



Sonoma Technology, Inc.  
*Air Quality Research and Innovative Solutions*

**ELEVENTH QUARTERLY REPORT OF AMBIENT AIR  
QUALITY MONITORING AT SUNSHINE CANYON  
LANDFILL AND VAN GOGH ELEMENTARY SCHOOL  
(June 1, 2010–August 31, 2010)**

**Quarterly Report  
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## EXECUTIVE SUMMARY

### 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<sub>10</sub> (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<sub>10</sub> concentrations are compared with federal and state PM<sub>10</sub> standards. When PM<sub>10</sub> exceedances occur, additional comparisons are made with the historical, regional, and annual ambient PM<sub>10</sub> concentrations. At least annually, the PM<sub>10</sub> 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 monitoring period of June 1, 2010, through August 31, 2010, was greater than 97% for PM<sub>10</sub>, BC, and wind parameters at both sites. There were no exceedances of the 150 µg/m<sup>3</sup> 24-hr federal PM<sub>10</sub> standard. The more stringent 24-hr California state PM<sub>10</sub> standard (50 µg/m<sup>3</sup>) was exceeded during this period on 33% of the days at the Van Gogh School site and on 11% of the days at the landfill site. At the landfill site, exceedances of the state standard in the June-August quarterly period declined from 30% in 2008 to 18% in 2009 and 11% in 2010. Average 24-hr BC concentrations at the landfill site exhibited a similar decline for the summer quarterly period, with average concentrations decreasing from 1.41 µg/m<sup>3</sup> in 2008 to 1.26 µg/m<sup>3</sup> in 2009 and 1.06 µg/m<sup>3</sup> in 2010. Maximum 24-hr BC concentrations during the summer quarterly period also declined at the landfill site over the last three years. BC concentrations at the Van Gogh School did not show such a distinct pattern, with 24-hr average and maximum BC concentrations for the summer quarters showing less difference between years.

### ES.3 MONITORING INFRASTRUCTURE

The recently completed infrastructure upgrades at the Sunshine Canyon Landfill and the Van Gogh Elementary School ambient air quality monitoring sites continue to function well, requiring fewer unscheduled visits for repairs than in previous years.



## 1. INTRODUCTION

This report provides a summary of data completeness, ambient PM<sub>10</sub> concentrations, average and maximum black carbon (BC) concentrations, instrument flow rate verification (quality control) data, and field operations for the recent quarterly period of June 1, 2010, through August 31, 2010. Data from this quarterly period represent the third year of summer quarter data collected from continuous monitoring at the Sunshine Canyon Landfill and Van Gogh Elementary School monitoring sites.

## 2. DATA COMPLETENESS

**Table 2-1** gives completeness statistics for all measured variables for the period June 1, 2010, through August 31, 2010. Data capture rates for PM<sub>10</sub> were near 100% at both sites. Data capture rates for BC and meteorological parameters exceeded 97%. A low percentage of data was missed (because of brief power outages), and a few hours of meteorological data from the landfill site were invalidated when the data acquisition system incorrectly recorded zero values for wind speed and wind direction.

Three-fourths of the BC data from Van Gogh School were validated as suspect. This occurred because the flow rates as measured by the reference flow meter were outside of tolerance levels. The cause of the problem was a leak in the push-to-connect fitting at the back of the Aethalometer™. During the time that this leak existed, about one-sixth of the sample air flow was derived from inside the monitoring trailer. The trailer ventilation does not filter particles in the size range commonly associated with BC. Any filtering effect would produce a negative artifact, that is, the BC concentrations would be lower than true ambient levels.

**Figure 2-1** shows a time series of 5-minute BC concentrations measured at the two monitoring sites in the midpoint of the period during which the leak existed. This demonstrates that the BC data collected at the Van Gogh School exhibited a pattern generally consistent with that measured at the landfill. As is common with suspect data, these data will be available for use in future data analyses.

Table 2-1. Data completeness statistics for the recent monitoring quarter, June 1, 2010, through August 31, 2010 (“WS/WD” is wind speed/wind direction).

Monitoring Location	Dates	Percent Data Capture <sup>a</sup> (%)			Percent Data Valid or Suspect (%) <sup>b</sup>			Percent Data Suspect (%) <sup>c</sup>		
		PM <sub>10</sub>	BC	WS/WD	PM <sub>10</sub>	BC	WS/WD	PM <sub>10</sub>	BC	WS/WD
Sunshine Canyon Landfill	6/1/10-8/31/10	99.5%	98.5%	97.6%	99.7%	100.0%	100.0%	0.0%	0.0%	0.0%
Van Gogh Elem. School	6/1/10-8/31/10	99.9%	98.5%	99.9%	90.8%	100.0%	100.0%	0.0%	75.0%	0.0%

<sup>a</sup> Percent Data Capture is the percentage of collected data values 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).

