



Sonoma Technology, Inc.
Air Quality Research and Innovative Solutions

Nineteenth Quarterly Report of Ambient Air Quality Monitoring at Sunshine Canyon Landfill and Van Gogh Elementary School

(June 1, 2012 – August 31, 2012)

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 (the Landfill) and at Van Gogh Elementary School in the nearby community of Granada Hills in fall 2007. PM₁₀ (particulate matter less than 10 microns in aerodynamic diameter) is measured hourly. Wind speed and wind direction are measured as 1-minute averages, and black carbon (BC, a surrogate for diesel particulate matter) is averaged over 5-minute intervals. The collected data undergo quarterly validation and are evaluated for completeness.

Following data validation, all data are reported as hourly averages. PM₁₀ concentrations are then compared with federal and state PM₁₀ standards. When PM₁₀ exceedances occur, additional comparisons are made with the historical, regional, and annual ambient PM₁₀ concentrations. At least annually, the PM₁₀ and BC data are analyzed 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. This Nineteenth Quarterly Report summarizes the summer quarter monitoring results from the fifth year of continuous monitoring.

ES-2. Statistics

The percent data capture for PM₁₀ at the Landfill site and at Van Gogh School approached 100%. At Van Gogh School, only 0.2% of the captured data was invalidated due to routine preventative maintenance procedures, and no data were suspect. However, at the Landfill monitoring site 12.5% of the captured PM₁₀ data were invalidated, and 18.5% were deemed suspect. BC data capture was 100% at both monitoring sites, with all data valid. The wind data capture percentage was greater than 98% at both monitoring sites. All of the captured wind data were valid at both locations. There were no exceedances of the federal 24-hr PM₁₀ standard of 150 µg/m³ during this quarter at either of the monitoring sites. The percentage of days exceeding the state standard of 50 µg/m³ for the June-August quarter was 10% for the Van Gogh School site and 16% for the Sunshine Canyon Landfill site. At the Landfill monitoring site, the average and maximum 24-hr BC concentrations during summer measurement periods has exhibited a consistent downward trend from 2008 through 2012. There is no distinct trend at Van Gogh School.

ES-3. Landfill Gas Sampling

At the request of the Los Angeles City Planning Department, Sonoma Technology, Inc. is no longer conducting Landfill gas sampling as part of the routine monitoring. One-in-six day sampling for volatile organic compounds (VOCs) is being conducted as part of a separate project, required by modifications to the April 22, 2010, Stipulated Order for Abatement.

1. Introduction

This report provides a summary of data completeness, ambient PM₁₀ (particulate matter less than 10 microns in aerodynamic diameter) concentrations, average and maximum black carbon (BC) concentrations, instrument flow rate verification (quality control) data, and field operations for the quarterly period of June 1, 2012, through August 31, 2012. Data from this quarterly period represent the fifth consecutive year of summer season 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, 2012, through August 31, 2012. The percent data capture for PM₁₀ at the Landfill site and at Van Gogh School approached 100%. At Van Gogh School, only 0.2% of the captured data were invalidated due to routine preventative maintenance procedures, and no data were suspect. However, at the Landfill monitoring site, 12.5% of the captured PM₁₀ data were invalidated, and 18.5% were deemed suspect. Suspect data are included in subsequent analyses (e.g., regional comparisons), while invalid data are not. Valid flow rates are within $\pm 5\%$ of the nominal flow rate of 16.7 lpm. Suspect flow rates differ from the nominal rate by greater than 5% but less than 10%, and flow rates that differ from the nominal rate by 10% or greater cause data to be invalidated. The coupler between the flow controller motor and the flow controller valve had become worn with age, leading to erratic sample flow rates. Multiple attempts at repair were made, and eventually the entire flow controller assembly had to be replaced. BC data capture was 100% at both monitoring sites, with all data valid. The wind data capture percentage was greater than 98% at both monitoring sites. Intermittent, but brief, interruptions with digital data capture caused a small fraction of the 1-minute wind data to be missed. All of the captured wind data were valid at both locations.

Table 2-1. Data completeness statistics for the recent monitoring quarter, June 1, 2012, through August 31, 2012.

