Sonoma Technology, Inc.
Air Quality Research and Innovative Solutions

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)

Quarterly Report
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EXECUTIVE SUMMARY

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 the Fall of 2007. Particulate matter less than 10 microns in aerodynamic diameter (PM_{10}) 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 historical, regional, and annual ambient PM_{10} concentrations. 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.

Data capture at the Landfill monitoring site was low (55%) for this quarter (December 1, 2008, through February 26, 2009) due to an extended power outage caused by the Sayre fire in mid-November. Data capture at the Community site at Van Gogh School was 100%. There was one exceedance of the 150 $\mu g/m^3$ 24-hr Federal PM_{10} standard at the Landfill site and no exceedances at the Community site. The more stringent 24-hr California State standard (50 $\mu g/m^3$) was exceeded about 6% of the time at each site.

During the baseline year, an analytical method was developed to characterize landfill impacts on neighborhood air quality, and that method was used through the last quarterly report (September 1 through November 30, 2008). Some of the drawbacks of that method are described in this report and an alternative approach is evaluated. The alternative analysis, based on high data capture rates over a year-long monitoring period, suggests the following:

- Hourly average PM_{10} and BC concentrations are higher on working days than on non-working days for all time periods and wind directions at each site.
- Hourly average PM_{10} and BC concentrations at the Landfill site are higher during daily operations compared to other time periods.
- When wind direction is from the south (i.e., the South Coast Air Basin), PM_{10} and BC concentrations at both sites are similar on average, regardless of the time period.
- When wind direction is from the south, hourly average BC concentrations are higher at both sites than when wind direction is from the landfill.
- When wind direction is from the landfill, PM_{10} and BC concentrations measured at the landfill are higher than those measured at the Community site.
- Most of the increase in concentrations associated with working days corresponds with higher regional concentrations on those days.
- The biggest impediment to reaching sound conclusions about landfill impacts on neighborhood-scale ambient air quality is the lack of appropriately sited upwind monitors (north rim of landfill).

This alternate analysis of the first complete year of continuous data should be continued as more data are collected, perhaps seasonally as well as annually, to evaluate the variability of the results.

The physical infrastructure supporting monitoring efforts needs maintenance. The restoration of permanent power connections has recently been completed at the Landfill site. Both trailers have developed water leaks, and the roofs need to be recoated with a suitable sealant. These trailers have been in place for several years and, while they still have some useful life, a review of their physical status to support long-term continuous monitoring should be undertaken.

No landfill gas (LFG) samples were collected during this quarter. LFG sampling at the two sites is scheduled for early May.

1. INTRODUCTION

Continuous (hourly) monitoring of particulate matter smaller than 10 microns (PM_{10}), black carbon (BC), wind speed, and wind direction began in August 2007 at the Sunshine Canyon Landfill (Landfill site) and at Van Gogh Elementary School (Community site) in neighboring Granada Hills. An overall decline in ambient PM concentrations measured at the two monitoring sites in this study has paralleled a regional drop in concentrations reported by the California Air Resources Board (ARB) and the South Coast Air Quality Management District (SCAQMD). This decline in regional concentrations has been clearly demonstrated at several monitoring sites and contributes significantly to the decline in PM_{10} concentrations reported at the Landfill site and the Community site during the last few years.

Since the continuous monitoring began, descriptions of the specific impact of landfill activities on ambient air quality in the community have been based on comparisons of newly collected data to the year-long baseline data collected in 2001–2002. These comparisons, based on subjectively chosen sector source activity type (e.g., freeway, urban, landfill) and time-of-day/day-of-week activity levels, have yielded mixed results, suggesting that the impact of landfill operations on air quality in nearby communities is highly variable and difficult to quantify. The seasonal and microscale differences in wind patterns, variable but intense traffic patterns in the area, and dominating regional pollutant concentrations, as well as differences in landfill activities, contribute to the variable comparisons that have characterized the quarterly data. These data have shown no single or predominant pattern among quarterly periods. Evaluating and improving methods to meaningfully quantify the impact of landfill operations on neighborhood-scale ambient air quality must remain a central focus of the ongoing monitoring. In the interest of furthering an understanding of the factors underlying the pollutant concentrations that are measured, an alternative method is described in this report to examine how landfill-based emissions may affect neighborhood-scale ambient air quality.

It was clearly demonstrated during the baseline year, and during the continuous monitoring over the past two years, that wind directions at the two monitoring sites can differ significantly at low to moderate wind speeds. Thus, data analyses using *matched* hourly pollutant data based on poorly correlated wind directions often exclude data points from one or the other monitor, even though a monitor may be collecting valid measurements of landfill-based PM_{10} or BC emissions. The current evaluation examines the landfill impacts on each monitor independently, using wind direction sectors that isolate the landfill as a specific area source. The monitors at the Landfill site are used to assess how emissions differ between landfill operating days and non-operating days, and between daytime and nighttime hours on those days. Specific daytime hours are chosen to reflect the main operating hours of the landfill, and the remaining hours reflect non-operating periods, mostly at night. The resulting average concentrations are then viewed in the context of regional concentrations measured at each monitor; the regional concentrations are based on a single wind direction sector selected to represent the South Coast Air Basin (SoCAB) (multiple sources) to the south. This approach gives a relative view of the impact of these two pollutant sources, the landfill and the region, on community-level air quality.

2. DATA COMPLETENESS

Data from the most recent quarter, December 1, 2008, to February 26, 2009, reflect low data capture at the Landfill monitoring site because of an extended power outage caused by the Sayre fire. The incompleteness of the data hinders substantive quarterly data analysis. This quarter is the second consecutive one during which data completeness at the Landfill site has been insufficiently representative (<75%). The Landfill site data capture rate during the previous quarter (September 1 to November 30, 2008) was compromised by insufficient meteorological data (60%) because of frequent wind sensor failure. (The sensor has since been replaced.) The low data capture rates necessarily place a lower emphasis on the quarterly metrics. In this report, the typical quarterly data completeness and federal and state exceedance statistics are presented, and year-long data are used to address how PM from the landfill affects neighborhood-level air quality.

