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Final Report

Alliance of the Methyl Bromide Industry Methyl Bromide Air Monitoring: Ventura, Santa Cruz, and Monterey Counties July-October, 2002

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1. INTRODUCTION

The purpose of this report is to present the data from ambient air monitoring for methyl bromide that was conducted in Ventura, Monterey, and Santa Cruz Counties in the summer and fall of 2002. This monitoring was conducted by Applied Measurement Science for the Alliance of the Methyl Bromide Industry (AMBI) at the behest of the California Department of Pesticide Regulation (CDPR). This requirement originated in a re-evaluation notice from June 26, 2001 directed toward the methyl bromide registrants in California.

Previous monitoring had been conducted by AMBI in summer, 2001 in Ventura (Oxnard/Camarillo areas) and Santa Barbara Counties (Santa Maria area). The California Air Resources Board had previously conducted monitoring in Monterey and Santa Cruz Counties in 2001.

The study director was Dr. Eric D Winegar, and laboratory analysis was conducted by Environmental Analytical Service, Inc. of San Luis Obispo under the guidance of Dr. Steven Hoyt. Field technicians were supplied by Diamond Resources of Arroyo Grande, CA and Applied Analytical Consulting of El Dorado Hills, CA.

This work described in this report was conducted in accordance to the work plan submitted to the California Department of Pesticide Regulation, dated August 27, 2002. This work plan was based on the approach developed in 2001 during the first round of monitoring.

2. STUDY DESIGN

The study was intended to collect sets of weekly ambient air concentrations of methyl bromide at sites that would be representative of exposure to the community during fumigation activities. The study design was intended to utilize three main factors for understanding ambient air dispersal of methyl bromide during fumigation activities: source strength (fumigation usage rates and locations), receptor impact (ambient air concentrations as measured during the study period), and the transport mechanism (meteorological conditions).

In order to obtain this information, it required sampling site selection that was balanced among several factors: vicinity to centers of population, a reasonable distance away from other fumigation activities or potential emission sources, meeting the specific sampling site criteria, and permission from the site owners. Final sampling site selections were made after consultation with CDPR.

The work plan to guide the study was prepared in accordance with the proposed protocol suggested by CDPR, reviewed by the AMBI group and then finalized and submitted to CDPR. Any substantive changes to the work plan were incorporated in later revisions that were also submitted to CDPR. Any modifications to the sampling schedule due to changing circumstances were communicated to CDPR immediately.

Based on past years' experiences, in order to ease the data evaluation process and due to the frequent Saturday and Sunday fumigation because of school hours rules, the sampling periods were set for Wednesday to Saturday, with sampling starting as early as possible in the day.

All samples were collected on a 24-hour time-integrated basis in Summa canisters, with subsequent analysis by GC/MS. Meteorological data was collected at each site throughout the study periods. Methyl bromide usage data was collected using the standard county Pesticide Use Report procedures.

2.1. Sampling Locations

2.1.1 Ventura County

Four sites were required to be monitored in the Oxnard/Camarillo area of Ventura County. Table 1 lists the sampling locations used in 2002 monitoring. These locations are the same as were used in 2001.

Sampling locations were selected based on the CDPR site selection criteria along with standard sampling guidelines. A large number of sites were screened and evaluated before selecting the best candidates and obtaining permission. Two of the sites were on public utility property.

The sampling sites listed below represent the final selection of sites following review by CDPR.

Oxnard/Camarillo Sampling Locations

1. Sharps Automotive (SHA)

   Rationale: Adjacent to both agricultural and population centers, good access, single story building, building owners cooperative. This location is adjacent to both residential areas on the west, north, and northeast. To the east are agricultural and sparse industrial areas.

   Evaluation of Siting Criteria: Excellent adherence to all aspects of siting criteria.

2. Abandoned Building (ABD) on Vineyard and Escalande Roads

   Rationale: Adjacent to business and residential area.

   Evaluation of Siting Criteria: Excellent adherence to all aspects of siting criteria.

3. United Water Conservation District (UWC) pump station, NW of airport.

   Rationale: Between Camarillo/Oxnard population centers, near agricultural/fumigation areas.