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	6/1/12–8/31/12	99.8%	100.0%	98.3%	87.5%	100.0%	100%	18.5%	0.0%	0.0%
Van Gogh Elem. School	6/1/12–8/31/12	99.9%	100.0%	98.8%	99.8%	100.0%	100%	0.0%	0.0%	0.0%

^a Percent Data Capture is the number 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).

^b Percent Data Valid or Suspect is the number of data values that are either valid or suspect, divided by the number of captured data values.

^c Percent Data Suspect is the number of data values labeled as suspect divided by the number of captured data values.

3. PM₁₀ Exceedances

The federal and state PM₁₀ exceedances for the current quarter, the corresponding quarters of the previous four years (2008, 2009, 2010, and 2011), and the baseline year (November 22, 2001, to November 21, 2002), are summarized in **Table 3-1**. There were no exceedances of the federal 24-hr PM₁₀ standard of 150 µg/m³ during this quarter at either of the monitoring sites. The percentage of days exceeding the state standard of 50 µg/m³ for the June–August quarter was 10% for the Van Gogh School site and 16% for the Sunshine Canyon Landfill site.

While there were no 24-hr exceedances of the federal standard, there have been a number of short-duration spikes in PM₁₀ levels at the Landfill monitor. Daily observation of the time series of PM₁₀ concentrations began exhibiting these unusual spikes in mid-August. Follow-up inquiries with BFI revealed that a trial re-vegetation project was underway on the southern berm of the old city portion of the Landfill, involving the placement of large quantities of soil from the Landfill's front terminal basin. **Figure 3-1** is a photo showing the amount and proximity of these soil amendments relative to the monitoring trailer. Short-term and highly localized PM₁₀ concentrations are increased any time there is activity involving the movement of this material. The positive, but more long-term, aspect of this is that successfully re-vegetating this area would decrease the potential for fugitive emissions of surface material under high wind conditions. We have noted these surface emissions several times in previous reports.

Table 3-1. Number of exceedances of federal and state 24-hr PM₁₀ standards during the current quarter and the June-August quarterly periods of the baseline year and of 2008, 2009, 2010, and 2011. In the “Federal” column, the values are *number of exceedances* and the *date* on which those exceedances occurred (no exceedances this quarter). In the “State” column, the values are *number of exceedances/total days on which valid 24-hr averages were measured* and the *percentage of exceedances* out of the total number of days on which valid 24-hr average PM₁₀ concentrations were measured.

Site	Quarterly Period	PM ₁₀ Standard	
		Federal 24-hr 150 µg/m ³	State 24-hr 50 µg/m ³
Van Gogh School	6/1/02–8/31/02	0	5/16 (31%)
	6/1/08–8/31/08	0	25/89 (28%)
	6/1/09–8/31/09	0	14/90 (16%)
	6/1/10–8/31/10	0	27/83 (33%)
	6/1/11–8/31/11	0	11/92 (12%)
	6/1/12–8/31/12	0	9/92 (10%)
Sunshine Canyon Landfill	6/1/02–8/31/02	0	44/67 (66%)
	6/1/08–8/31/08	0	28/92 (30%)
	6/1/09–8/31/09	0	16/87 (18%)
	6/1/10–8/31/10	0	10/91 (11%)
	6/1/11–8/31/11	0	23/92 (25%)
	6/1/12–8/31/12	0	10/64 (16%)



Figure 3-1. A re-vegetation project on the south berm of the Landfill has involved the movement and deposition of large quantities of soil, leading to short-term spikes in PM₁₀ concentrations recorded by the Landfill monitor.

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. Findings from the Multiple Air Toxics Exposure Study III, conducted by the South Coast Air Quality Management District (SCAQMD), found DPM to be the most important toxic pollutant contributing to risk in the Los Angeles basin.¹

Table 4-1 provides the 24-hr average and maximum 24-hr BC concentrations collected from June 1, 2012, through August 31, 2012, and compares these concentrations with data from

¹ South Coast Air Quality Management District (2008) MATES-III: Multiple air toxics exposure study in the South Coast Air Basin. Final report prepared for the South Coast Air Quality Management District, Diamond Bar, CA, September. Available on the Internet at <http://www.aqmd.gov/prdas/matesIII/Final/Document/aaa-covermates3.pdf>.

corresponding quarters of the four previous years as well as the baseline year. At the Landfill monitoring site, the average and maximum 24-hr BC concentrations during summer measurement periods exhibit a consistent downward trend from 2008 through 2012. This trend is not distinct at Van Gogh School. The heavy equipment used to move the soil in close proximity to the monitoring trailer at the Landfill site (see Figure 3-1) is believed to be contributing to short-term spikes in BC concentrations at that monitor, but it is hard to be definitive about this without precise time/location activity data.