Table 2-1 gives completeness statistics for all measured variables for the December 1, 2008, through February 26, 2009, period. The extended power outage caused by the Sayre fire resulted in a data capture rate at the Landfill monitoring site of only about 55% for the quarterly period.

Table 2-1. Data completeness statistics for the recent monitoring quarter, December 1, 2008, through February 26, 2009. Low percent data capture at the Landfill site is explained by the loss of electrical power due to the Sayre fire; power was lost on November 15, 2008, and restored on January 8, 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/W D	PM_{10}	B C	WS/ WD
Sunshine Canyon Landfill Site	12/1/08-2/26/09	56%	56%	55%	99%	100%	100%	0%	0%	0%
Van Gogh Elementary School Site	12/1/08-2/26/09	100%	100%	100%	95%	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 comparison of the federal and state PM_{10} exceedances for the current quarter and the corresponding quarters of the previous year and the baseline year are given in **Table 3-1**. The exceedance of 185 μg/m^3 recorded at the Landfill site on January 9, 2009, is attributed to high

northerly winds that increased localized PM_{10} emissions (wind-blown dust). This exceedance may have been exacerbated by the close proximity of burned areas to the PM_{10} monitoring site. The concentration at the Community monitoring site on that day (70.8 μg/m^3) was similar to concentrations at other regional monitors on that day and did not directly reflect the exceedance recorded at the Landfill site. Daily maximum PM_{10} concentrations (preliminary data) at the SCAQMD's monitoring stations at Anaheim, Glendora, and Los Angeles (N. Main St.) were 75, 30, and 67 μg/m^3, respectively, on that day. California Air Resources Board (ARB) data from the monitoring site in nearby Santa Clarita are not yet available. The more stringent California 24-hr standard (50 μg/m^3) was exceeded at both the Community and the Landfill sites about 6% of the days during the current quarter.

Table 3-1. Number of exceedances of federal and state PM_{10} standards for the current quarter with those measured in the December 1–February 26 quarterly periods from the original baseline year (November 22, 2001–November 21, 2002) and the most recent year (November 22, 2007–November 21, 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	12/1/01-2/26/02	12/1/07-2/26/08	12/1/08-2/26/09	12/1/01-2/26/02	12/1/07-2/26/08	12/1/08-2/26/09
Federal	24-hr	150 μg/m^3	0	0	0	0	1 (167 μg/m^3; 2/14/08)	1 (185 μg/m^3; 1/9/09)
State	24-hr	50 μg/m^3	6/68 (9%)	2/70 (3%)	6/82 (7%)	8/55 (15%)	9/82 (11%)	3/48 (6%)

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.

Table 4-1 compares the quarterly BC concentrations for corresponding periods in the baseline year, the most recent year, and the current period. Average 24-hr BC concentrations at the Community site for this quarter were between the average concentrations recorded in the winter quarters of the baseline year (2001–2002) and last year (2007–2008). Average quarterly concentrations at the Landfill site were nearly identical to those recorded a year previously, and lower than those of the corresponding period in the baseline year. The maximum BC concentration at the Community site for the current period was double that recorded in the previous year's quarter, while the maximum at the Landfill site was slightly elevated compared to the previous year.

Table 4-1. Comparison of BC concentrations for the current quarter with those measured in the December 1–February 26 quarterly periods from the original baseline year (November 22, 2001–November 21, 2002) and the most recent year (November 22, 2007–November 21, 2008).

	BC Concentration ($\mu g/m^3$)					
	Van Gogh School			Sunshine Landfill		
	Dec 2001-Feb 2002	Dec 2007-Feb 2008	Dec 2008-Feb 2009	Dec 2001-Feb 2002	Dec 2007-Feb 2008	Dec 2008-Feb 2009
Average 24-Hr	0.75	0.46	0.55	0.85	0.54	0.56
Maximum 24-Hr	3.72	1.49	3.14	3.49	1.91	2.02

5. EVALUATING LANDFILL IMPACTS

An analytical method to characterize landfill impacts on neighborhood air quality was developed during the baseline year and has been used every quarter until now. Under that method, the Landfill- and Community-based pollution measurements were compared by first selecting hours when the wind directions at the two sites match. Then each hourly PM_{10} and BC data point is assigned to an activity type (landfill, freeway, or "other") determined by wind direction and to an activity level determined by time of day. A number of factors act to confound this analysis. It has been repeatedly demonstrated that the wind direction at the two monitoring sites can differ substantially, especially at low to moderate wind speeds; thus, requiring a match of hourly pollutant concentrations by wind direction can eliminate data pertinent to at least one of the sites. Secondly, the broad, subjectively determined wind direction sectors do not accurately represent the intended sources, because multiple sources in each broad sector can affect the data. Additionally, a specified wind direction sector incorporates different sources depending on the distance downwind from the target source. For example, for the monitor at the downwind edge of the landfill, it may suffice to define the wind sector from 303° to 360° as encompassing the landfill, but at Van Gogh Elementary School (1 mile to the south) this same wind sector includes the confluence of Interstate 5 and Route 14.

This report explores one alternative for evaluating how landfill operations may affect local ambient air quality. The suggested method offers a different, more direct approach for determining how the landfill affects the air quality on a neighborhood scale. Because of the distance separating the monitors from the landfill source, the sectors that define the landfill are specified differently for each receptor site, with a narrower wind sector (described below) used for the more distant Community site.

A question central to determining landfill impacts on ambient air quality in the community might be: when wind directions are from the landfill, how much of the concentrations measured in the community are due to landfill contributions, and how much are due to regional concentrations? Unfortunately, there exists no continuous monitor upwind of the landfill that, ideally, would help address this question directly. We may be able to indirectly address the question by first comparing concentration levels at the Landfill site when the landfill

is operational and when it is not, that is, on working days (Monday–Friday) and non-working days (Sundays and federal holidays), and between daytime hours (landfill operating, between 0600 and 1700 PST) and nighttime hours (remaining hours when the landfill is not operating) within each of the type-of-day categories. Long-term averages can be used to quantify differences in landfill-specific PM_{10} and BC concentrations for these categories. While this does not separate out the regional, upwind component, the use of long-term averages can estimate how daily landfill operations affect measured concentrations at the source. Noted differences can then be compared to the community-based data by choosing a wind direction sector for the community monitor that is defined to isolate the landfill.