<sup>b</sup> Percent Data Valid or Suspect is the percentage of data values that are either valid or suspect, divided by the number of captured data values.

<sup>c</sup> Percent Data Suspect is the percentage of data values labeled as suspect divided by the number of captured data values.

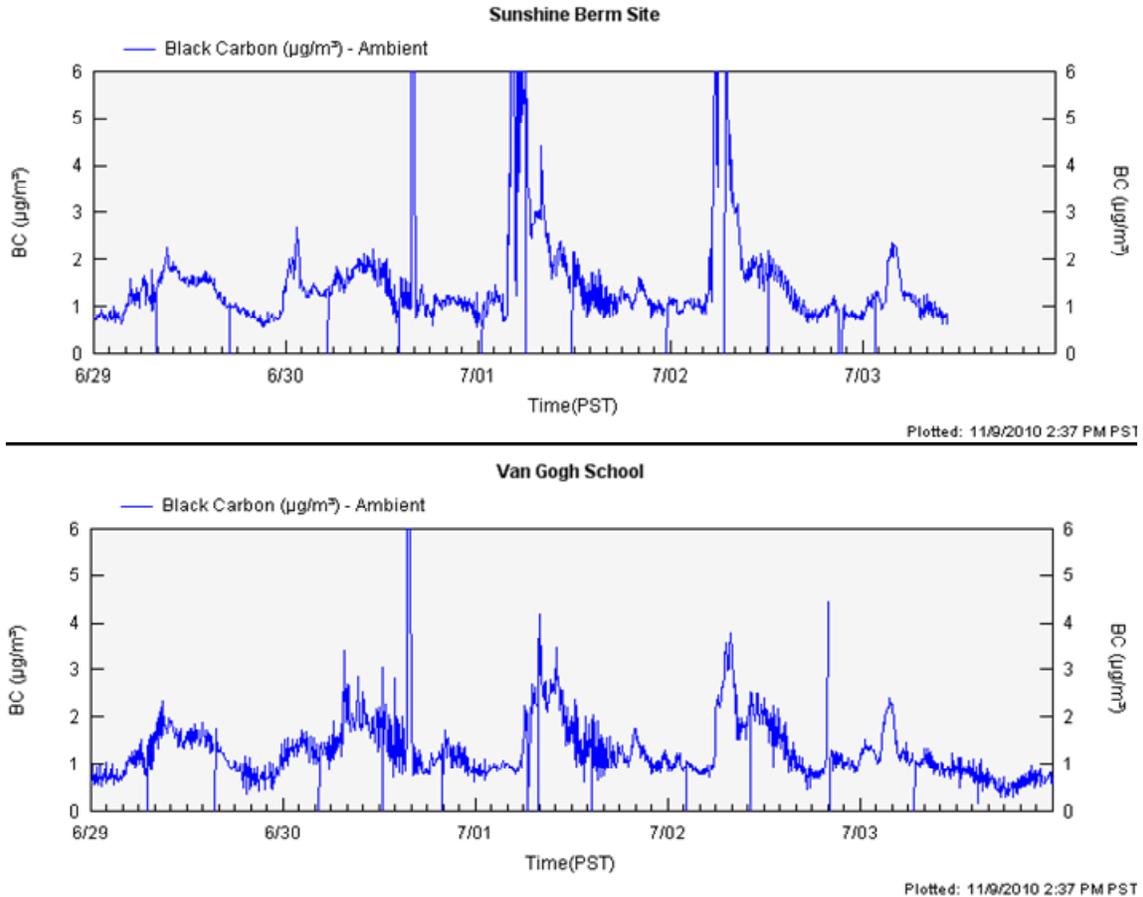


Figure 2-1. A comparison of 5-minute BC data from the two monitoring sites demonstrates that the small leak that existed in the Aethalometer™ at the Van Gogh School had minimal effect on the capacity to track ambient concentrations of BC. The gap in data at the landfill (Sunshine Berm Site) on 7/3/10 was due to a power outage.