Table 4-1. Comparison of 24-hr BC concentrations for the current quarter with those measured in the June-August quarterly periods of the baseline year and of 2008, 2009, 2010, and 2011.

Site	Quarterly Period	BC Concentrations ($\mu\text{g}/\text{m}^3$)	
		Average 24-hr	Maximum 24-hr
Van Gogh School	6/1/02–8/31/02	1.40	2.33
	6/1/08–8/31/08	0.98	1.71
	6/1/09–8/31/09	1.03	2.23
	6/1/10–8/31/10	1.07	1.75
	6/1/11–8/31/11	0.86	1.43
	6/1/12–8/31/12	0.81	1.63
Sunshine Canyon Landfill	6/1/02–8/31/02	1.09	2.69
	6/1/08–8/31/08	1.41	3.01
	6/1/09–8/31/09	1.26	2.45
	6/1/10–8/31/10	1.06	1.88
	6/1/11–8/31/11	0.99	1.78
	6/1/12–8/31/12	0.93	1.79

5. Field Operations

Tables 5-1 and 5-2 list dates and major tasks associated with visits to the Sunshine Canyon Landfill and Van Gogh School sites, respectively, between June 1, 2012, and August 31, 2012.

Table 5-3 shows the PM_{10} and BC monitors' flow rates as reported by the monitors and measured with a NIST-traceable flow standard. During the month of June 2012, the NIST-traceable flow standard (BGI Tetra Cal) continued to exhibit the problems that were mentioned in the previous (18th) Quarterly Report. Electrical contacts within the body of the unit would be alternately functional and non-functional. When they were functional, flow checks could be performed. When the unit was non-functional, flow checks were missed. The unit was returned to BGI multiple times for repair, and it finally became evident that the meter needed to be replaced. BFI purchased a new BGI Delta-Cal for project use, which was received on June 25, 2012.

Tables 5-4 and 5-5 give the results of the June 21 meteorological audits at the Landfill and Van Gogh School monitoring sites, respectively.

Table 5-1. Sunshine Canyon Landfill monitoring site visits and field maintenance and operations from June 1, 2012, through September 5, 2012.

Date of Site Visit	Description of Work
Friday, June 8, 2012	Flow checks on PM ₁₀ and BC samplers. Collect PM ₁₀ and BC data.
Thursday, June 21, 2012	Meteorological audits conducted.
Friday, June 22, 2012	Unscheduled visit to troubleshoot BAM flow problem. Loose set screw on shaft between flow control motor and valve tightened.
Monday July 9, 2012	Leak and flow check on BAM. Collected PM ₁₀ and BC data. Aethalometer flow check. Clean BAM vane and nozzle. Change BAM tape and conduct self-test. Continue troubleshooting erratic BAM flow rates, flow control coupler issue.
Wednesday, August 22, 2012	Removed BAM flow controller assembly to attempt repair on bench.
Thursday, August 23, 2012	Replaced repaired BAM flow controller assembly. Conducted BAM flow and leak check, cleaned roller and vane. Performed BAM self-test. Collected PM ₁₀ and BC data. Daily review of PM ₁₀ data following the flow controller repair indicated that the flow controller repair was unsuccessful. Ordered new flow controller from Met One on 8/29/12.
Wednesday, September 5, 2012	Installed new flow controller assembly, conducted flow and leak checks, and performed BAM self-test.

Table 5-2. Van Gogh School monitoring site visits and field maintenance and operations from June 1, 2012, through August 31, 2012.

