AIR MONITORING
PVT LAND COMPANY, LTD.
NANAKULI, HAWAII

Summary Report
September 2010

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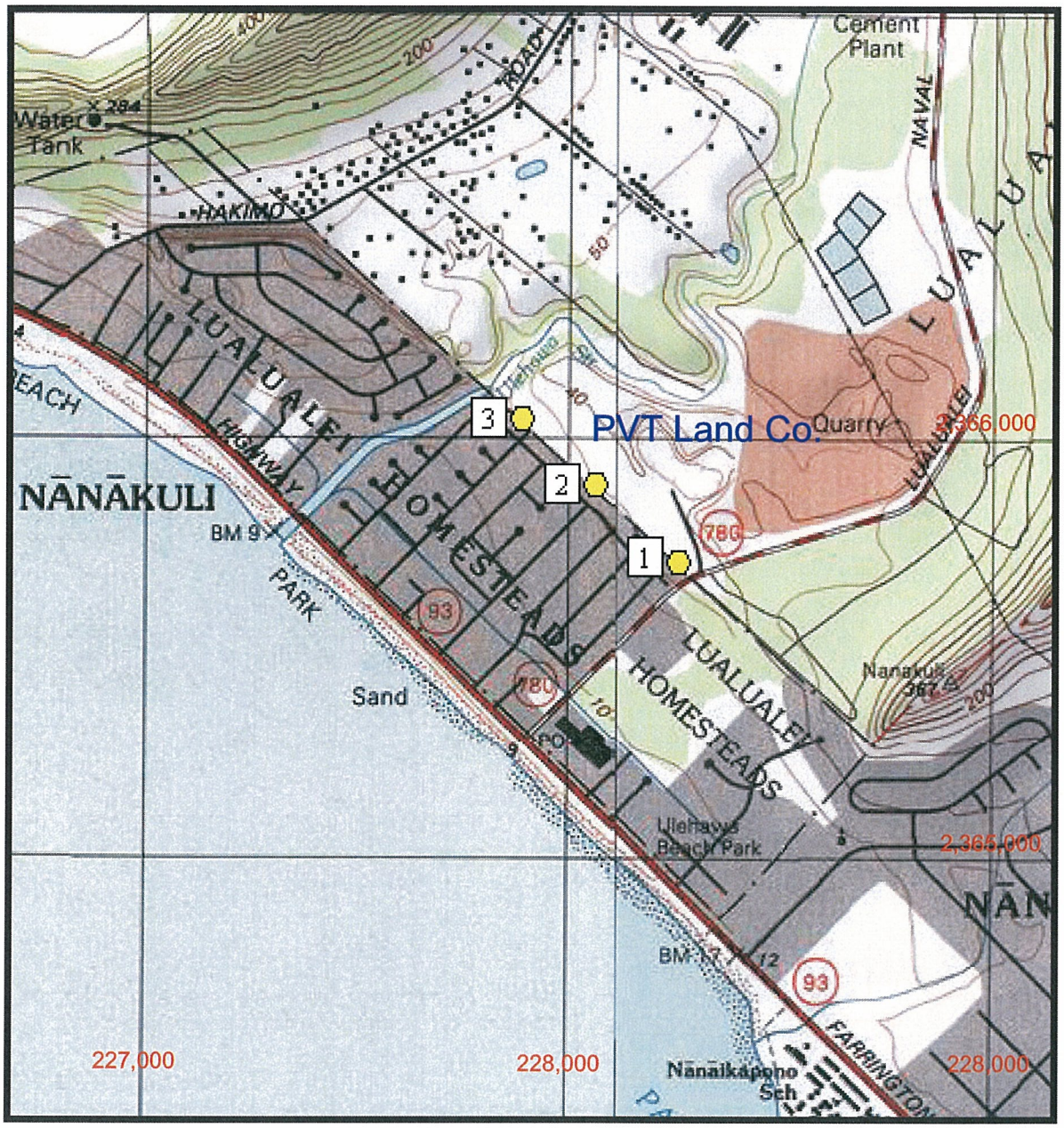
1.0 INTRODUCTION

An air monitoring program at the PVT Land Company's facility in Nanakuli, Hawaii commenced on 21 November 2009. Portable samplers[1] operating at a nominal 5 liters per minute (lpm) are located at three (3) sites on the property (Figure 1). The samplers are mounted on top of an existing dust barrier fence at a height of 17 feet (Figure 2) and collect total suspended particulate matter (TSP) on 47 millimeter (mm) glass fiber filters from midnight to midnight on sample days. The EPA's published once-every-six-days schedule [2, 3] (Appendix A) is followed. The filters, whose tare weights were initially determined in accordance with EPA guidelines by the Airmetrics laboratory in Eugene, Oregon, are sent to the same laboratory for final weighing. A weather station is already operated onsite thereby providing wind data for correlation with the air monitoring data.

