

**PHASE II PM<sub>10</sub> AIR MONITORING PROGRAM  
Hollister Hills State Vehicular Recreational Area**

**January 15, 2009**

**1. Introduction**

This report summarizes Phase II PM<sub>10</sub> data gathered at the Hollister Hill State Vehicle Recreational Area (SVRA) during the period May 2008 to November 2008. The air monitoring project was conducted in accord with a contract between the State of California Department of Parks and Recreation and the Monterey Bay Unified Air Pollution Control District (MBUAPCD).

The location of the monitor sites are described in Table 1.

**2. Monitoring Network Design**

**TABLE I SITE LOCATION INFORMATION**

Site	Area of Park	Latitude	Longitude	Elevation
Downwind A	New Acquisition	36° 48.211'	121° 25.847'	880'
Downwind B	New Acquisition	36° 46.913'	121° 23.710'	570'
Downwind C	New Acquisition	36° 45.726'	121° 23.339'	1,350'
Upwind IN	Existing Park Area	36° 47.144'	121° 27.517'	1,770'
Hollister REF*	Offsite	36° 50' 36"	121° 21' 44"	126'

\* The District Hollister Reference station is located offsite at 1979 Fairview Road. It is part of the MBUAPCD's PM<sub>10</sub> monitoring network and is the nearest permanent PM<sub>10</sub> monitoring site

**3. Monitoring Equipment**

The monitoring equipment used was chosen based on reliability, portability and ability to operate automatically in a remote setting with minimal operator attention. The PM<sub>10</sub> and meteorological equipment used are summarized in Table II.

**Table II DESCRIPTION OF MONITORING EQUIPMENT  
Sites A, B, C, and Upwind IN**

Type	Manufacturer	Model	Parameters	Description
Portable Particulate Sampler	Airmetrics	MiniVol	PM10	Acquires sample continuously for 24-hours at 5 liters/min on 47 mm diameter Teflon filters.
Meteorological Instrument	Davis Instruments	Vantage Pro	Wind speed, direction, temperature and rainfall	Digitally records hourly values for WS, WD and Temp, plus the derived parameters of heating and cooling degree days, accumulated rainfall & peak wind.

The PM<sub>10</sub> data were collected using the Airmetrics MiniVol samplers. The MiniVol is a lightweight battery operated sampler, which makes it ideal for use in remote areas, such as the SVRA. The low power requirements of the portable MiniVol sampler allows for operation of a network of these samplers in environments where it would otherwise not be feasible to operate using the type of conventional samplers which are typically used in urban environments. Although the MiniVol's are not federal reference method (FRM) samplers, their results closely approximate FRM air quality data. The sample is collected on a 47 mm Teflon filter media which has been approved by the United States Environmental Protection Agency (EPA). Other features of the MiniVol include a 7day programmable timer, an elapsed time meter, rechargeable battery packs, and allweather PVC construction.

Meteorological data were collected using the Davis Instruments Vantage Pro portable weather station. Like the MiniVol, the low power requirements of this system make it ideal for remote locations. Wind, temperature and rainfall data were digitally recorded. The file could be downloaded at the site via a laptop computer and then postprocessed using software provided by the manufacturer. Electronic components were housed in a weather resistant box.

The PM<sub>10</sub> samplers were programmed to run midnight to midnight once every six days according to a nationwide sampling schedule established by EPA. The meteorological instruments ran continuously, every day of the week.

Equipment at each of the stations was enclosed by a chain link fence with the sensors mounted on a metal pole or mast that was supported vertically by a tripod. The setup for a typical PM<sub>10</sub>/Met station (Downwind C) is shown in Figure 3.

#### **4. Ambient Air Quality Standards for PM<sub>10</sub>**

Air pollution due to particulate matter is an important public health concern. Of particular concern are the inhalable particulates, which are 10 microns or less (PM<sub>10</sub>) in diameter. These can vary considerably in composition and are collectively as PM<sub>10</sub> which are the subject pollutant for this study. PM<sub>10</sub> includes any material except water that exists in the solid, liquid or semivolatile state in the atmosphere. For purposes of this study, solid form fugitive dust is the primary concern.

For reference, a micron is equal to a millionth of a meter and is too small to be seen by the unaided eye.

