carbon (BC) concentrations, landfill gas (LFG) sampling results, instrument flow rate verification (quality control) data, and field operations for the recent quarterly period covering August 25 through November 30, 2009. In addition to these quarterly statistics, a year-to-year comparison presents estimates of the landfill impacts on neighborhood-scale PM_{10} and BC concentrations and how those impacts have changed. Seasonal characteristics of PM_{10} and BC concentrations are portrayed graphically.

2. DATA COMPLETENESS

Table 2-1 gives completeness statistics for all measured variables for the August 25 through November 30, 2009 period. Data capture at the Landfill site was 100% during the quarter and exceeded 97% at the School site for all parameters. Approximately 7% of the captured PM_{10} at Van Gogh Elementary was invalidated because of mechanical problems with the tape transport mechanism in the BAM-1020 PM_{10} monitor.

Table 2-1. Data completeness statistics for the recent monitoring quarter, August 25, 2009, through November 30, 2009.

Monitoring Location	Dates	Percent Data Capture[a] (%)			Percent Data Valid or Suspect (%)[b]			Percent Data Suspect (%)[c]		
		PM_{10}	BC	WS/ WD	PM_{10}	BC	WS/WD	PM_{10}	BC	WS/ WD
Sunshine Canyon Landfill Site	8/25/09-11/30/09	100%	100%	100%	99%	100%	100%	0%	0%	0%
Van Gogh Elementary School Site	8/25/09-11/30/09	97%	100%	100%	93%	100%	100%	0%	0%	0%

[a] Percent Data Capture is the percent of data values that were collected divided by the total number of expected data intervals in the date range (e.g., for the raw BC 5-minute data, 12 data values are expected per hour, and 288 data values are expected per day).
[b] Percent Data Valid or Suspect is the percent of data values that are either valid or suspect divided by the number of **captured** data values.
[c] Percent Data Suspect is the percent of data values that are labeled as suspect divided by the number of captured data values.

3. PM_{10} EXCEEDANCES

A listing of the federal and state PM_{10} exceedances for the current quarter, and for the corresponding quarters of the previous year and the baseline year, is given in **Table 3-1**. There were no exceedances of the 24-hr federal PM_{10} standard during this quarterly period in 2002 or 2008. There was one exceedance during the 2009 quarter, occurring at both sites on October 27. PM_{10} concentrations reported by the California Air Resources Board (ARB) from other hourly PM_{10} monitors in southern California indicate that regional concentrations of PM_{10} were also high on that day (**Table 3-2**, preliminary data). The Los Angeles and Niland monitoring sites were within a few micrograms of exceeding the standard. The concentrations measured at the Landfill site and School site on that day were higher than any other regional measurements. The high concentrations were accompanied by high winds, particularly evident at the ridgetop location of the Landfill site monitor (**Figure 3-1**). Locally derived fugitive dust near the Landfill monitoring trailer may have contributed to the high concentrations measured at the Landfill site on that day. The surface stabilization treatment applied on August 19 and 20, 2009, may have weathered enough to result in exposed soil surfaces. Observations made in December 2009 confirmed that the soil surface treatment had mostly worn away.

The more stringent California 24-hr standard (50 $\mu g/m^3$) was exceeded at the School site on 14% of the days and at the Landfill site on 19% of the days. These proportions are lower than those reported for summer 2008 and for the summer period of the baseline year. Note that at the School site during the baseline year, only about one-third of the days had data completeness sufficient for calculation of 24-hr averages.

Table 3-1. Number of exceedances of federal and state 24-hr PM_{10} standards during the current quarter and during the August 25–November 30 quarterly periods of the baseline year (November 22, 2001–November 21, 2002) and of 2008. Exceedances of the state standard are expressed as the proportion, and percentage, of the number of valid 24-hr averages in each period.

			Van Gogh School			Sunshine Canyon Landfill		
Regulatory Level	Avg. Period	PM_{10} Standard	8/25/02-11/30/02	8/25/08-11/30/08	8/25/09-11/30/09	8/25/02-11/30/02	8/25/08-11/30/08	8/25/09-11/30/09
Federal	24-hr	150 $\mu g/m^3$	0	0	1 (10/27/09)	0	1 (10/9/08)	1 (10/27/09)
State	24-hr	50 $\mu g/m^3$	8/34 (24%)	15/97 (15%)	12/87 (14%)	56/84 (67%)	16/80 (20%)	19/98 (19%)

Table 3-2. Maximum hourly and average 24-hr PM_{10} concentrations measured at several southern California locations on October 27, 2009 (preliminary data from ARB), and at the Landfill and School monitoring sites. Note that the Los Angeles and Niland locations were only a few micrograms below the 24-hr federal exceedance level of 150 $\mu g/m^3$.

	PM_{10} Concentration ($\mu g/m^3$)	
Monitoring Location	Daily 1-hr Maximum	24-hr Average
Lompoc	82	43
Indio	356	91
Los Angeles (N. Main St.)	348	147
Paso Robles	61	24
Nipomo	309	75
Niland	441	148
Santa Maria	192	40
Santa Barbara	164	56
Brawley	397	113
Landfill Site	872	239
School Site	473	165