2.0 QUALITY CONTROL/ASSURANCE

Monitoring is conducted in accordance with EPA and manufacturer guidelines. [1, 4, 5] All samplers were calibrated at the factory before onsite installation and will be calibrated annually in accordance with EPA and manufacturer guidelines.[1, 4, 5, 6] Sampler flow rate set points based on local temperature and pressure conditions were determined in accordance with manufacturer guidelines.[1] The field operator adjusts flow rates as necessary before each run to assure proper set points are maintained. Data sheets are maintained to record sample date, site number, sampler number, elapsed times. and start and ending flow rates. A log book is also maintained by the operator to record significant activities and observations during the sampling program.

FIGURE 1
MONITORING SITES



USGS Quad Schofield Barracks (1998)
1:24,000 (NAD-83)

FIGURE 2

AIR SAMPLER SITING

Photo by W. Lyon

Photo by W. Lyon

An independent check of sampler flow rates and sampling procedures is conducted and recorded monthly. Chain of custody accompany the filters from initial sampling through final weighing at the laboratory where the filters are archived.

3.0 RESULTS AND DISCUSSION

3.1 TSP Results. Fifteen (15) samples were collected and analyzed during September 2010, and the analysis results for each of the three (3) monitoring stations are summarized in Table 1 and Figure 3.

TABLE 1

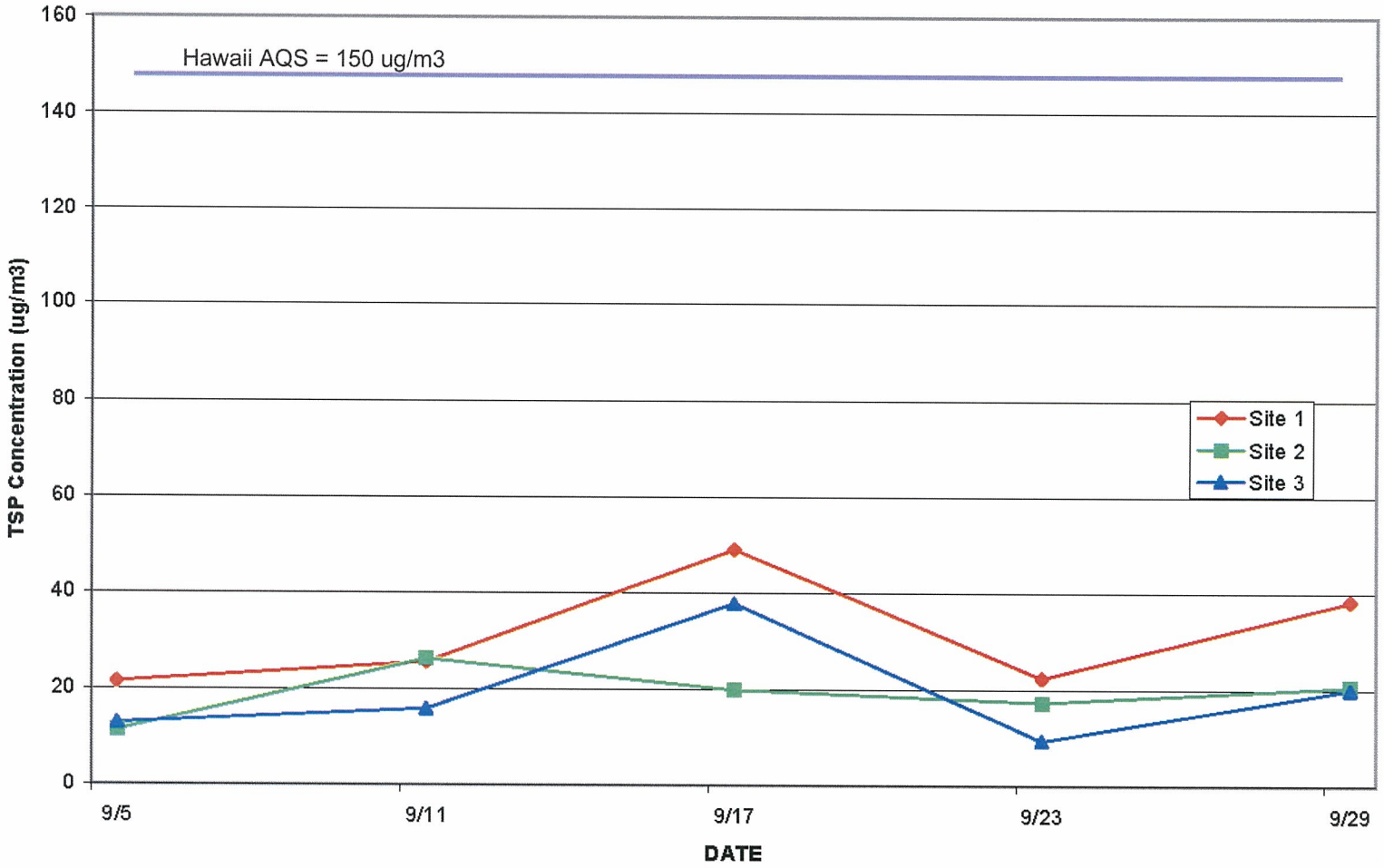
DAILY AND CUMULATIVE TSP CONCENTRATIONS SEPTEMBER 2010