State and federal ambient air quality standards for PM<sub>10</sub> are summarized in Table III. These standards have been established to protect public health and are based on epidemiological studies and include a concentration and an averaging time. As shown in the table, California standards are considerably more stringent and protective of public health than federal standards. For example, the State 24hour PM<sub>10</sub> standard is 50 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) compared to the corresponding federal standard at 150  $\mu\text{g}/\text{m}^3$ . Although the actual composition of any PM<sub>10</sub> sample may be complex, the standard is based solely on the mass of the PM<sub>10</sub> present in the air and not its composition.

**TABLE III AMBIENT AIR QUALITY STANDARDS FOR PM<sub>10</sub>**

Averaging Time	California Standard	Federal Standard	
		Primary <sup>a</sup>	Secondary <sup>b</sup>
24 Hours	50 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>

<sup>a</sup> Designed to protect human health

<sup>b</sup> Designed to protect public welfare (i.e., to prevent damage to vegetation, property and visibility).

<sup>c</sup> Annual averages based on Arithmetic mean.

For purposes of implementing these standards, the state of California is divided into 14 areas or air basins. Areas are designated by the state and federal governments as being attainment, nonattainment or unclassified in relation to how measured air quality compares to the standard. The SVRA project area is located in the North Central Coast Air Basin (NCCAB), which includes San Benito, Santa Cruz, and Monterey Counties. Like most areas of the state, the NCCAB is designated as a nonattainment area for the state PM<sub>10</sub> standard. However, PM<sub>10</sub> air quality in the NCCAB does meet the federal PM<sub>10</sub> standard.

## 5. Quality Assurance

To assure consistency, the first last and tenth PM10 filter of every batch of fifty filters was retained in the laboratory as a laboratory blank. In addition, a field or trip blank filter was sent out with every 6day batch of filters. These trip blanks were processed with each batch of filters so that any minor adjustments due to handling in the field could be made to the final PM10 concentrations. A record of all filter transfers between the lab and the field were maintained on a Chain of Custody form.

In addition, during the monitoring, an additional sampler was available for collocated and simultaneous operation with the primary sampler at each site. The collocated sampler was used as a quality control check to assure repeatable results from the primary sampler and could be used as a backup in the event that the primary sampler failed.

Staff of the MBUAPCD performed all necessary equipment calibrations; filter inspections, site set-up and documentation, as well as periodic audits of the sites.

## 6. Analytical Procedure

All filters were processed in MBUAPCD's laboratory in accord with EPA methods. This included gravimetrically determining preand postexposure filter weights, including the lab and field blanks, under conditions of controlled temperature and humidity in the lab. The mass concentration of PM<sub>10</sub> was computed in the lab as the total mass of PM<sub>10</sub> captured on the filters (final filter weight initial filter weight) divided by the total volume of air sampled, expressed in micrograms per cubic meter (µg/m<sup>3</sup>). The results for each filter were recorded on a laboratory results report form. The filters, including the field

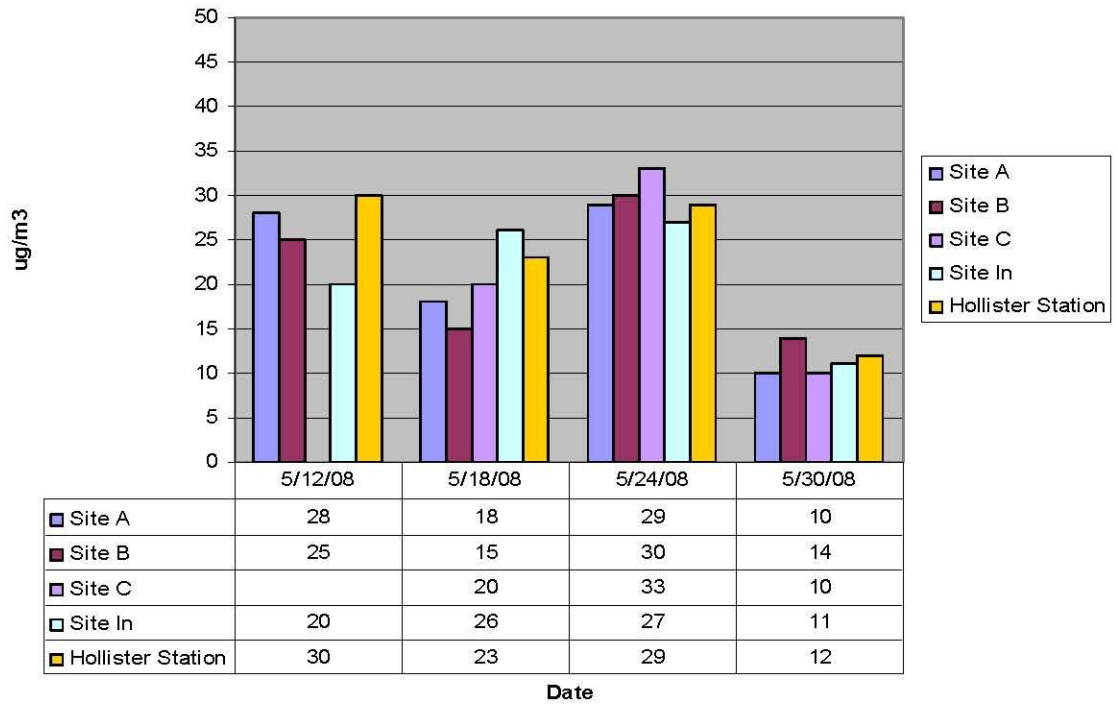
and lab blanks were then frozen in the event that additional analysis of the baseline samples is needed.