While wind direction measurements at the community site remain more variable than measurements made at the higher elevation landfill site, the long-term averages may allow us to reasonably assess the differences in concentrations at the source and downwind of the source. It remains true, however, that the complex geography of the landfill and surrounding area produces significant variability in local meteorology and thus in pollutant transport in a way that is difficult to quantify. The new, alternative approach depends on long-term averages to quantify landfill impacts.

A parallel analysis for each receptor site uses a contrasting sector specifically selected to represent the SoCAB. This method allows a general assessment of the effect of working and non-working days on regional pollution concentrations, bearing in mind that both monitoring sites are likely to reflect any regional differences that are observed in a similar way. The objective of this dichotomous approach is to compare the impact of a large area source like the Sunshine Canyon Landfill to the impact of the large air basin to the south.

5.1 WIND DIRECTION SECTORS FOR SELECTING DATA

Data for this analysis were selected using wind sectors to represent the landfill source area. **Figure 5-1** shows an aerial image of the landfill with the wind sector for the landfill-based monitor, shown in black, and the community-based monitor's sector, shown in green. These sectors are used to select the data used in computation of the working and non-working days' (hours') pollution metrics presented in the following sections. Note that the landfill-based monitor's wind sector (greater than or equal to 303° and less than or equal to 360° from true north) is broader than that for the Community monitor (greater than or equal to 325° and less than or equal to 355° from true north). The analysis is based only on direction, not on matching times between records using identical wind sectors, as in the past. The underlying premise is that long-term averages calculated in this matter more accurately represent true average landfill-derived contributions than do those calculated from matched hourly records, since poor wind direction correlations at low wind speeds produced a very small data set. Note that some hourly records included in an individual monitor's averages do not appear in the other monitor's averages. For average concentrations calculated from the wind sector targeting the SoCAB, both monitors use the same sector (greater than or equal to 150° and less than or equal to 210° from true north, **Figure 5-2**).

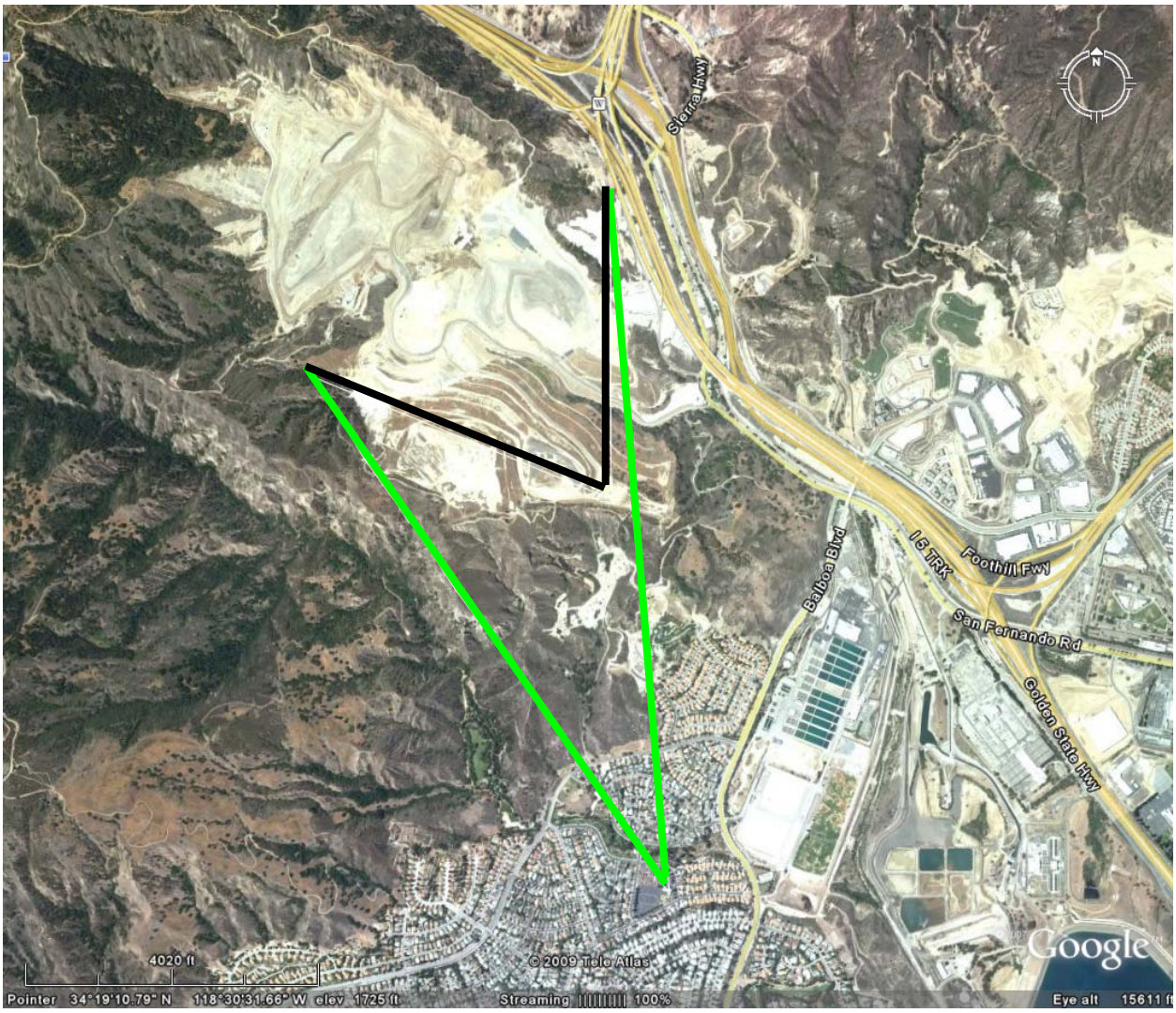


Figure 5-1. Aerial image of the Sunshine Canyon Landfill and the surrounding area, showing the wind direction sectors used for selecting data for analysis from the landfill-based monitor (in black) and the community-based monitor (in green).