Site No.	Number of Samples	TSP Range ($\mu g/m^3$)	Cumulative Number of Samples	Cumulative TSP Mean ($\mu g/m^3$)
1	5	21.4 - 49.0	53	34.6
2	5	11.4 - 26.3	53	24.7
3	5	9.4 - 37.8	53	19.1

Until 1987 when EPA promulgated a standard for particulate matter equal to or less than 10 microns (μ) in diameter (PM_{10}) standard, there was a 24-hour TSP standard of 150 $\mu g/m^3$ [7, 8]. TSP includes particles up to 100μ in aerodynamic diameter; [6] and the fraction of PM_{10} in TSP is typically about 50%; thus, dividing the values in Table 1 by two (2) provides an approximation of PM_{10} values for comparison with the DOH monitoring results as well as the PM_{10} standards.[9]

FIGURE 3

TSP CONCENTRATIONS
September 2010



In this case, however, without dividing by two (2), the maximum 24-hour values in Table 1 are comparable to recent Department of Health (DOH) monitoring results at leeward Oahu sites, i.e., Pearl City and Kapolei, where maximum 24-hour PM_{10} values of 45 and 36 $\mu g/m^3$, respectively, were reported. [10]

It is thus clear that the undivided daily TSP concentrations are also less than the 24-hour 150 ug/m^3 PM_{10} standard, and the undivided cumulative mean values are also below the 50 ug/m^3 annual standard.

The September 2010 results continue to support the preliminary findings suggested in the previous reports:

- TSP concentrations continued to be low during September and were variable among the three sites. The differences between the mean TSP values for all the data to-date from all three sites continue to be statistically significant, i.e., most notably between Site 1 and Site 3 ($p<0.001$ by *t-test.*)[11] Site 1 is the closest to Lualualei Naval Road and Site 3 is the farthest; thus weekday activity along that road continues to be a possible factor.

- On the non-work weekend days, the mean TSP level for all the data to-date for all three sites (22.9 $\mu g/m^3$) continued to be significantly ($p = 0.011$) less than the mean for the other five workdays (27.4 $\mu g/m^3$).

3.2 Correlation with Wind Direction. Wind directions during the sampling days are presented in Figures 4 - 8. Daytime winds on 5 September were variable throughout the day. Winds on 11 September were easterly at night and northwesterly during much of the day. Winds on 17 September were predominantly east southeast with some periods of westerlies. On 23 September, winds were from the east during the early morning, shifting to the west by noon and into the early evening and then to east southeast during the night. Winds on 29 September were east southeast during the early morning, shifted south southwest during the afternoon and then to southerly up to midnight.

The data were analyzed to determine if there was any correlation between wind direction and TSP level. The results of that analysis are summarized in Table 2. "Offsite winds" were defined as wind directions which did not cross PVT lands before reaching the air samplers. They were generally in the southern quadrants and ran from southeast to northwest. As in previous months, no statistically significant correlation between wind direction and TSP concentration could be identified.