## **7. Results**

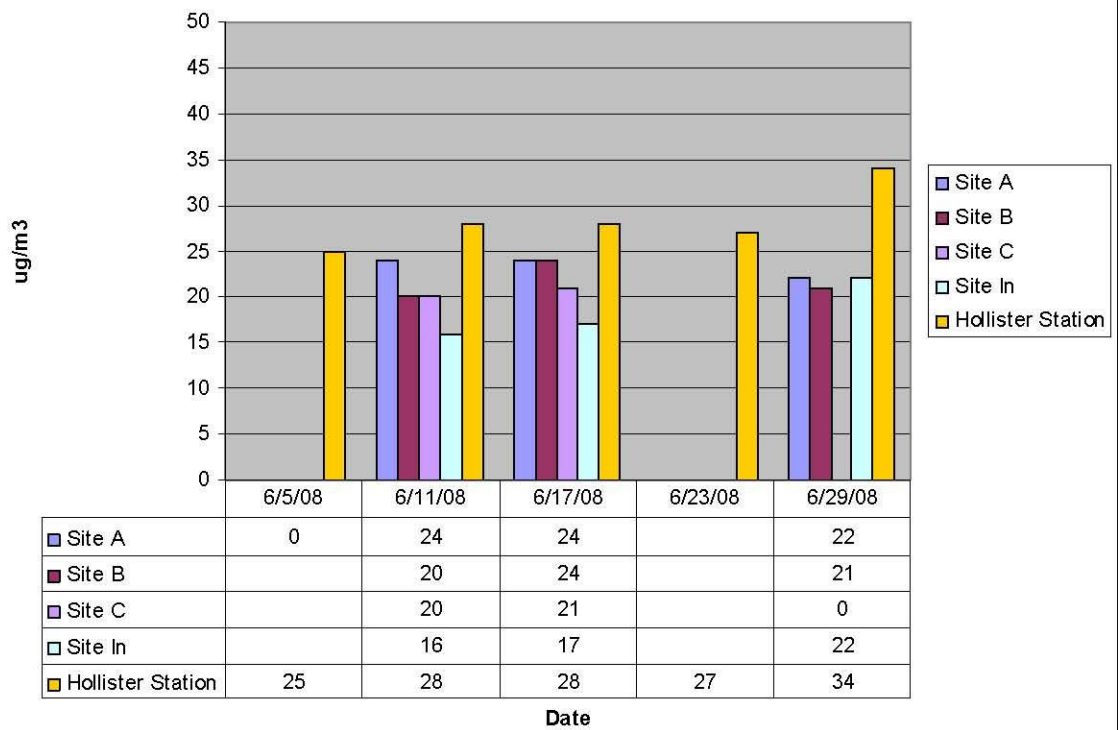
### **a. Results in Relation to Standards**

The seven months of monitoring data indicate relatively low levels of PM<sub>10</sub> in the SVRA. All results were well within applicable state and federal ambient air quality standards (AAQS).