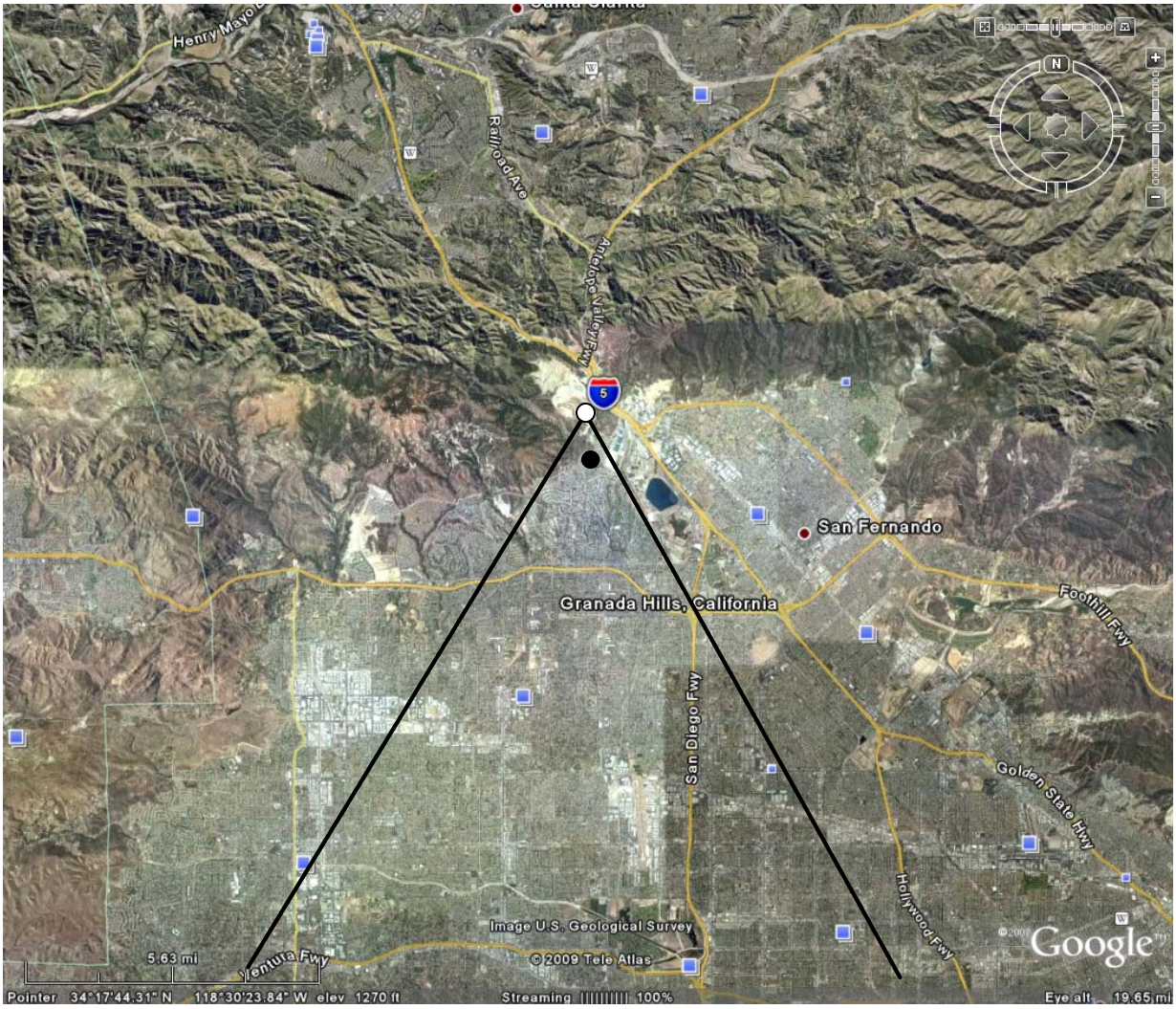


Figure 5-2. Aerial image of the Sunshine Canyon Landfill and the northern portion of the SoCAB, showing the wind direction sector used for selecting data for analysis to compare with the landfill wind direction sectors depicted in Figure 5-1. The white dot represents the landfill monitor, and the black dot represents the community-based monitor at Van Gogh School.

5.2 LANDFILL IMPACTS–WORKING AND NON-WORKING DAYS AND HOURS

After the air quality data has been initially filtered by the wind direction sectors outlined above, PM_{10} and BC concentrations at the two monitoring sites are compared by categorizing hourly pollutant and meteorological data into landfill working and non-working days, and working and non-working hours within those days. Working days at the landfill are arbitrarily defined as Monday through Friday, excluding federal holidays. Non-working days are considered Sundays and federal holidays. (The assumption is that the landfill is closed on these holidays. Operations occurring on these days would obviously confound the averages to an unknown degree.) Saturdays, because their "mixed use" at the landfill does not allow them to fit easily into either category, are arbitrarily excluded from this analysis. The hours within days in each of these categories are additionally binned into working hours (defined as beginning at

0600 PST and ending at 1700 PST, called daytime) and non-working hours (called nighttime). While the level of activity may vary within this timeframe, long-term averaging is intended to integrate the activity levels into a single number useful for comparisons. Filtering data by wind direction and categorizing data by working/non-working days and hours may address several questions related to landfill impacts on neighborhood-scale ambient air quality:

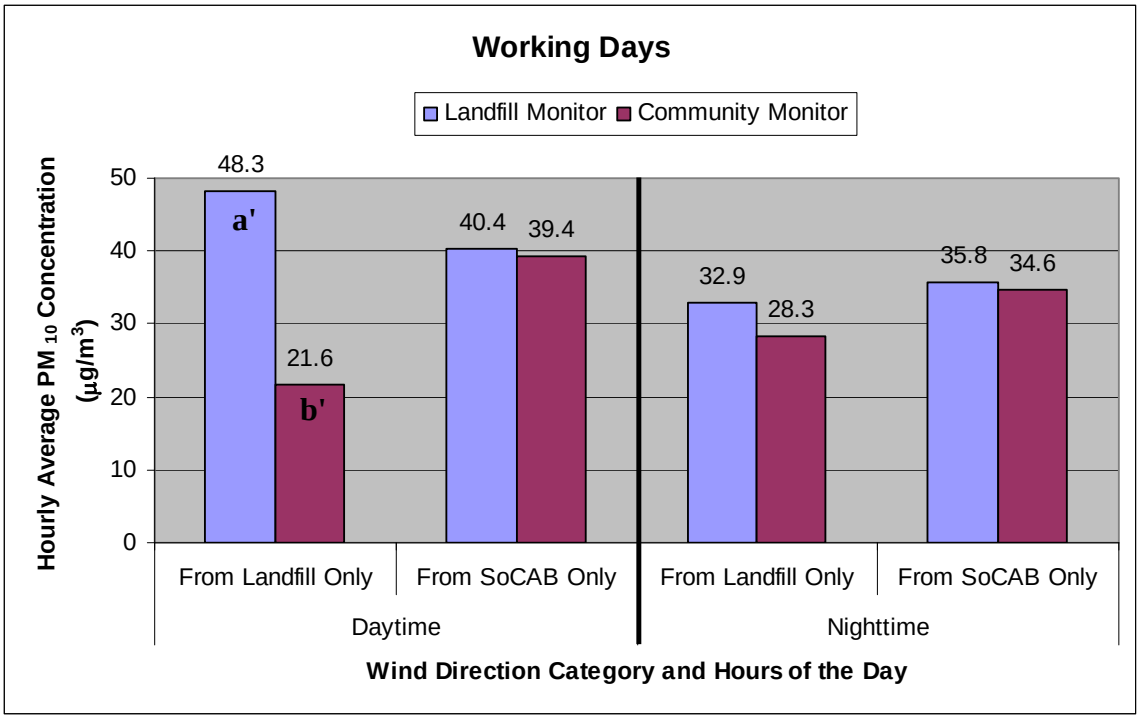
- Is additional PM_{10} or BC measured in the ambient air when the landfill is open compared to when it is closed, and are any increases in concentration observed at the landfill monitor for working days reflected in the community-based data?
- If differences in pollution levels are observed between working and non-working days, are they associated with working hours only, or do non-working hours contribute significantly to the observed ambient concentrations, suggesting that regional sources and/or seasonal variation are important factors?
- How do the long-term average PM_{10} and BC concentrations measured in the wind direction sectors isolating the landfill compare to the long-term average concentrations measured from a wind direction sector selected to represent the SoCAB?

5.2.1 PM_{10} Impacts

Figure 5-3 summarizes the long-term averages calculated from a complete year of data, spanning November 22, 2007, through November 21, 2008, during which data completeness was greater than 90% and a low percentage of suspect data points was within the captured data. Baseline year data is not included in this analysis because (1) the data completeness was low, (2) the wind direction data for that year were not specified as corrected to true north values, and (3) the initial audit of the wind direction sensor at the landfill site showed a total deviation from true north of 19°. While this may represent a magnetic alignment with a declination of 14° with an error of 5°, the actual alignment is unknown.

The data depicted in **Figure 5-3** prompt several comments:

- PM_{10} concentrations on non-working days (bottom panel) are generally lower than working days (top panel). This result is not unexpected.
- When wind direction is from the SoCAB, PM_{10} concentrations at the landfill-based and community-based monitors are similar, on average, during each of the evaluated time periods.
- When wind direction is from the landfill,
  - The landfill-based monitor reports higher average PM_{10} concentrations than the community-based monitor, with greater differences observed during the daytime hours.
  - The landfill-based monitor reports similar average PM_{10} concentrations for all hours on non-working days and for non-working hours (nighttime) on working days.
  - During daytime hours on working days, PM_{10} concentrations at the Landfill monitor (letter “a-prime” [a']) are higher than at other times. This follows because operations might be expected to increase PM_{10} emissions on average.