TABLE 2

TSP AND OFFSITE WIND DIRECTIONS SEPTEMBER 2010

Date	Site 1		Site 2		Site 3	
	TSP	Offsite Winds*	TSP	Offsite Winds*	TSP	Offsite Winds*
	(ug/m^3)	(%)	(ug/m^3)	(%)	(ug/m^3)	(%)
9/5/10	21.4	57.3	11.4	42.7	12.9	53.9
9/11/10	25.5	62	**26.3**	43.5	16.0	44.6
9/17/10	**49.0**	52.2	19.9	26.1	**37.0**	28.3
9/23/10	22.4	100	17.4	42.4	9.4	42.4
9/29/10	38.3	100	20.7	58.3	20.1	58.3

* Winds which did not cross the PVT property during the 24-hr sampling period

FIGURE 4

HOURLY WIND DIRECTION AND TSP CONCENTRATIONS 5 September 2010 (Sunday)

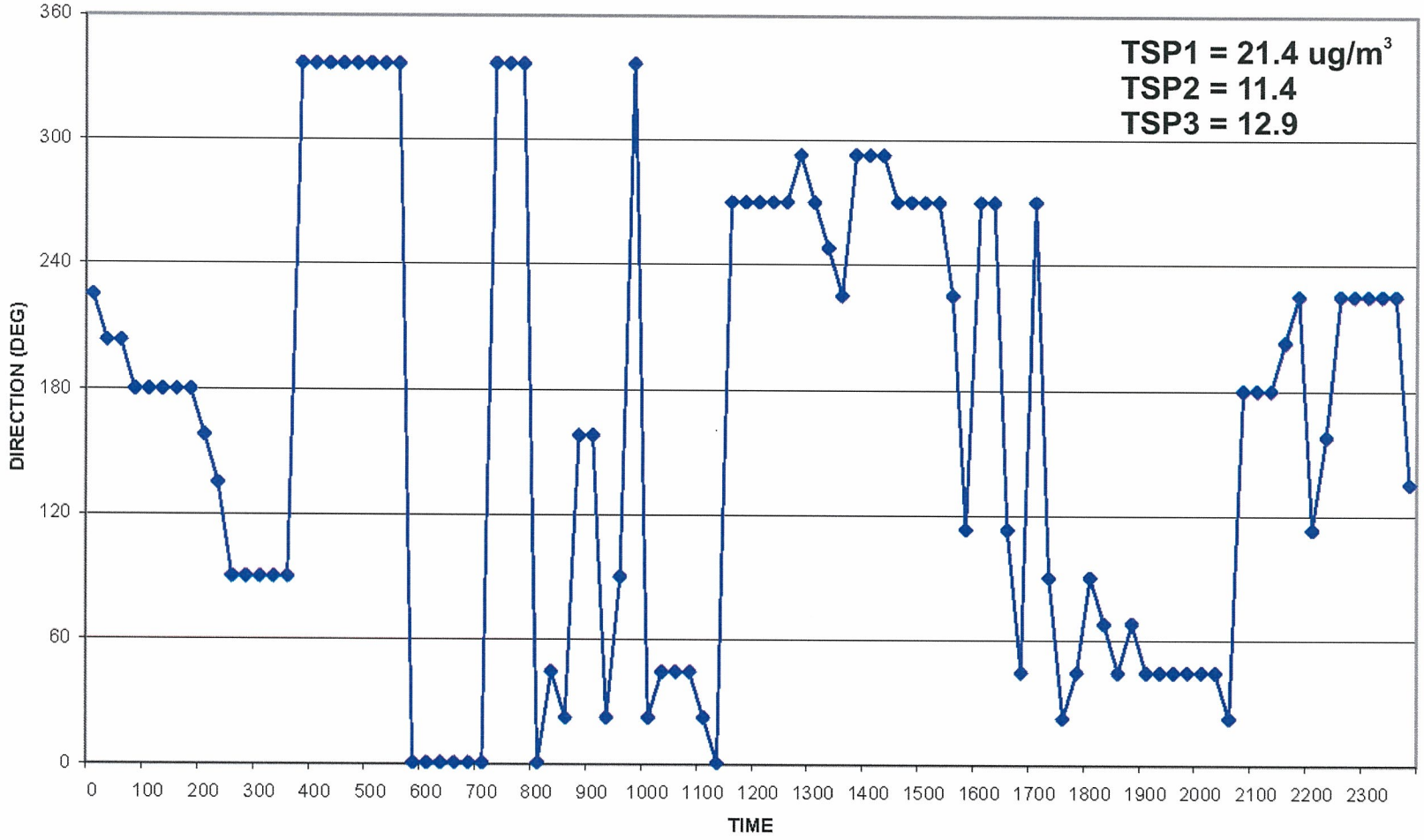


FIGURE 5

HOURLY WIND DIRECTION AND TSP CONCENTRATIONS 11 September 2010 (Saturday)