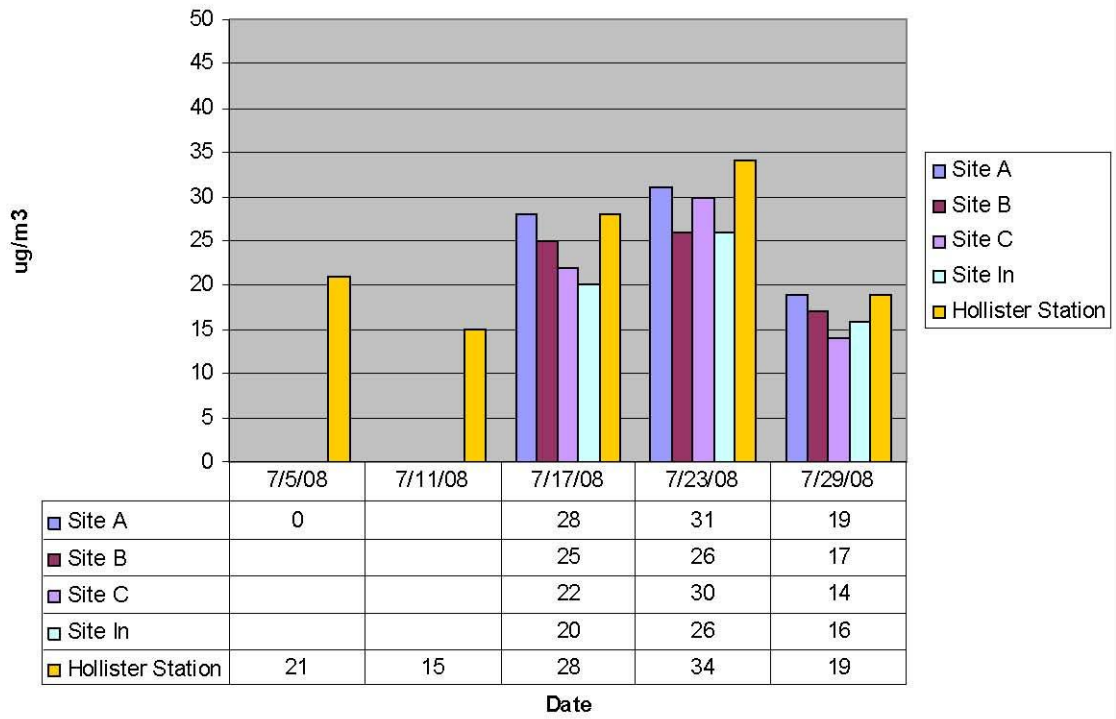
### May 2008 Filter Data



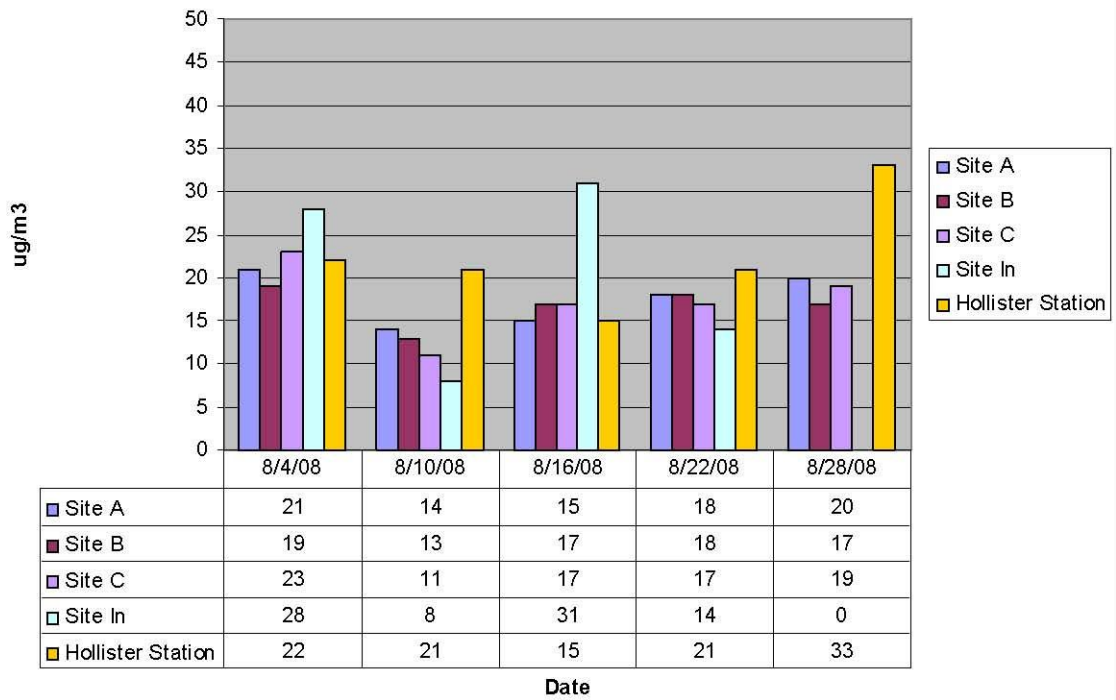