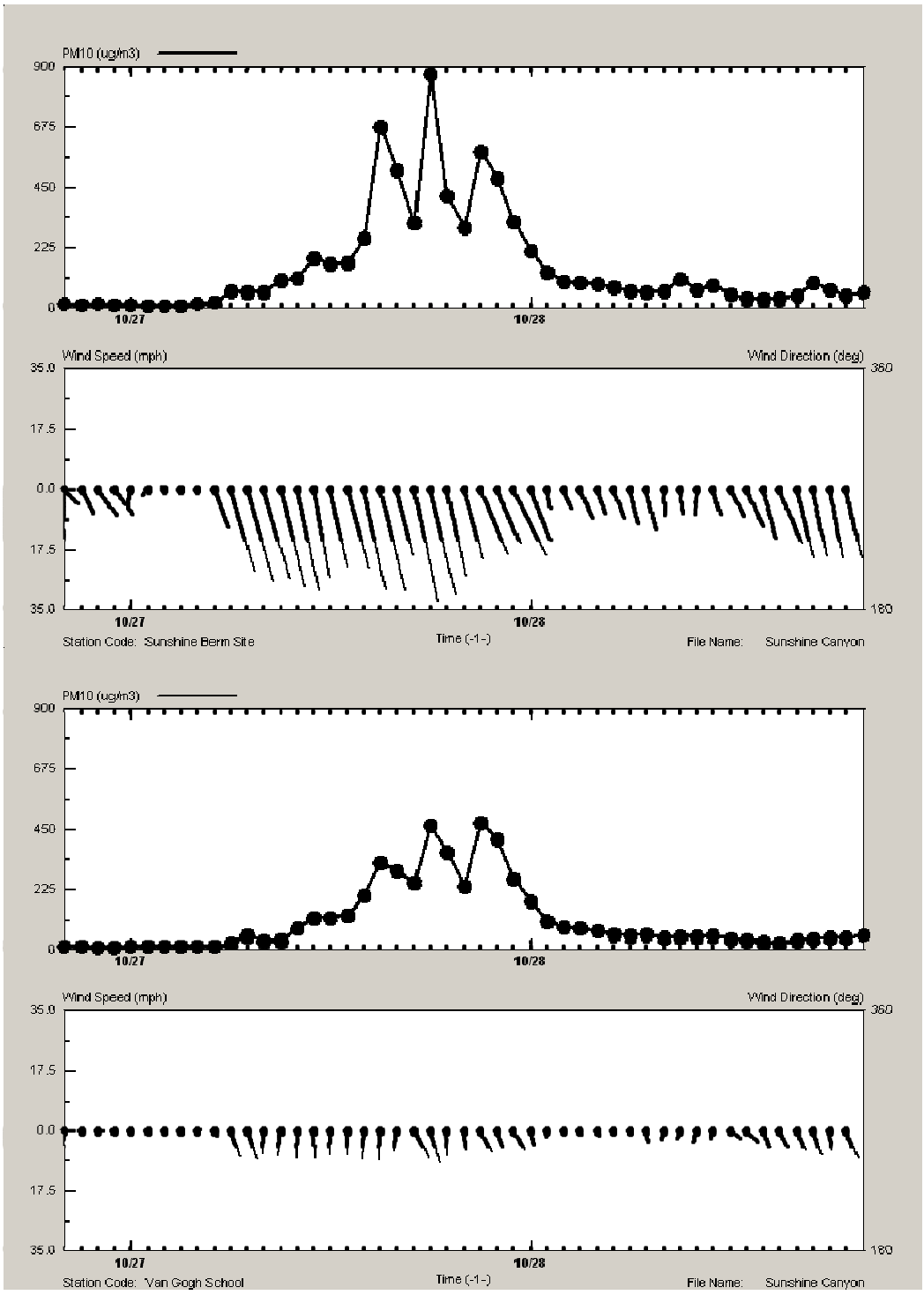

Figure 3-1. High winds at the Landfill site on October 27, 2009 (second panel, hourly averages) were associated with the high hourly PM_{10} concentrations observed there on that day (top panel). At the School site, wind patterns (bottom panel, hourly averages) and the PM_{10} hourly time series (third panel) were similar to those at the Landfill site, but lower in magnitude. Bristles on the vector wind plots point in the direction toward which the wind was blowing.

4. AVERAGE AND MAXIMUM BLACK CARBON CONCENTRATIONS

While no federal or state standards exist for BC concentrations in ambient air, BC is a measurable component of ambient air that correlates well with diesel particulate matter (DPM). Because of growing evidence that DPM is associated with several negative health effects, BC is often measured in an attempt to quantify the relative amounts of DPM in ambient air. However, because BC is not a criteria pollutant and not routinely measured by state or regional agencies, data illustrating long term trends in local or regional concentrations are not readily available for comparison with the measurements made at the Landfill or School monitoring locations.

Table 4-1 gives the 24-hr average and maximum 24-hr BC concentrations for August 25 through November 30, 2009, and compares these concentrations with data from corresponding quarters of 2008 and the baseline year (2001-2002). The Landfill site showed higher 24-hr average and maximum 24-hr BC concentrations than did the School site during this quarter. Average BC concentrations at the Landfill site in the 2009 quarter were lower than landfill-based measurements in 2008 and 2002. Maximum 24-hr BC concentrations showed little difference among the three years' quarterly periods at the Landfill site.

The average 24-hr BC concentration at the School site was slightly higher this quarter than in the 2008 quarter, but substantially lower than in the baseline year of 2002. The maximum 24-hr BC concentration at the School site during this quarter was slightly lower than the baseline year, but substantially lower than the comparable quarter in 2008. The high 2008 quarterly maximum BC concentration at the School site is attributed to a non-landfill source, as the Landfill site monitor did not reflect maximum 24-hr concentrations of similar magnitude on that day.

Table 4-1. Comparison of 24-hr black carbon concentrations for the current quarter with those measured in the August 25–November 30 quarterly periods from the original baseline year (November 22, 2001–November 21, 2002) and from 2008.

	BC Concentration ($\mu g/m^3$)					
	Van Gogh School			Sunshine Landfill		
	8/25/02-11/30/02	8/25/08-11/30/08	8/25/09-11/30/09	8/25/02-11/30/02	8/25/08-11/30/08	8/25/09-11/30/09
Average 24-Hr	1.30	0.76	0.86	1.23	1.27	1.06
Maximum 24-Hr	2.92	4.88	2.77	2.83	3.01	2.98

5. APPORTIONING REGIONAL AND LANDFILL SOURCES OF PM_{10} AND BC

The ambient air quality and meteorological data collected through November 30, 2009, completes the second full year of continuous monitoring at the Landfill and School sites. In previous analyses used to estimate landfill impacts on ambient air quality, rolling annual averages were used to ensure adequate sample sizes in the wind direction and time-of-day data bins that categorized the hourly pollutant and meteorological data. The full year data sets, characterized by high data capture rates, now allow comparisons of distinct annual averages based upon adequate sample sizes without employing rolling average calculations.