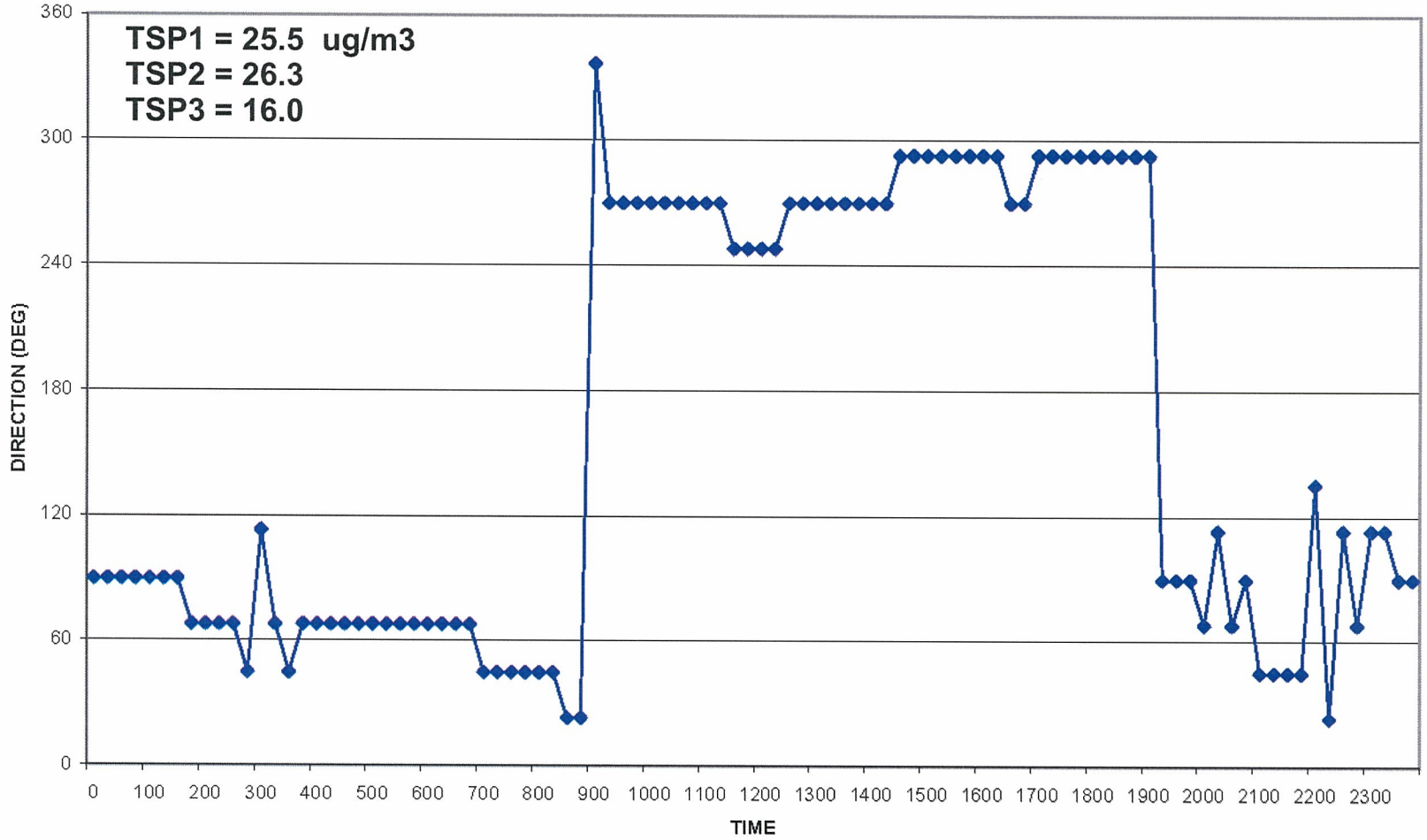


FIGURE 6

HOURLY WIND DIRECTION AND TSP CONCENTRATIONS 17 September 2010 (Friday)