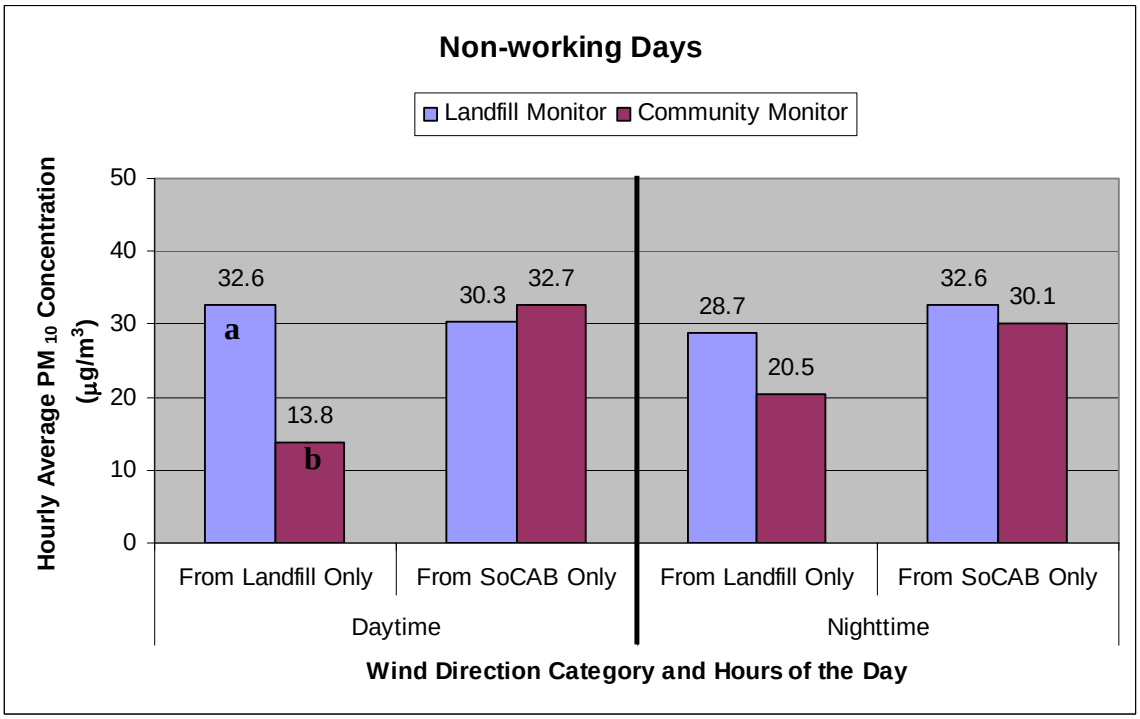


Figure 5-3. Hourly average PM_{10} concentrations by wind direction sector and hours of the day, measured at the Landfill monitor and Community (school) monitor, on working days (top panel) and non-working days (bottom panel). Averages are calculated from a complete year's hourly averages.

The long-term average PM_{10} concentrations determined when wind direction is from the SoCAB can help us understand the impact of regional pollutant levels and suggests a method by which the locally measured concentrations may be apportioned between regional concentrations, additional regional increases associated with working days, and landfill increases associated with working days. The method is described in relation to the data shown in **Figure 5-3:**

- With winds from the SoCAB during the daytime hours on normal days, average PM_{10} concentrations at the landfill and in the community are nearly equal, averaging 39.9 $\mu g/m^3$ (**Figure 5-3**, top panel). The monitors at the two sites also measure similar values during the daytime on *non-working* days, but concentrations are lower, averaging 31.5 $\mu g/m^3$ (**Figure 5-3**, bottom panel). Thus, based on long-term averages spanning a full year, the regional daytime PM_{10} levels are estimated to be about 27% higher on working days than on Sundays and Federal Holidays.
- If we make a similar comparison with the data collected from daytime hours when the wind direction is from the landfill, we see that the concentrations on non-working days are lower, compared to working days, at each site (a versus a' and b versus b' in **Figure 5-3**), but the monitors at the two locations measure substantially different concentrations. Some of this decrease associated with non-working days can be attributed to lower, regional activity levels and some can be attributed to the fact that the landfill is not operating during those times. One estimate of the regional decrease in PM_{10} is the 27% estimate calculated above. This makes it possible to calculate, by difference, an estimate of the proportion of the total PM_{10} contribution attributable to the landfill. Application of this analysis to the daytime data from **Figure 5-3** is shown in **Figure 5-4**.

Figure 5-4 shows estimates of the proportions of the average daytime concentrations measured on working days at the Landfill monitor (48.3 $\mu g/m^3$) and at the Community monitor (21.6 $\mu g/m^3$) that are attributable to regional concentrations (associated with non-working days), additional regional concentrations (associated with working days), and landfill contributions (associated with working days).

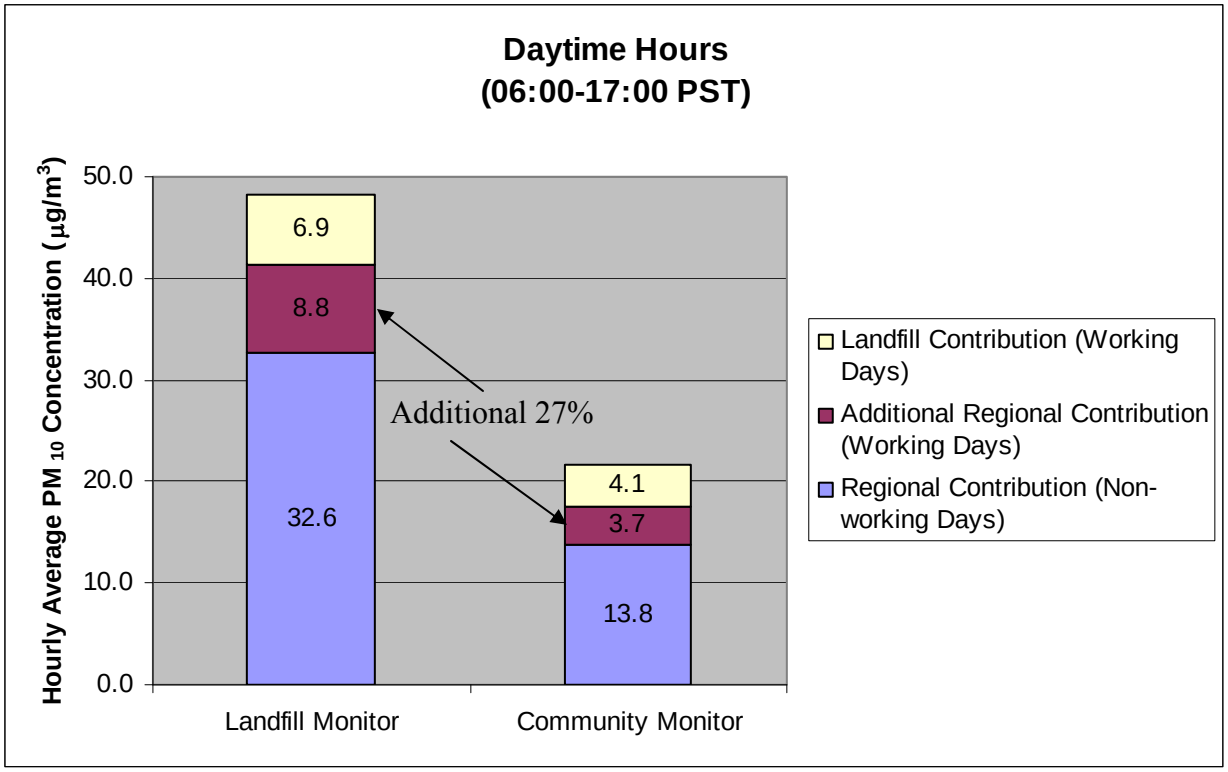


Figure 5-4. Average PM_{10} concentrations during daylight hours on non-working days are used to estimate regional concentrations. An additional 27% of the hourly average PM_{10} concentration measured during daytime hours on non-working days is attributed to additional regional activity levels on working days. The remaining portion is an estimate of the landfill contribution to the overall average concentration. The estimates are calculated from a full year's data collected from November 22, 2007, through November 21, 2008.