Comparisons of the estimates of regional and landfill contributions to ambient pollutant concentrations, discussed below, include the data from the baseline year collected from November 2001 through November 2002. When comparing data from the baseline year, one should keep in mind that the data completeness (data capture and percent valid) for that year was relatively low (approximately 75% at the Landfill site and 50% at the School site); this could affect the ability of the collected data to represent the actual concentrations.

The data analysis methodology used to estimate regional and landfill contributions of PM_{10} and BC has been described previously (see Quarterly Report 907032.13-3610-QR, *Fifth Quarterly Report of Ambient Air Quality Monitoring at Sunshine Canyon Landfill and Van Gogh Elementary School with Additional Analysis of a Full Year Data Set (December 1, 2008–February 26, 2009))*. In general, concentrations measured during periods with winds from directions other than the landfill help determine regional contributions, and landfill contributions are determined by difference. The current analysis utilizes slightly altered subsets of data compared to previous analyses. This is a result of the reclassification of days that previously fell under the "holiday" classification but are actually working days for Landfill operations (e.g., Memorial Day and July 4 are regular working days at the Landfill).

5.1 PM_{10}

Figure 5-1 shows estimates of regional contributions of PM_{10} during working and non-working days, and estimates of landfill contributions during working days, for the baseline year and the two recent monitoring years. Also shown is the six-year average annual PM_{10} concentration measured at the South Coast Air Quality Management District (SCAQMD) monitoring station in Santa Clarita. The maximum annual average PM_{10} concentration for this period at Santa Clarita was 31.6 $\mu g/m^3$ in 2002.

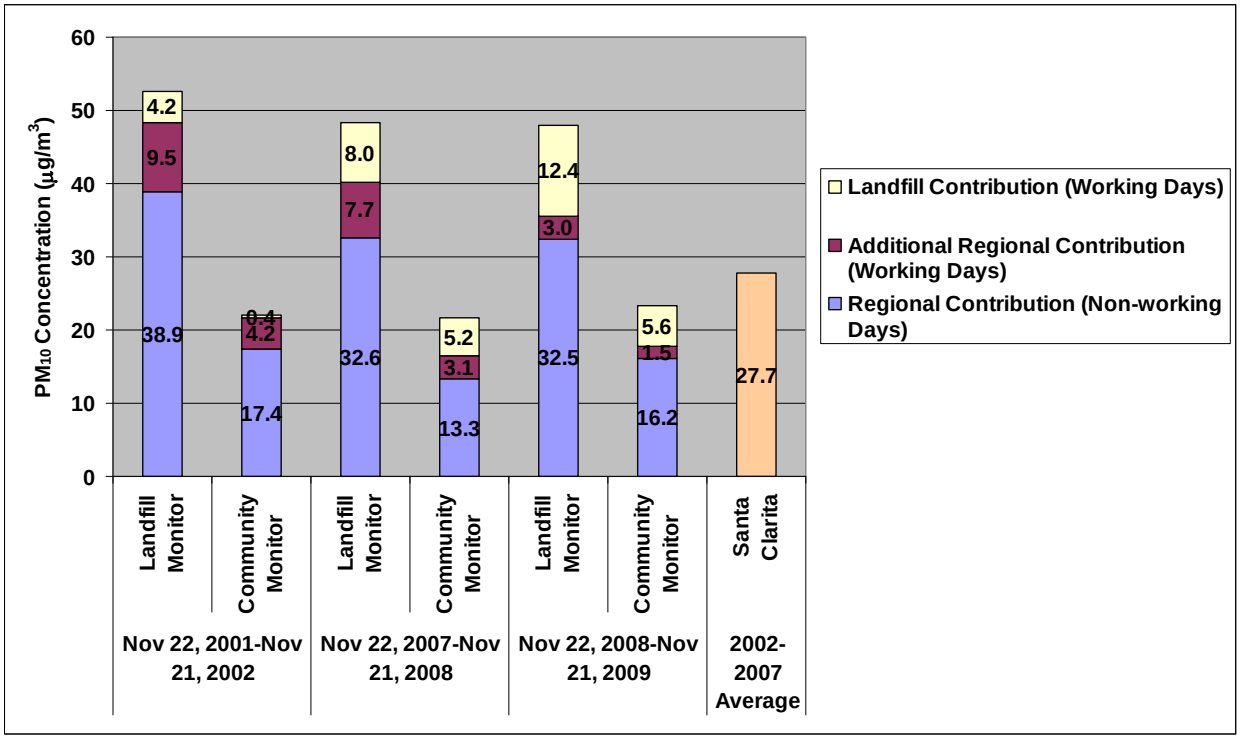

Figure 5-1. Estimated regional and landfill contributions to the annual average PM_{10} concentrations measured at the Landfill site and the School site for the baseline year and the two recent years with continuous monitoring. The 6-year average of annual PM_{10} concentrations measured at the SCAQMD monitoring station in Santa Clarita is also shown.

The following comments about PM_{10} concentrations refer to Figure 5-1:

- Average annual PM_{10} concentrations at the School monitor are about 50% of the average annual PM_{10} concentrations at the Landfill monitor.
- Average annual PM_{10} concentrations at the School monitor are lower than the 6-year average at the Santa Clarita station, and average concentrations at the Landfill are higher.
- The regional contribution on non-working days (blue bar) was lower in 2008 and 2009, compared to the baseline year, at both monitoring sites. This observation is consistent with the long-term trend in the South Coast Air Basin.
- The additional regional contribution attributed to working day activities (maroon bar) has decreased since the baseline year at both monitoring sites.
- The landfill contribution to PM_{10} concentrations in the community remains just over 5 $\mu g/m^3$ annual average and was consistent for the last two years.
- The landfill contribution to PM_{10} concentrations measured at the landfill has increased. This increase has been driven by short-term spikes associated with high wind speeds and locally derived fugitive dust.

5.2 BLACK CARBON

Figure 5-2 shows estimates of regional contributions of BC during working and non-working days, and estimates of landfill contributions during working days, for the baseline year and the two recent monitoring years.