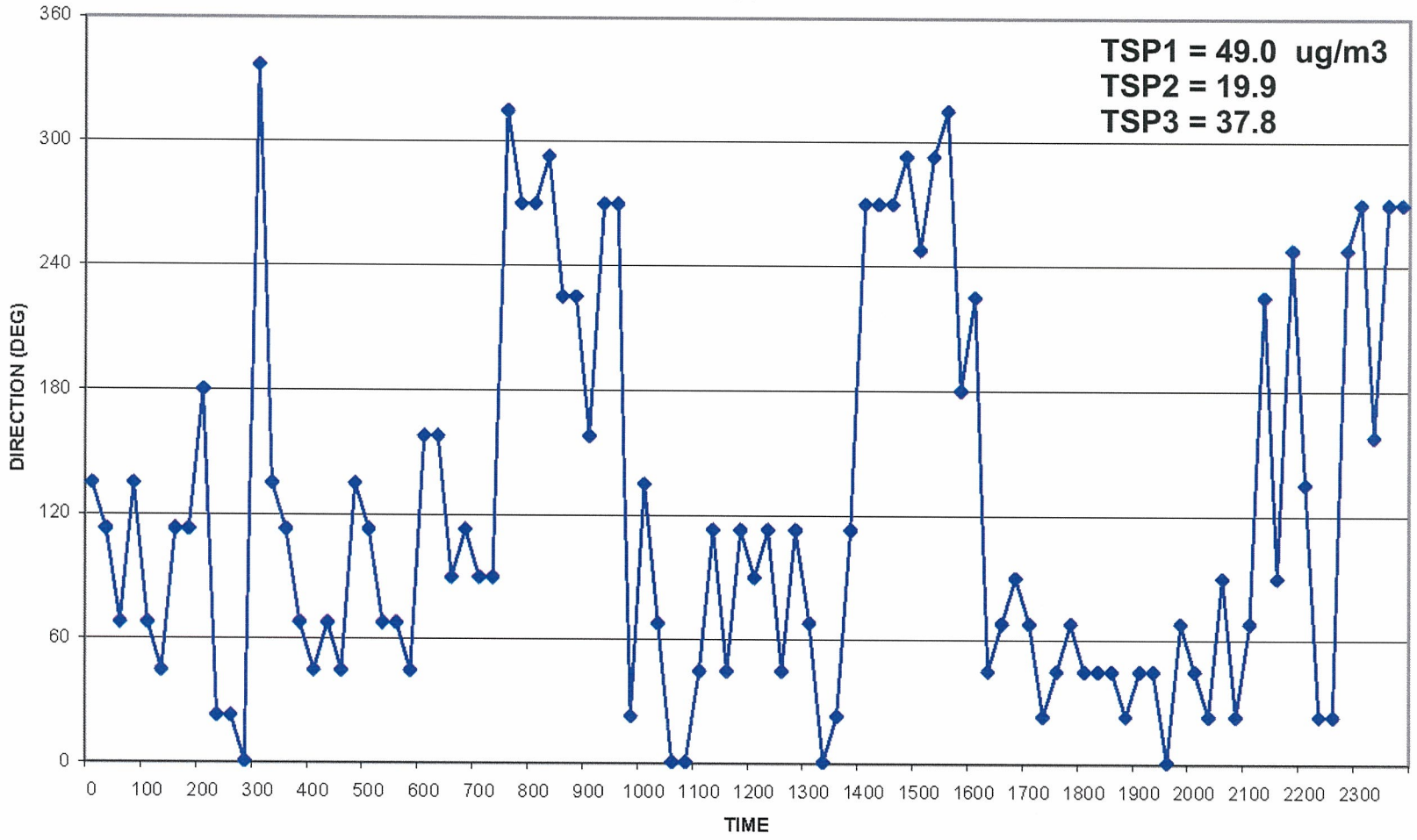


FIGURE 7

HOURLY WIND DIRECTION AND TSP CONCENTRATIONS 23 September 2010 (Thursday)