### 3. PM<sub>10</sub> EXCEEDANCES

The federal and state PM<sub>10</sub> exceedances for the current quarter, the corresponding quarters of the previous two years, and the baseline year are summarized in **Table 3-1**. During all years in which continuous PM<sub>10</sub> has been measured, no exceedances of the 24-hr federal PM<sub>10</sub> standard have occurred during the summer quarter at either the Sunshine Canyon Landfill or Van Gogh School. At the landfill site, the proportion of days exceeding the state standard for the June-August quarterly period declined from 30% in 2008 to 18% in 2009, declining further to 11% in 2010. All three recent summer quarters at the landfill monitoring site show a markedly lower proportion of days exceeding the state standard compared with the baseline year of 2002, during which the standard was exceeded on 66% of the days that had acceptable data quality. The pattern at Van Gogh School was similar, with the exception of the summer period of 2010, which had a higher proportion of days exceeding the standard than in any of the previous years.

This may be attributable to the prevalence of onshore flows carrying PM<sub>10</sub> from the South Coast Air Basin northward.

Table 3-1. Number of exceedances of federal and state 24-hr PM<sub>10</sub> standards during the current quarter and the June-through-August quarterly periods of the baseline year (November 22, 2001, to November 21, 2002), 2008, and 2009.

Regulatory Level	Avg. Period	PM <sub>10</sub> Standard	Van Gogh School				Sunshine Canyon Landfill			
			6/1/02-8/31/02	6/1/08-8/31/08	6/1/09-8/31/09	6/1/10-8/31/10	6/1/02-8/31/02	6/1/08-8/31/08	6/1/09-8/31/09	6/1/10-8/31/10
Federal	24-hr	150 µg/m <sup>3</sup>	0	0	0	0	0	0	0	0
State	24-hr	50 µg/m <sup>3</sup>	5/16 (31%)	25/89 (28%)	14/90 (16%)	30/92 (33%)	44/67 (66%)	28/92 (30%)	16/87 (18%)	10/91 (11%)

#### 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** provides the 24-hr average and maximum 24-hr BC concentrations for June 1, 2010, through August 31, 2010, and compares these concentrations with data from corresponding quarters of the two most recent years and the baseline year (2002). In a pattern that parallels the average 24-hr PM<sub>10</sub> concentrations during the summer months, average BC concentrations at the landfill site declined from 1.41 µg/m<sup>3</sup> in 2008 to 1.26 µg/m<sup>3</sup> in 2009 to 1.06 µg/m<sup>3</sup> in 2010. Maximum 24-hr BC concentrations at the landfill site during the summer quarters also declined over these three consecutive years. BC concentrations at the Van Gogh School did not show such a distinct pattern, with 24-hr average and maximum BC concentrations showing less difference between years for the summer quarter.

Table 4-1. Comparison of 24-hr BC concentrations for the current quarter with those measured in the June 1-through-August 31 quarterly periods from the original baseline year (November 22, 2001, to November 21, 2002), 2008, and 2009.

	BC Concentrations (µg/m <sup>3</sup> )							
	Van Gogh School				Sunshine Canyon Landfill			
	6/1/02-8/31/02	6/1/08-8/31/08	6/1/09-8/31/09	6/1/10-8/31/10	6/1/02-8/31/02	6/1/08-8/31/08	6/1/09-8/31/09	6/1/10-8/31/10
Average 24-Hr	1.40	0.98	1.03	1.08	1.09	1.41	1.26	1.06
Maximum 24-Hr	2.33	1.71	2.23	1.75	2.69	3.01	2.45	1.88

## 5. LANDFILL GAS SAMPLING

No landfill gas (LFG) sampling occurred during this quarterly period. The ambient air quality monitoring work conducted over the previous years at these sites has demonstrated that landfill impacts on the neighboring communities have seasonal, as well as diurnal, components. With the limited number of LFG samples prescribed by the Conditions of Approval, we have chosen to focus the LFG sampling efforts during the fall periods of the year when wind conditions generally change from onshore (southerly) to offshore (northerly) flow, and when early morning meteorological conditions favor downslope air flow patterns that may carry LFGs from the landfill to the community.

## 6. MONITORING SITE INFRASTRUCTURE UPGRADE UPDATE

The recently completed infrastructure upgrades at the Sunshine Canyon Landfill and the Van Gogh Elementary School ambient air quality monitoring sites have resulted in a much improved operating environment for the monitoring instruments. The new data acquisition systems have improved the reliability of the monitoring stations by greatly reducing the number of system conflicts and restarts that were common to the previous, multiple DAS approach.