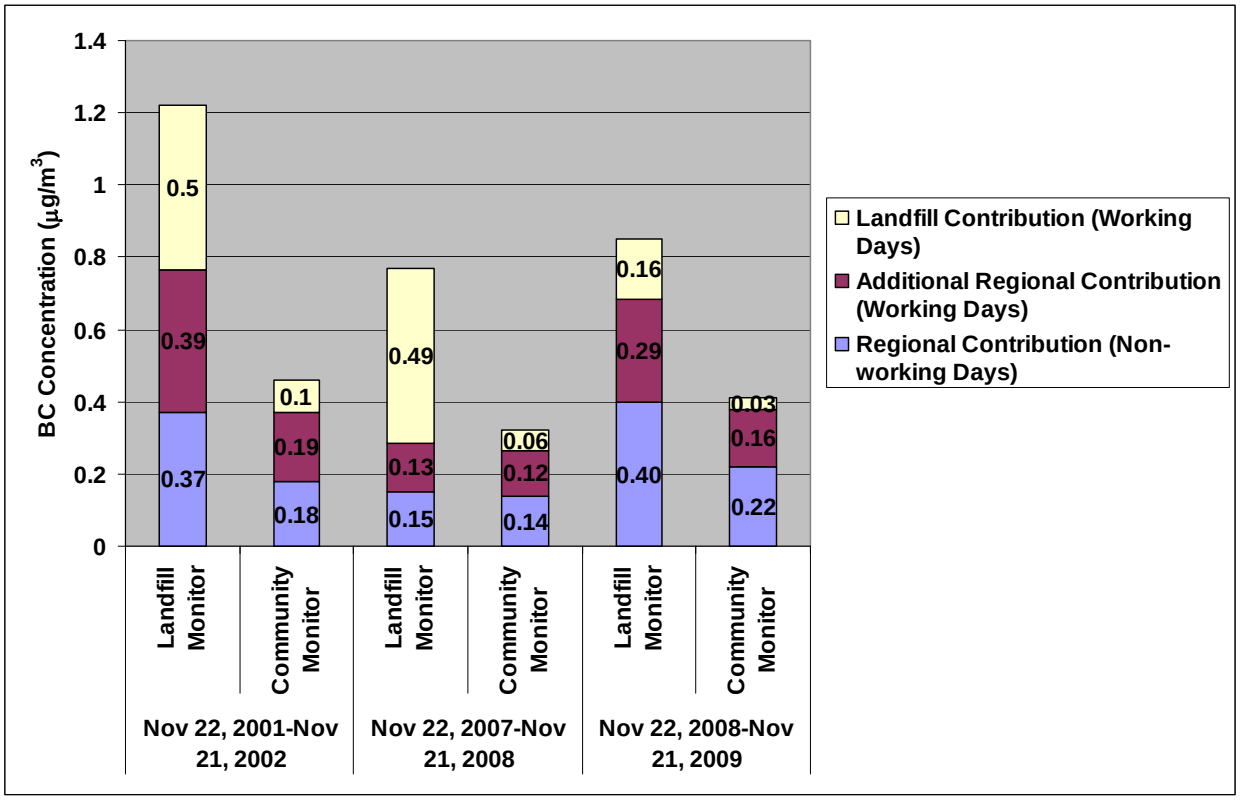

Figure 5-2. Estimated regional and landfill contributions to the annual average BC concentrations measured at the Landfill site and the School site for the baseline year and the two recent years with continuous monitoring.

The following comments about BC refer to Figure 5-2:

- The landfill contribution to BC concentrations measured at the Landfill site decreased substantially in the last year compared to previous years. Community-based BC concentrations, already small, also decreased. This represents an apparent reduction in landfill-associated BC contributions, leading to improved local ambient air quality. BFI's ongoing effort to introduce improved emission controls on their equipment and trucks is likely an important contributor to this improvement. Future data will be able to confirm this observation.
- BC concentrations were lower during the last two years of continuous monitoring, compared to the baseline year. No regional monitoring data are available to confirm this finding.

- The most recent year of data shows a slight increase over the previous year. This was dominated by increases in the regional contribution, in which both working days and non-working days exhibited higher regional BC concentrations.

6. SEASONAL CHARACTERISTICS OF PM_{10} AND BC

Particulate matter pollution varies diurnally, associated with the variations of within-day activity levels, source strengths, and meteorology, and on longer time scales such as the working day/non-working day comparisons used above to estimate regional and landfill contributions. Seasonal variations in pollutant concentrations also occur, driven largely by meteorological differences between the seasons.

Box whisker plots are commonly used to display a large amount of data and are particularly useful in assessing differences among data. Most box whisker plots show an interquartile range (i.e., 25^{th} to 75^{th} percentile) and also illustrate data outside this range. **Figure 6-1** shows a sample box whisker plot that describes how the data are presented. The box shows the 25^{th}, 50^{th} (median), and 75^{th} percentiles. The whiskers always end on a data point. When the plots show no data beyond the end of a whisker, the whisker shows the value of the highest or lowest data point. The whiskers have a maximum length equal to 1.5 times the length of the box (the interquartile range). If data are outside this range, the points are shown on the plot. These "outliers" are further identified by asterisks representing the points that fall within three times the interquartile range from the end of the box and circles representing points beyond.

Figure 6-2 (PM_{10}) and **Figure 6-3** (BC) employ box whisker plots to describe the seasonal characteristics of PM_{10} and BC measured at the Landfill site and the School site. The plots show the distribution of concentrations by month (24-hr averages) for the baseline year (2001-2002) and the two most recent years with continuous data, 2007-2008 and 2008-2009. Since the baseline year ran from November to November, other annual data are grouped similarly. Note that the December 2008 data from the Landfill site are missing due to a power outage from the Sayre fire.