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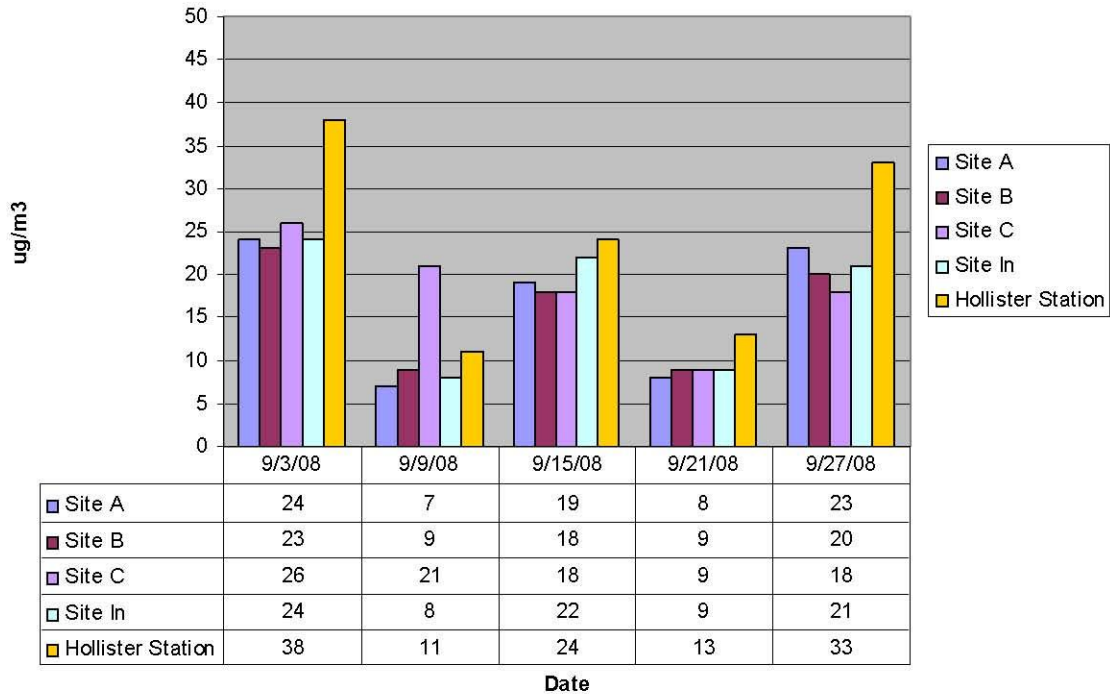
**July 2008 Filter Data**