## 7. FIELD OPERATIONS

**Tables 7-1 and 7-2** list dates and major tasks associated with visits to the Sunshine Canyon Landfill and Van Gogh School sites, respectively, between June 1, 2010, and August 31, 2010. **Table 7-3** shows the PM<sub>10</sub> and BC monitors' flow rates, as reported by the monitors and measured with a NIST-traceable flow standard. During the regularly scheduled maintenance on August 25, the flow rate of the BAM at the landfill site was outside the acceptable limit by 0.1 lpm. While a flow calibration could have been performed, it was decided to wait until the next regularly scheduled flow check before determining that re-calibration was required.

Table 7-1. Sunshine Canyon Landfill monitoring site visits and field maintenance and operations from June 1, 2010, through August 31, 2010.

Date of Site Visit	Description of Work
Wednesday, June 2, 2010	Unscheduled visit. Aethalometer™ flatlined on June 1. Power cycled on June 2 and restarted successfully.
Friday, June 18, 2010	Regular preventive maintenance. Flow checks on PM <sub>10</sub> and BC samplers. Collect PM <sub>10</sub> and BC data.
Monday, July 5, 2010	Unscheduled visit. Database write error. Power cycled station to initiate auto reboot of all systems.
Thursday, July 15, 2010	Regular preventive maintenance. Flow checks on PM <sub>10</sub> and BC samplers. Collect PM <sub>10</sub> and BC data. Clean BAM capstan, roller, nozzle, and vane. Install new BAM filter tape. Install new Aethalometer™ filter tape.
Monday, August 9, 2010	Regular preventive maintenance. Flow checks on PM <sub>10</sub> and BC samplers. Collect PM <sub>10</sub> and BC data. Clean BAM capstan, roller, nozzle, and vane.
Wednesday, August 25, 2010	Regular preventive maintenance. Flow checks on PM <sub>10</sub> and BC samplers. Collect PM <sub>10</sub> and BC data. Clean BAM capstan, roller, nozzle, and vane.

Table 7-2. Van Gogh School monitoring site visits and field maintenance and operations from June 1, 2010, through August 31, 2010.

Date of Site Visit	Description of Work
Wednesday, June 2, 2010	Unscheduled visit. Aethalometer™ flatlined on June 1. Power cycled on June 2 and restarted successfully.
Friday, June 11, 2010	Unscheduled visit. BAM tape break. Installed new filter tape.
Friday, June 18, 2010	Regular preventive maintenance. Flow checks on PM <sub>10</sub> and BC samplers. Collect PM <sub>10</sub> and BC data. Clean BAM capstan, roller, nozzle, and vane.
Thursday, July 15, 2010	Regular preventive maintenance. Flow checks on PM <sub>10</sub> and BC samplers. Collect PM <sub>10</sub> and BC data. Clean BAM capstan, roller, nozzle, and vane. Failed leak check. Disassembled nozzle, replaced inlet receiver O-rings, nozzle adapter O-ring, and lower inlet receiver O-ring. Leak check passed.
Monday, August 9, 2010	Regular preventive maintenance. Flow checks on PM <sub>10</sub> and BC samplers. Collect PM <sub>10</sub> and BC data. Replace BAM filter tape.
Wednesday, August 25, 2010	Regular preventive maintenance. Replaced Aethalometer™ tape. Flow checks on PM <sub>10</sub> and BC samplers. Collect PM <sub>10</sub> and BC data. Clean BAM capstan, roller, nozzle, and vane.

Table 7-3. Flow rates for the BAM PM<sub>10</sub> monitors and Aethalometer™ BC monitors at the Sunshine Canyon Landfill and Van Gogh School sites from June 1, 2010, through August 31, 2010. BAM flow rates are volumetric (local temperature and pressure) and Aethalometer™ flow rates are at Standard Temperature and Pressure. 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	6/18/10	16.7	16.5	16.7	16.5	3.5	3.5
	7/15/10	16.7	16.2	16.7	16.2	3.6	3.8
	8/9/10	16.7	16.6	16.7	16.6	3.4	3.6
	8/25/10	16.6	15.9	16.6	15.9	3.4	3.6
Van Gogh Elementary School	6/18/10	16.7	16.4	16.7	16.4	3.8	3.0
	7/15/10	16.7	16.7	16.7	16.7	3.6	2.9
	8/9/10	16.7	16.6	16.7	16.6	3.6	3.0
	8/25/10	16.7	16.5	16.7	16.5	3.6	3.4