As would be expected, within-year patterns of PM_{10} concentrations (Figure 6-2) and BC concentrations (Figure 6-3) are similar at the two sites. These seasonal patterns show that the particulate matter median values are higher in the summer months than in the winter months. This difference is attributed to the southerly wind flow during the summer months, when pollutants originating in the large metropolitan areas to the south are carried northward and dominate the ambient pollution levels. Under northerly wind flows, typical of wintertime conditions, transported air has lower pollutant concentrations than those typical of the urbanized portion of the South Coast Air Basin. Thus, pollution levels tend to be lower under moderate and low wind speeds during wintertime. Periodic high wind events in fall and winter (e.g., Santa Ana winds) can create short term spikes in PM_{10} attributable mostly to locally derived fugitive dust.

The Landfill site exhibits more outliers (asterisks and circles) than does the School site for PM_{10} (Figure 6-2). These high daily average PM_{10} concentrations are associated with high wind speeds that entrain locally derived dust that is measured by the Landfill monitor but not always by the School monitor.

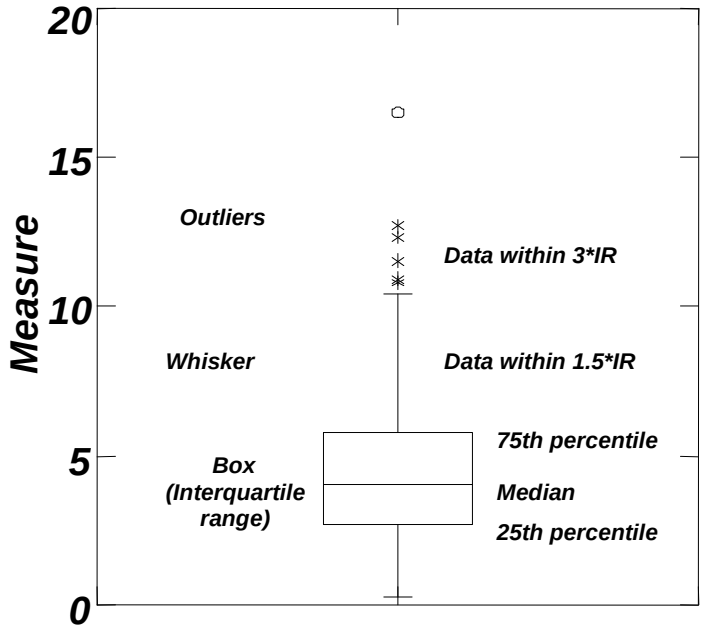

Figure 6-1. Descriptive characteristics of a box whisker plot. In the box whisker plots of Figures 6-2 and 6-3, the median line is replaced by a notch in the box, representing the 95% confidence interval for the median. "IR" refers to the Interquartile Range. Note that when the data set is small, the notch can extend beyond the interquartile range and the box looks unusual (see some of the baseline year data in Figures 6-2 and 6-3).

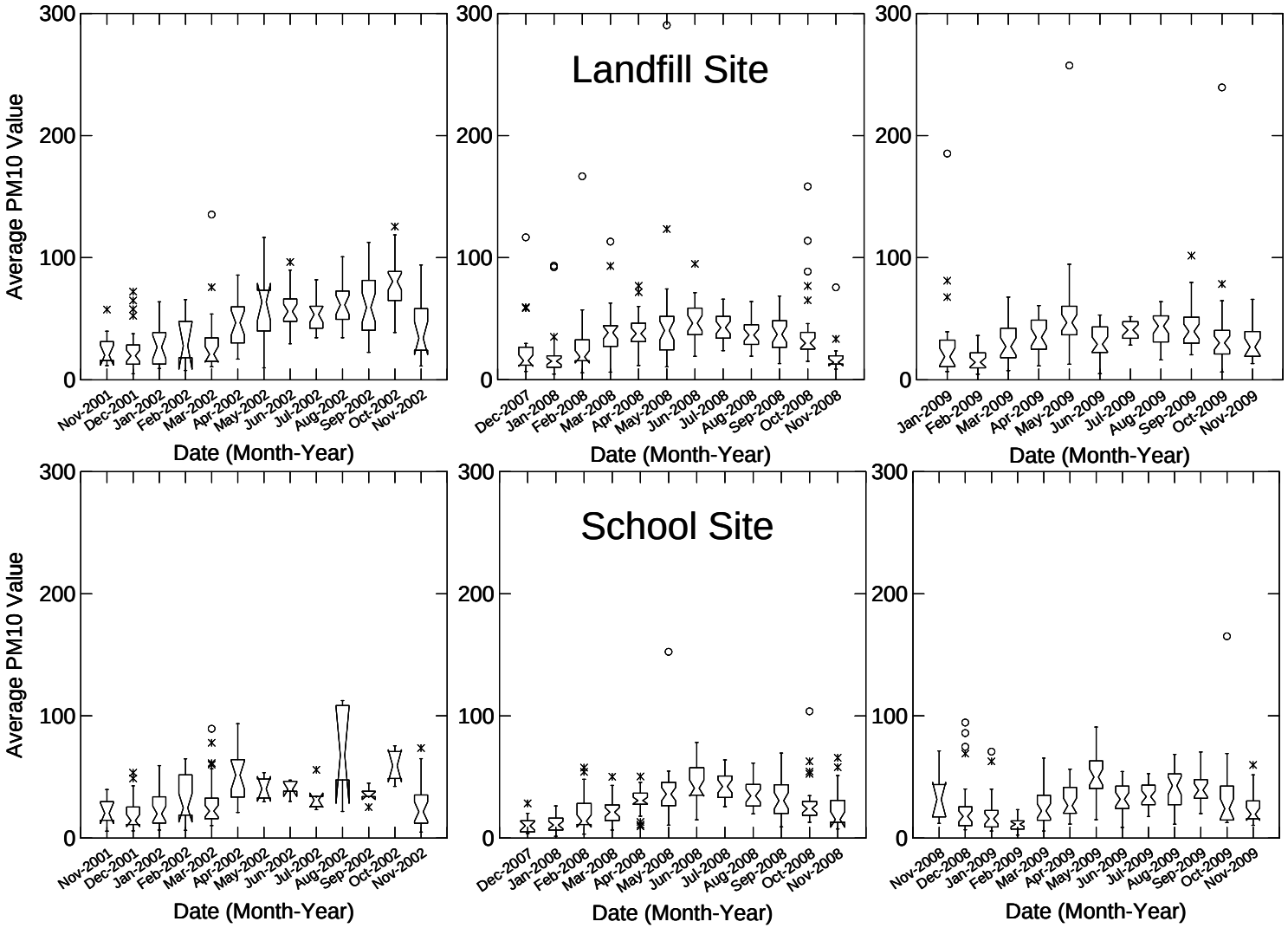

Figure 6-2. Monthly box whisker plots of 24-hr average PM_{10} mass at the Landfill site (top row) and the School site (bottom row) for the baseline year (2001-2002) and the two recent years of continuous data (2007-2008 and 2008-2009). Concentrations are in $\mu g/m^3$.