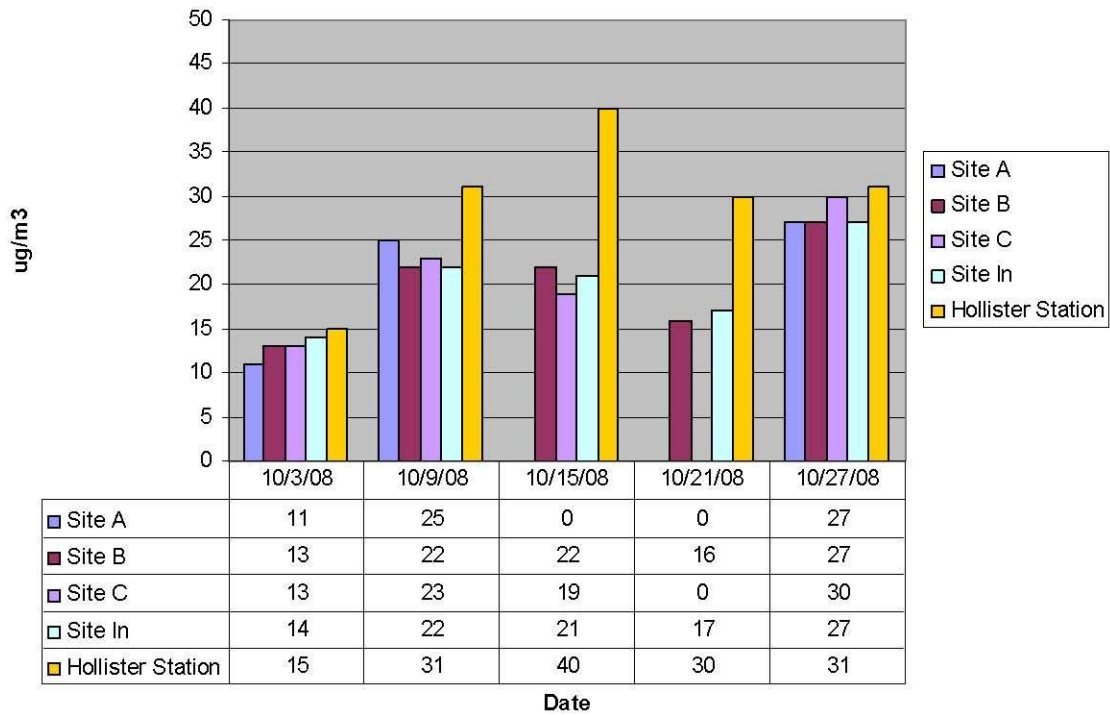
**August 2008 Filter Data**

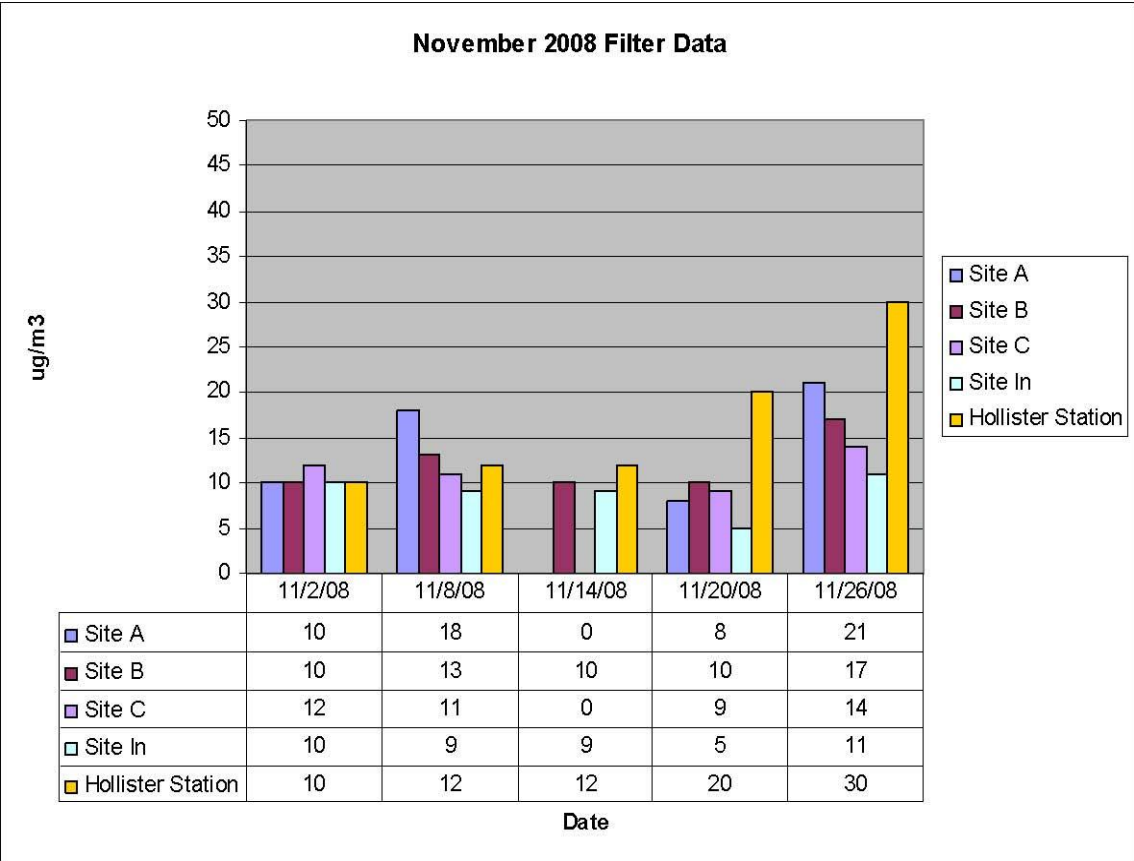


### September 2008 Filter Data



### October 2008 Filter Data





**8. Meteorological Data**

Met data attached separate file, file name HH2008MetData.pdf