Date of Site Visit	Description of Work
Friday, June 8, 2012	Collect PM ₁₀ and BC data. Replaced Aethalometer tape.
Thursday, June 21, 2012	Meteorological audits conducted.
Monday July 9, 2012	Leak and flow check on BAM. Collected PM ₁₀ and BC data. Aethalometer flow check. Clean BAM vane and nozzle.
Wednesday, August 22, 2012	Leak and flow check on BAM. Collected PM ₁₀ and BC data. Aethalometer flow check. Clean BAM vane and nozzle. Change BAM tape and conduct self-test.

Table 5-3. Flow rates for the BAM PM₁₀ monitors and Aethalometer BC monitors at the Sunshine Canyon Landfill and Van Gogh School sites from June 1, 2012, through August 31, 2012. 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	6/8/12	16.7	16.5	16.7	16.7	-- ^a	-- ^a
	6/22/12	16.6	12.5	16.7	16.7	2.6	2.7
	7/9/12	16.1	16.4	16.1	16.4	2.4	2.7
	8/23/12	16.7	15.8	16.7	16.7	2.6	2.8
Van Gogh Elementary School	6/8/12	-- ^b	-- ^b	-- ^b	-- ^b	-- ^b	-- ^b
	7/9/12	16.7	15.7	16.7	16.7	3.0	2.8
	8/22/12	16.7	15.7	16.7	16.7	3.0	3.0

^a Not measured.

^b The flows at Van Gogh could not be measured on this date due to malfunction of the NIST-traceable BGI TetraCal flow meter.

Table 5-4. Results of the meteorological audit conducted at the Landfill monitoring site on June 21, 2012.

Sunshine Canyon Met Audit: Wind speed and direction only					
<u>Unadjusted Wind Direction Audit</u>					
Site location:	Sunshine Cyn Landfill		Date:	6/21/2012	
Coordinates	34.19.12 N 118.30.28 W		Calibrated By:	Ksmith	
Elevation	1719 ft		Calibrator	RMyoung	
Wind Monitor	RMyoung		Make:	RMyoung	
Model:	5305V		Model:	Bench Alignment Vane	
Serial No:	Body 99221		Serial No:	STI 0000442	
			Datalogger	DRDAS	
			Make	DRDAS	
			Model:		
Torque Reading:	<10 gr/cm cw		Compass:	Brunton sn 2610797458	
	<15 ccw				
Direction Setting	Calibrator	Expected	DAS	Error	Remarks
Tower alignment	GPS	360	1	1	
Degrees	Wheel	0	0	0	Clockwise
Degrees	Wheel	30	30	0	Clockwise
Degrees	Wheel	60	60	0	Clockwise
Degrees	Wheel	90	89	-1	Clockwise
Degrees	Wheel	120	119	-1	Clockwise
Degrees	Wheel	150	149	-1	Clockwise
Degrees	Wheel	180	178	-2	Clockwise
Degrees	Wheel	210	208	-2	Clockwise
Degrees	Wheel	240	238	-2	Clockwise
Degrees	Wheel	270	268	-2	Clockwise
Degrees	Wheel	300	298	-2	Clockwise
Degrees	Wheel	330	329	-1	Clockwise
Degrees	Wheel	0	1	1	Counter-clockwise
Degrees	Wheel	330	329	-1	Counter-clockwise
Degrees	Wheel	300	299	-1	Counter-clockwise
Degrees	Wheel	270	269	-1	Counter-clockwise
Degrees	Wheel	240	239	-1	Counter-clockwise
Degrees	Wheel	210	208	-2	Counter-clockwise
Degrees	Wheel	180	178	-2	Counter-clockwise
Degrees	Wheel	150	148	-2	Counter-clockwise
Degrees	Wheel	120	119	-1	Counter-clockwise
Degrees	Wheel	90	89	-1	Counter-clockwise
Degrees	Wheel	60	60	0	Counter-clockwise
Degrees	Wheel	30	30	0	Counter-clockwise
Degrees	Wheel	0	0	0	Counter-clockwise
Degrees	Wheel	355	355	0	Cross-over at 355 deg.
Degrees	Wheel	5	5	0	Clockwise

Table 5-4. Results of the meteorological audit conducted at the Landfill monitoring site on June 21, 2012.