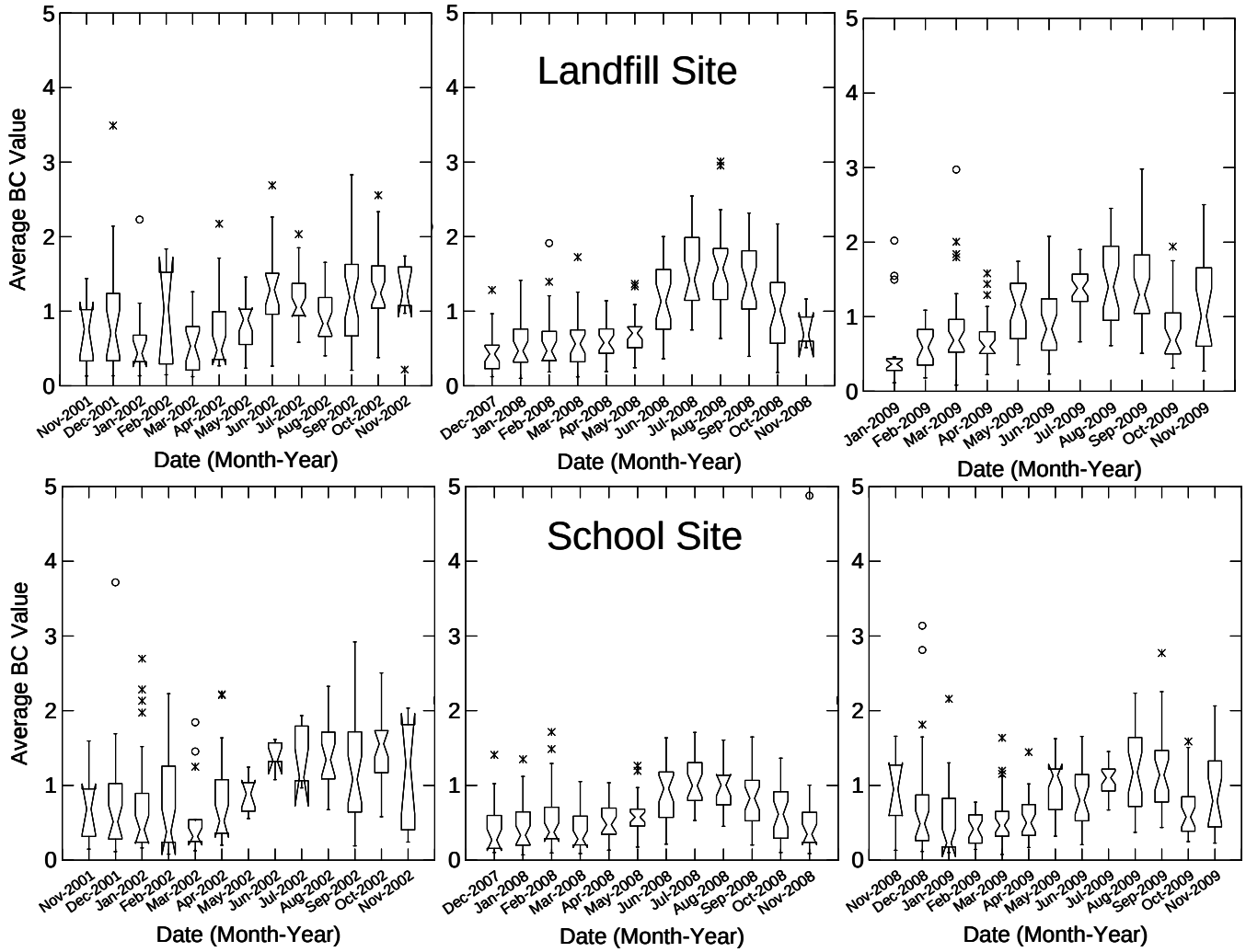

Figure 6-3. Monthly box whisker plots of 24-hr average black carbon mass at the Landfill site (top row) and the School site (bottom row) for the baseline year (2001-2002) and the two recent years of continuous data (2007-2008 and 2008-2009). Concentrations are in $\mu g/m^3$.

7. LANDFILL GAS SAMPLING

A landfill gas sampling event occurred on September 1, 2009. Between 7:00 and 9:00 a.m., two consecutive 1-hr samples (7:00 to 8:00 a.m. and 8:00 to 9:00 a.m., local time) were obtained at each monitoring site, for a total of four separate samples. Samples were analyzed for methane by method ASTM D1946, and non-methane organic compounds were analyzed by TO-15 using a Full Scan at Low level and by Selective Ion Monitoring using a special list of volatile organic compounds (VOC) targeting LFG.

7.1 METHANE

Three of the four sample results reported for methane for the September 1, 2009, LFG sampling are characterized by low values that must be viewed as suspect data. Methane concentrations in the atmosphere should not dip below 1.75 ppmV in the northern hemisphere. The ASTM D 3416 analytical technique has a precision of 20%, so values of 1.6 ppm or above are viewed as reliable. The 7:00 a.m. sample at Van Gogh School was within the expected range 2.31 ppm methane. The other three samples were below 0.25 ppm. STI has been working with the analytical laboratory (Environmental Analytical Services of San Luis Obispo) to understand the low methane readings. It is believed that the passive sub-ambient sampling procedure (evacuated canisters with a critical orifice flow controller), which requires pressurization of the can following sampling to obtain a sufficient aliquot for analysis, is diluting the sample and leading to results below the Method Detection Limit (MDL). Future LFG samples will use an alternative method, such as using a pump to pressurize the canister during sampling, to obtain a larger volume of air over the hourly sample period.