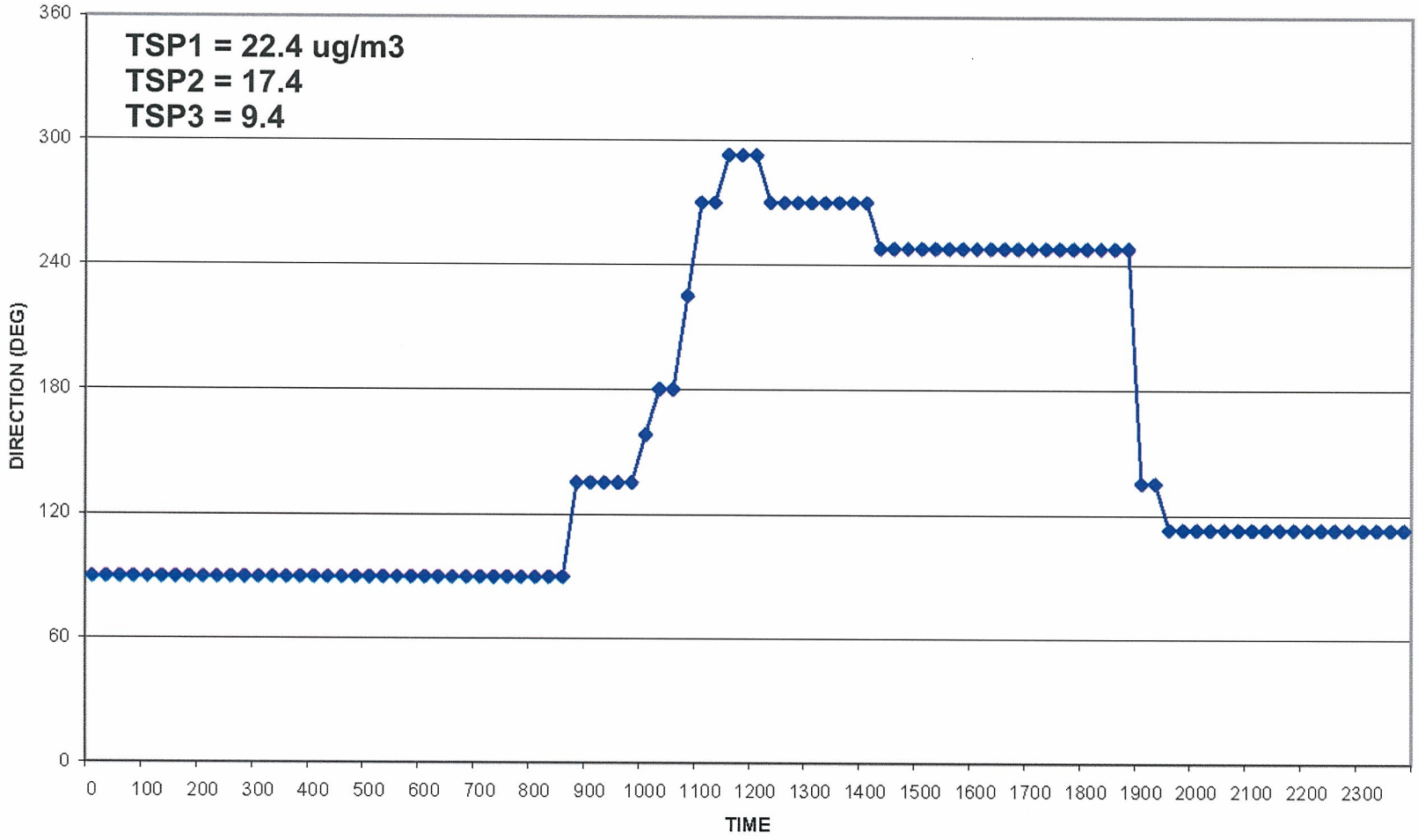
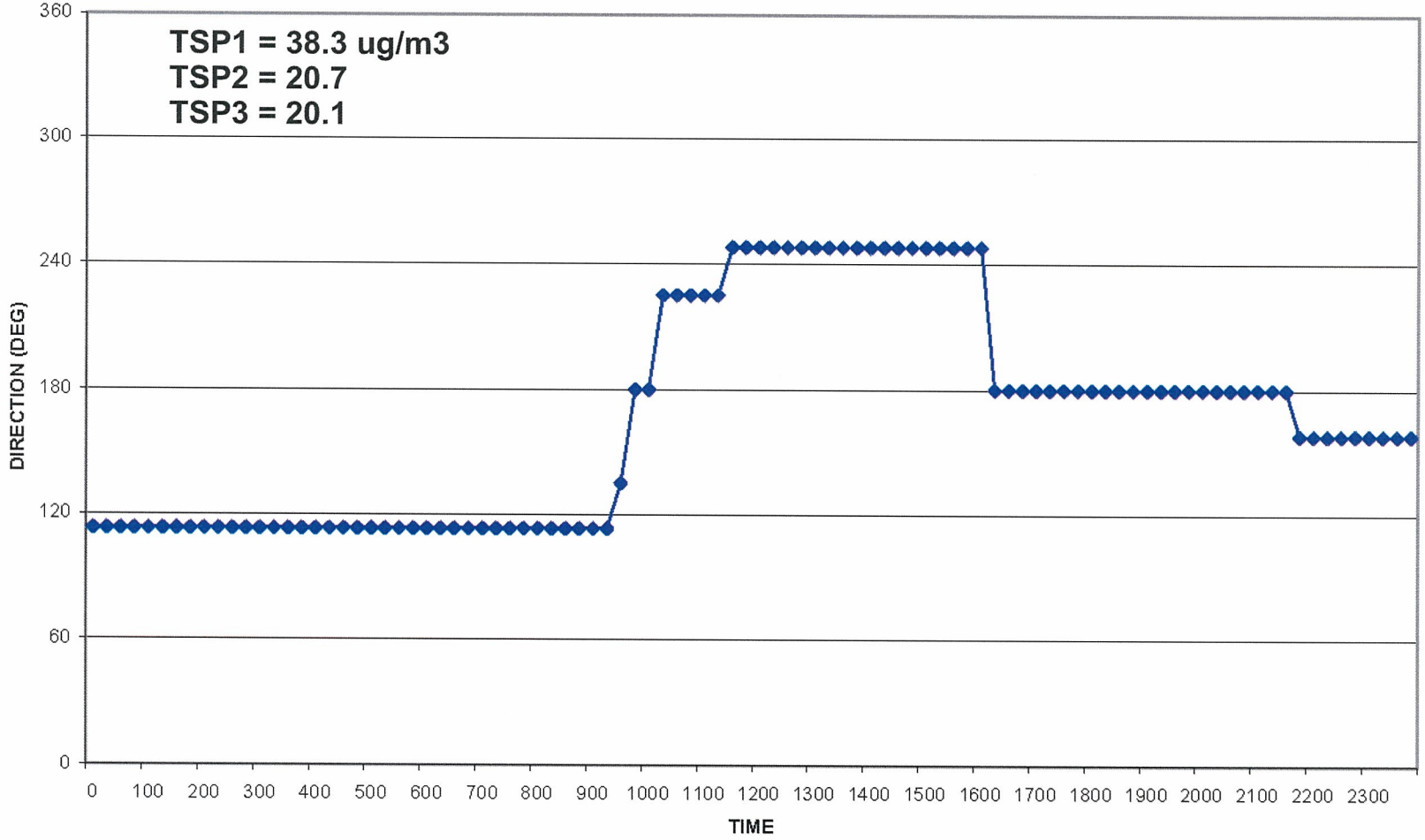


FIGURE 8

HOURLY WIND DIRECTION AND TSP CONCENTRATIONS 29 September 2010 (Wednesday)



APPENDIX A

EPA 2010 MONITORING SCHEDULE

2010 Monitoring Schedule

3-day & 6-day Monitoring Schedule for TSP, Pb, PM-10, PM-2.5, and VOC. 12-day Monitoring Schedule for PM-2.5 Collocation.

January

Su	M	Tu	W	Th	F	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

February

Su	M	Tu	W	Th	F	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28						

March

Su	M	Tu	W	Th	F	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

April

Su	M	Tu	W	Th	F	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

May

Su	M	Tu	W	Th	F	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

June

Su	M	Tu	W	Th	F	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

July

Su	M	Tu	W	Th	F	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

August

Su	M	Tu	W	Th	F	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

September

Su	M	Tu	W	Th	F	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

October

Su	M	Tu	W	Th	F	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

November

Su	M	Tu	W	Th	F	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

December

Su	M	Tu	W	Th	F	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

& & = 1/3 day sampling

& = 1/6 day sampling

= 1/12 day sampling