This analysis suggests that even though the landfill may be contributing additional PM_{10} above the regional concentrations, as measured at the landfill-based monitor, the contribution results in a lower concentration at the community-based monitor. The level of certainty associated with the analytical results needs to be evaluated. As the continuous PM_{10} and BC data continue to accumulate, additional season-based data sets can be used to assess the variability that exists in the annual data.

5.2.2 Black Carbon Impacts

Figure 5-5 presents results for BC data, in an analysis parallel to the PM_{10} analysis in Section 5.21. Estimated regional BC concentrations, based on wind directions selected to represent the SoCAB, are 88% higher during daytime hours on working days than during daytime hours on non-working days. The apportionment of average BC concentrations to regional, additional regional on working days, and landfill components associated with working days is shown in **Figure 5-6**.

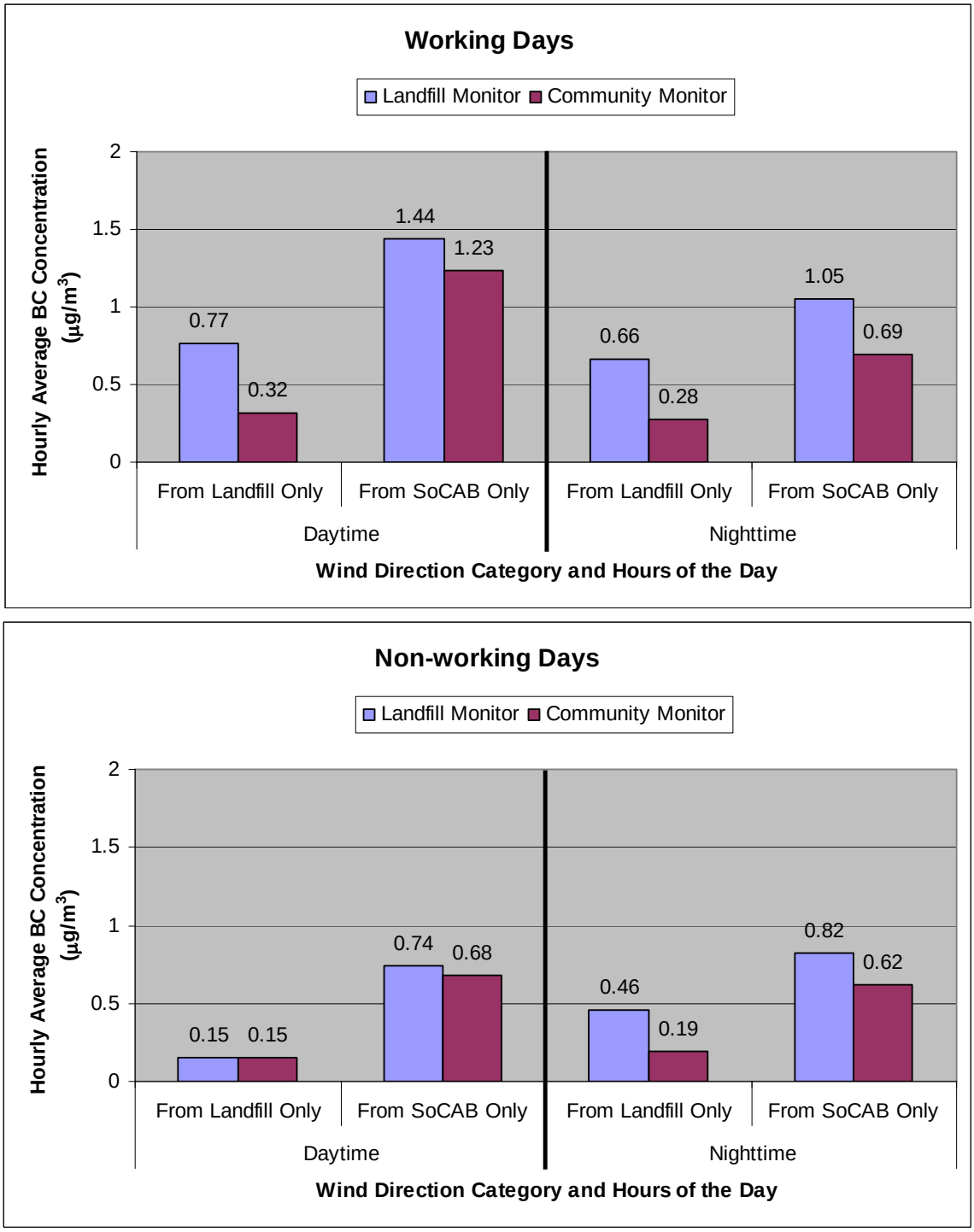


Figure 5-5. Hourly average BC concentrations by wind direction sector and hours of the day, measured at the Landfill monitor and community monitor, on working days (top panel) and non-working days (bottom panel). Averages are calculated from a complete year's hourly averages.

The BC data prompt the following comments:

- BC concentrations on non-working days (**Figure 5-5**, bottom panel) are lower than working days (top panel) under all day and hour classifications.
- BC contributions under wind directions from the SoCAB exceed those from the landfill wind direction sector under all day and hour classifications (**Figure 5-5**).
- The landfill-based monitor reports higher hourly average BC concentrations than the community-based monitor under most classifications; it never reports lower concentrations (**Figure 5-5**).
- The landfill contributes a substantial proportion of the hourly average BC concentration measured at the Landfill monitor when winds are from the landfill (**Figure 5-6**, yellow bar), but this contribution is not reflected by measurements in the community, where nearly all of the BC is attributable regional or additional regional contributions during the daytime hours of working days.
- As was true with the PM_{10} analysis, these data suggest that even though the landfill may be contributing additional BC above regional concentrations, as measured by the landfill-based monitor, the contribution results in a lower concentration at the community-based monitor.

As was the case with the PM_{10} analysis, future analysis of seasonally-based data sets can help to assess the variability that exists within the annual statistics.