7.2 NON-METHANE ORGANIC COMPOUNDS (NMOC)

The current ambient air monitoring program at the Landfill and School sites includes analyses for several compounds. The rationale for choosing the compounds is discussed in STI's First Annual Report, *First Annual Report of Ambient Air Quality Monitoring at Sunshine Canyon Landfill and Van Gogh Elementary School (May 10, 2007-May 30, 2008).* The compounds include NMOCs commonly associated with landfills, in particular those specified in SCAQMD's Core Group of "Carcinogenic and Toxic Air Contaminants" in Rule 1150.1. Some other compounds included are not listed in SCAQMD's Core Group but appear in the listing of the Agency for Toxic Substances and Disease Registry, part of the U.S. Centers for Disease Control.

The results from the September 1, 2009, sampling event are presented graphically in **Figure 7-1.** As in previously submitted reports, the figures illustrate how the samples compare to averaged Los Angeles and Ventura county data, from 2005 forward. The figures also allow comparison of the sample data with the MDL for the compounds. Data shown below the MDL are considered non-detectable.

Some of the compounds associated with landfill emissions have been classified by the U.S. Environmental Protection Agency (EPA) as environmental and health hazards, or air toxics. Cancer and non-cancer health benchmarks have been established for many of these compounds.

Sample concentrations are compared to cancer benchmarks in the figure. Exposure to concentrations at this level for 70 years would be expected to result in one additional case of cancer per million people. Non-cancer health benchmarks also assume a 70-year exposure, but refer to non-cancerous conditions such as asthma, neurological effects, or reproductive effects. All of the measured concentrations are below the non-cancer health benchmarks.

Results indicate that most compounds were within the expected range for the Los Angeles area, with the exception of benzene and trichloroethene (trichloroethylene) in one of the samples. The hourly sample collected at the Van Gogh School site between 8:00 a.m. and 9:00 a.m. local time (sample "VG 090109-800 AM") showed high concentrations of trichloroethylene (64 µg/m^3) and benzene (5.5 µg/m^3). This transient spike may have been the result of a locally generated plume of air, as the concentrations in the other three samples were within the normal range for the Los Angeles area.

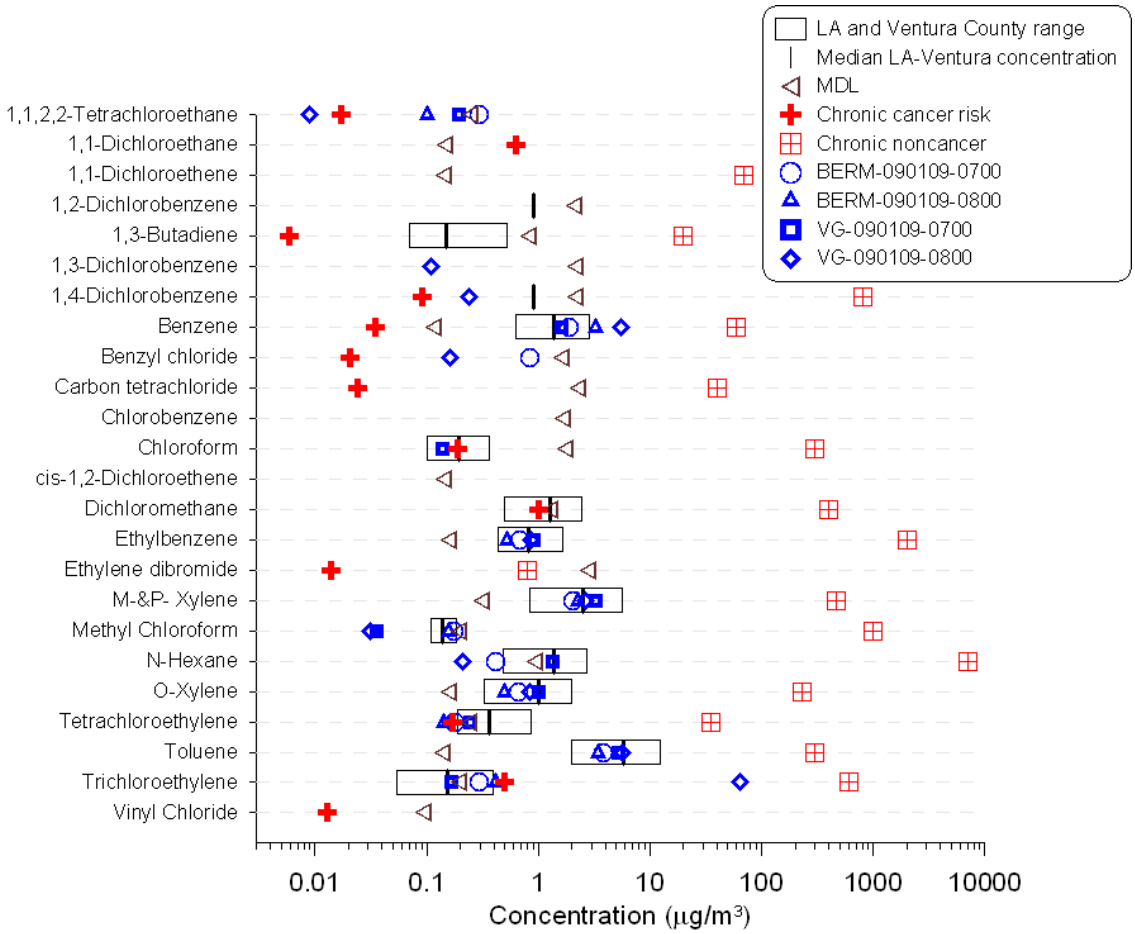

Figure 7-1. Ranges of the 10th to 90th percentile quarterly averages and median values for available Los Angeles and Ventura county NMOC data from 2005 forward; concentrations determined from the September 1, 2009, samples collected at the Landfill site ("Berm") Van Gogh School ("VG"); Method Detection Limits (MDL); and chronic cancer risk benchmarks. If data are not shown, the compounds were "not detected."