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<u>Unadjusted Wind Speed Audit</u>					
			Calibrator Make:		RYoung
			Model:		18820/18831
			Serial No:		CA-03792
			Propeller SN:		60314
Torque Reading:		1.0 gr/cm			
	Multiplier	0.01145			
Synchronous Motor	RPM	Velocity (mph)	DAS (mph)	Error (mph)	Remarks
None	0.00	0.00	0.00	0.00	
High Speed	300	3.44	3.5	0.06	
High Speed	600	6.87	6.9	0.03	
High Speed	1200	13.74	13.8	0.06	
High Speed	2600	29.77	30.0	0.23	
High Speed	6000	68.70	69.1	0.40	
High Speed	9000	103.05	103.6	0.55	

Table 5-5. Results of the meteorological audit conducted at the Van Gogh School monitoring site on June 21, 2012.

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Sunshine Canyon Met Audit: Wind speed and direction only					
<u>Unadjusted Wind Direction Audit</u>					
Site location:	Van Gogh School		Date:	6/21/2012	
Coordinates	34.18.17 N 118.30.18 W		Calibrated By:	Ksmith	
Elevation	1272 ft		Calibrator	RMYoung	
Wind Monitor			Make:	RMYoung	
Make:	RMYoung		Model:	Bench Alignment Vane	
Model:	5305V		Serial No:	STI 0000442	
Serial No:	Body 99220		Datalogger	DRDAS	
			Make	DRDAS	
			Model:		
Torque Reading:	<10 gr/cm cw		Compass:	Brunton sn 2610797458	
	<15 ccw				
Direction Setting	Calibrator	Expected	DAS	Error	Remarks
Tower alignment	GPS	360		358	
Degrees	Wheel	0	1	1	Clockwise
Degrees	Wheel	30	31	1	Clockwise
Degrees	Wheel	60	61	1	Clockwise
Degrees	Wheel	90	93	3	Clockwise
Degrees	Wheel	120	123	3	Clockwise
Degrees	Wheel	150	153	3	Clockwise
Degrees	Wheel	180	183	3	Clockwise
Degrees	Wheel	210	213	3	Clockwise
Degrees	Wheel	240	243	3	Clockwise
Degrees	Wheel	270	273	3	Clockwise
Degrees	Wheel	300	302	2	Clockwise
Degrees	Wheel	330	332	2	Clockwise
Degrees	Wheel	0	1	1	Counter-clockwise
Degrees	Wheel	330	332	2	Counter-clockwise
Degrees	Wheel	300	302	2	Counter-clockwise
Degrees	Wheel	270	272	2	Counter-clockwise
Degrees	Wheel	240	242	2	Counter-clockwise
Degrees	Wheel	210	212	2	Counter-clockwise
Degrees	Wheel	180	183	3	Counter-clockwise
Degrees	Wheel	150	153	3	Counter-clockwise
Degrees	Wheel	120	123	3	Counter-clockwise
Degrees	Wheel	90	93	3	Counter-clockwise
Degrees	Wheel	60	62	2	Counter-clockwise
Degrees	Wheel	30	32	2	Counter-clockwise
Degrees	Wheel	0	2	2	Counter-clockwise
Degrees	Wheel	355	355	0	Cross-over at 355 deg.
Degrees	Wheel	5	7	2	Clockwise

Table 5-5. Results of the meteorological audit conducted at the Van Gogh School monitoring site on June 21, 2012.

Page 2 of 2

Unadjusted Wind Speed Audit					
			Calibrator Make:		RYoung
			Model:		18820/18831
			Serial No:		CA-03792
			Propeller SN:		72254
Torque Reading:		1.0 gr/cm			
	Multiplier	0.01145			
Synchronous Motor	RPM	Velocity (mph)	DAS (mph)	Error (mph)	Remarks
None	0.00	0.00	0.00	0.00	
High Speed	300	3.44	3.4	-0.04	
High Speed	600	6.87	6.9	0.03	
High Speed	1200	13.74	13.8	0.06	
High Speed	2600	29.77	29.9	0.13	
High Speed	6000	68.70	69.0	0.30	
High Speed	9000	103.05	103.4	0.35	