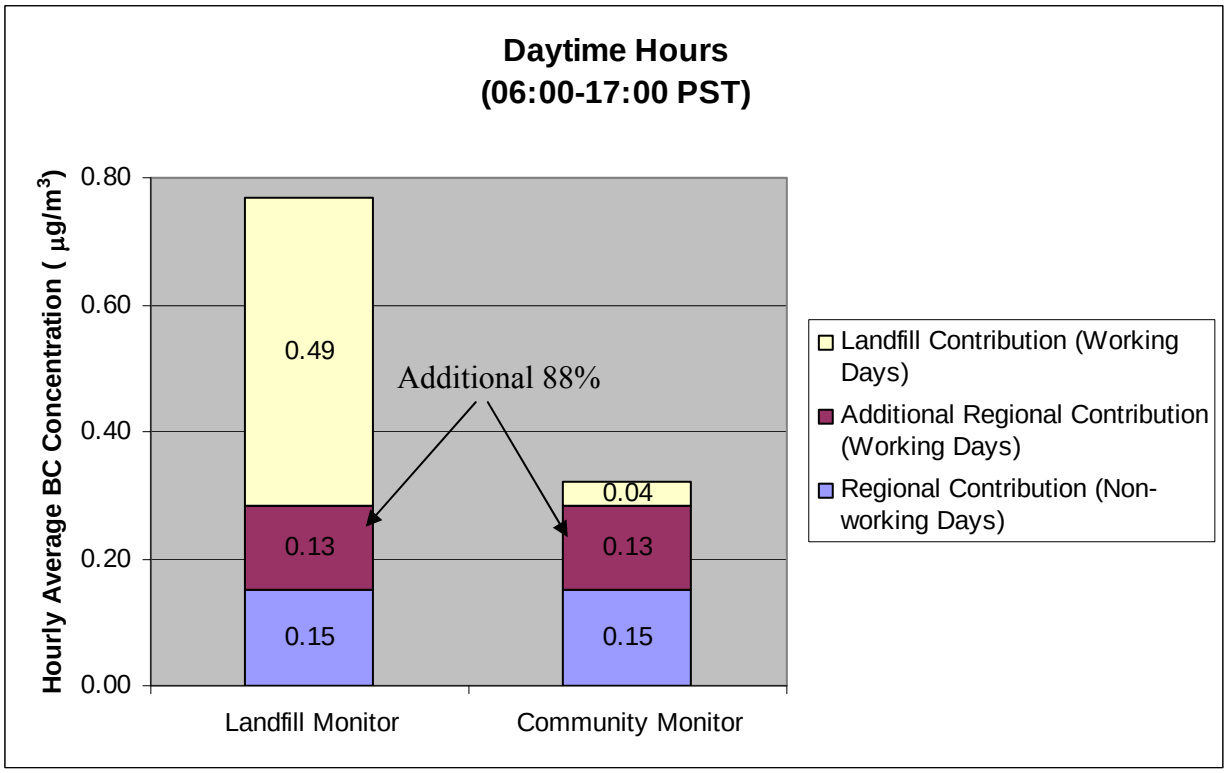


Figure 5-6. Average BC concentrations during daylight hours on non-working days are used to estimate regional concentrations. An additional 88% of the hourly average BC concentration measured during daytime hours on non-working days is attributed to additional regional activity levels on working days. The remaining portion is an estimate of the landfill contribution to the overall average concentration. The estimates are calculated from a full year of data collected from November 22, 2007 through November 21, 2008.

6. FIELD OPERATIONS

Tables 6-1 and 6-2 list the dates and major tasks associated with visits to the Landfill and Community sites, respectively, between September 1, 2008, and November 30, 2008. **Table 6-3** shows the PM_{10} and BC monitors' flow rates, as reported by the monitors and as measured with a NIST-traceable flow standard.

Table 6-1. Landfill site visits and field maintenance and operations from December 1, 2008, through February 26, 2009.

Date of Site Visit	Description of Work
Wednesday, January 14, 2009	First visit following restoration of power after Sayre fire. Collect PM_{10} and BC data. Verify system operations are OK.
Saturday, February 7, 2009	Flow and leak checks on PM_{10} and BC samplers. Collect PM_{10} and BC data. Clean BAM capstan, roller, nozzle and vane.
Thursday, February 19, 2009	Site visit to troubleshoot Aethalometer™. Disk fail. Replace and reboot.
Thursday, February 26, 2009	Flow and leak checks on PM_{10} and BC samplers. Collect PM_{10} and BC data. Clean BAM nozzle and vane.

Table 6-2. School site visits and field maintenance and operations from December 1, 2008, through February 26, 2009.

Date of Site Visit	Description of Work
Friday, December 19, 2008	Flow and leak checks on PM_{10} and BC samplers. Collect PM_{10} and BC data. Clean BAM nozzle and vane.
Wednesday, January 14, 2009	Replace BAM tape. Flow and leak checks on PM_{10} and BC samplers. Collect PM_{10} and BC data.
Thursday, February 12, 2009	Flow and leak checks on PM_{10} and BC samplers. Collect PM_{10} and BC data.
Thursday, February 26, 2009	Flow and leak checks on PM_{10} and BC samplers. Clean BAM capstan, roller, nozzle, and vane. Collect PM_{10} and BC data.

Table 6-3. Flow rates for the BAM PM_{10} monitors and Aethalometer™ BC monitors at the Landfill and Community sites from December 1, 2008, through February 26, 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	1/14/09	16.7	Not measured	16.7	Not measured	5.4	Not measured
	2/7/09	16.7	16.6	16.7	16.6	5.9	5.9
	2/26/09	16.7	16.7	16.7	16.7	5.5	5.5
Van Gogh Elementary School	12/19/08	16.7	16.6	16.7	16.6	5.4	5.4
	1/14/09	16.6	16.7	16.6	16.7	5.3	5.4
	2/12/09	16.7	16.7	16.7	16.7	5.4	5.4
	2/26/09	16.6	16.6	16.6	16.6	5.4	5.4