8. UPDATE ON MONITORING SITE INFRASTRUCTURE

BFI has agreed to fund infrastructure upgrades and improvements at both monitoring sites. These improvements include the following:

- Purchase and installation of new air conditioning units
- Application of roof sealant and additional insulation to interior walls and ceiling
- Purchase and installation of new data acquisition systems, including new hardware and software
- Upgrading and service of the Aethalometer™ black carbon monitors
- Purchase and installation of new RM Young Model 5305 AQ wind monitors.

These improvements help assure that reliable data will continue to be collected. Sonoma Technology, Inc., will manage the procurement, installation, programming, and testing of the upgraded components. The procurement process has been initiated, and the work is expected to be completed a few weeks after all components are in hand.

9. FIELD OPERATIONS

Tables 9-1 and 9-2 list the dates and major tasks associated with visits to the Landfill and School sites, respectively, between August 25 and November 30, 2009. **Table 9-3** shows the PM_{10} and BC monitors' flow rates, as reported by the monitors and as measured with a NIST-traceable flow standard.

Table 9-1. Landfill site visits and field maintenance and operations from August 25, 2009, through November 30, 2009.

Date of Site Visit	Description of Work
Tuesday, September 1, 2009	VOC samples from 7:00 to 9:00 a.m.
Wednesday, September 9, 2009	PC down, required visit for hard boot. Flow and leak checks on PM_{10} and BC samplers. Clean BAM capstan, roller, nozzle, and vane. Install new BAM filter tape. Collect PM_{10} and BC data.
Saturday, September 19, 2009	Tape break on BAM, re-spooled. Self test: passed.
Monday, September 21, 2009	Flow and leak checks on PM_{10} and BC samplers. Clean BAM nozzle and vane. Collect PM_{10} and BC data.
Wednesday, October 7, 2009	Change Aethalometer™ tape. Flow and leak checks on PM_{10} and BC samplers. Collect PM_{10} and BC data.
Wednesday, October 21, 2009	Collect PM_{10} and BC data. Clean BAM capstan, roller, nozzle, and vane. Flow and leak checks on PM_{10} and BC samplers.
Thursday, November 5, 2009	Flow and leak checks on PM_{10} and BC samplers. Collect PM_{10} and BC data. Clean BAM capstan, roller, nozzle, and vane. Install new BAM filter tape.
Monday, November 16, 2009	Communications down. Hard drive full. Cleared space. Flow and leak checks on PM_{10} and BC samplers. Clean BAM nozzle and vane. Collect PM_{10} and BC data.

Table 9-2. School site visits and field maintenance and operations from August 25, 2009, through November 30, 2009.

Date of Site Visit	Description of Work
Tuesday, September 1, 2009	VOC samples from 7:00 to 9:00 a.m. Installed RMY AQ wind sensor (STI loaner).
Wednesday, September 9, 2009	Flow and leak checks on PM_{10} and BC samplers. Clean BAM capstan, roller, nozzle, and vane. Install new BAM filter tape. Collect PM_{10} and BC data.
Friday, September 11, 2009	Visit to troubleshoot BAM tape error. Advanced tape and self test: passed.
Monday, September 14, 2009	PC down, required visit for hard boot.
Monday, September 21, 2009	Flow and leak checks on PM_{10} and BC samplers. Clean BAM nozzle and vane. Collect PM_{10} and BC data.
Monday, September 28, 2009	Site visit to troubleshoot BAM (no data reported). Rebooted BAM, self test passed.
Thursday, October 8, 2009	Repaired BAM tape break. Flow and leak checks on PM_{10} and BC samplers. Collect PM_{10} and BC data.
Wednesday, October 21, 2009	Flow and leak checks on PM_{10} and BC samplers. Collect PM_{10} and BC data. Clean BAM nozzle and vane.
Thursday, November 5, 2009	Flow and leak checks on PM_{10} and BC samplers. Collect PM_{10} and BC data. Clean BAM nozzle and vane.
Wednesday, November 18, 2009	Install new roll of BAM tape. Flow and leak checks on PM_{10} and BC samplers. Collect PM_{10} and BC data.

Table 9-3. Flow rates for the BAM PM_{10} monitors and Aethalometer™ BC monitors at the Landfill and School sites from August 25 through November 30, 2009. BAM flow rates are volumetric (local temperature and pressure), and Aethalometer™ flow rates are at Standard Temperature and Pressure (STP). Reference flows were measured with a NIST-traceable flow standard. BAM target flow rate is 16.7 lpm volumetric, to meet the 10 micron cut point of the inlet, with an acceptable range of 16.0 to 17.3 lpm. The Aethalometer™ has no size cut point.

Location	Date	Flow Rates (lpm)					
		BAM as Found	Reference	BAM as left	Reference	Aethalometer™ as Found	Reference
Sunshine Canyon Landfill	9/9/09	16.2	16.2	16.2	16.2	5.2	5.3
	9/21/09	16.7	16.7	16.7	16.7	5.4	5.4
	10/7/09	16.7	16.7	16.7	16.7	5.2	5.3
	10/21/09	16.7	16.7	16.7	16.7	5.2	5.3
	11/5/09	16.7	16.7	16.7	16.7	5.4	5.3
	11/16/09	16.7	16.7	16.7	16.7	5.5	5.4
Van Gogh Elementary School	9/9/09	16.7	16.3	16.7	16.3	5.7	5.7
	9/21/09	16.7	16.7	16.7	16.7	6.1	5.9
	10/8/09	16.7	16.7	16.7	16.7	6.2	5.9
	10/21/09	16.7	16.7	16.7	16.7	6.2	6.0
	11/5/09	16.7	16.7	16.7	16.7	6.4	6.0
	11/18/09	16.7	16.7	16.7	16.7	6.0	5.7