   Evaluation of siting criteria: Excellent other than being adjacent to fumigated field on two occasions, as noted in discussion.

4. Pleasant Valley Water (PVW) District pump station

   Rationale: Middle of agricultural area, in targeted township, downwind of background sources.

   Evaluation of siting criteria: Excellent adherence to all aspects of siting criteria.

Figure 1 shows an overview of the Ventura County sites, which are marked with stars. From the land usage perspective, these four sites cover urban, rural, and boundary areas (between rural and urban). In addition, two of the sites are distinctly downwind of fumigation areas.

Table 1. Ventura County Sampling Locations

Oxnard/Camarillo Area			Coordinates	
Map Site Code	**Name**	**Location**	**Latitude**	**Longitude**
SHA	Sharps Automotive	Saviers/Hueneme	34.148080°	-119.178200°
ABD	Abandoned Building	Vineyard/Escalade	34.230400°	-119.174717°
UWC	United Water Cons. District #2	Near Airport - NW	34.216690°	-119.111400°
PVW	Pleasant Valley Water	Los Posas/Rt. 34	34.196967°	-119.069367°

Figure 1. Oxnard/Camarillo Area Sites

2.1.1.1 Sampling Schedule

Sampling was conducted over 24-hour periods from Wednesday to Saturday each week for eight weeks, starting on July 10, 2002 and ending on August 31, 2002. The start and end times for the samples were approximately mid-day.

The monitoring was scheduled to coincide with the maximum usage periods for methyl bromide soil fumigation in the Ventura County area. Past data has shown that the peak of the season is in the late July to early August time frame.

2.1.2 Monterey/Santa Cruz Counties

A total of five sites were required in the Monterey/Santa Cruz Counties areas. In addition, a background site was selected in the city of Santa Cruz. In order to achieve some comparability with previous monitoring, attempts were made to find sites close to the original CDPR/CARB sites while still adhering to siting criteria. Table 3 contains siting location information. Figures 2 and 3 show the AMBI locations in blue diamonds relative to CDPR/CARB sites, which are marked in red dots.

The selected sites and the rationale for each is as follows.

1. Watsonville City Park Services yard (WAT). East Front St. and Union.

   Rationale: This location is within 0.5 miles of the Pajaro school site (PMS), is in an area of high population density, and is not directly adjacent to any potential fumigation sites.

   Evaluation of siting criteria: Sampler was within 15 meters of trees. However, the trees are separated by a large gap which allows air movement.

2. Farm Bureau Office (FRM). 141 Monte Vista Street.

   Rationale: In residential area, near the center of town. Located approximately 0.46 miles from MES site. No close agricultural areas.

   Evaluation of siting criteria: Excellent adherence to all aspects of site criteria.

3. County Public Works yard (CPW). Grimmer Road.

   Rationale: On eastern, downwind of town. Adjacent to agricultural areas, but ones that were not forecasted to be fumigated.

   Evaluation of siting criteria: Excellent adherence to all aspects of site criteria.

4. BB Construction (BBC). Corner of San Juan Grade Road and Cornwall Roads in Salinas.

Rationale: Close to previous monitoring site. Away from agricultural activities.

Evaluation of siting criteria: Excellent adherence to all aspects of site criteria.

5. Monterey County Unified Air Pollution Control District ambient air monitoring site (MAQ).

Rationale: previous CDRP/CARB site, not close to current agricultural activities.

Evaluation of siting criteria: Proximity to building was of some concern.

Table 3. Watsonville and Salinas Sampling Locations

Watsonville/Salinas Area			Coordinates	
Map Site Code	**Name**	**Location**	**Latitude**	**Longitude**
WAT	Watsonville Park Offices	East Front and Union	36.697615°	-121.628867°
FRM	Farm Bureau	Prospect Dr.	36.698156°	-121.606950°
CPW	County Public Works yard	Grimmer Road	36.945583°	-121.754533°
MAQ	MBUAQMD monitoring site	E. Laurel Dr.	36.690444°	-121.625571°
BBC	BB Construction	San Juan Grade Road	36.733859°	-121.637865°

Figure 2. Watsonville Area Sites

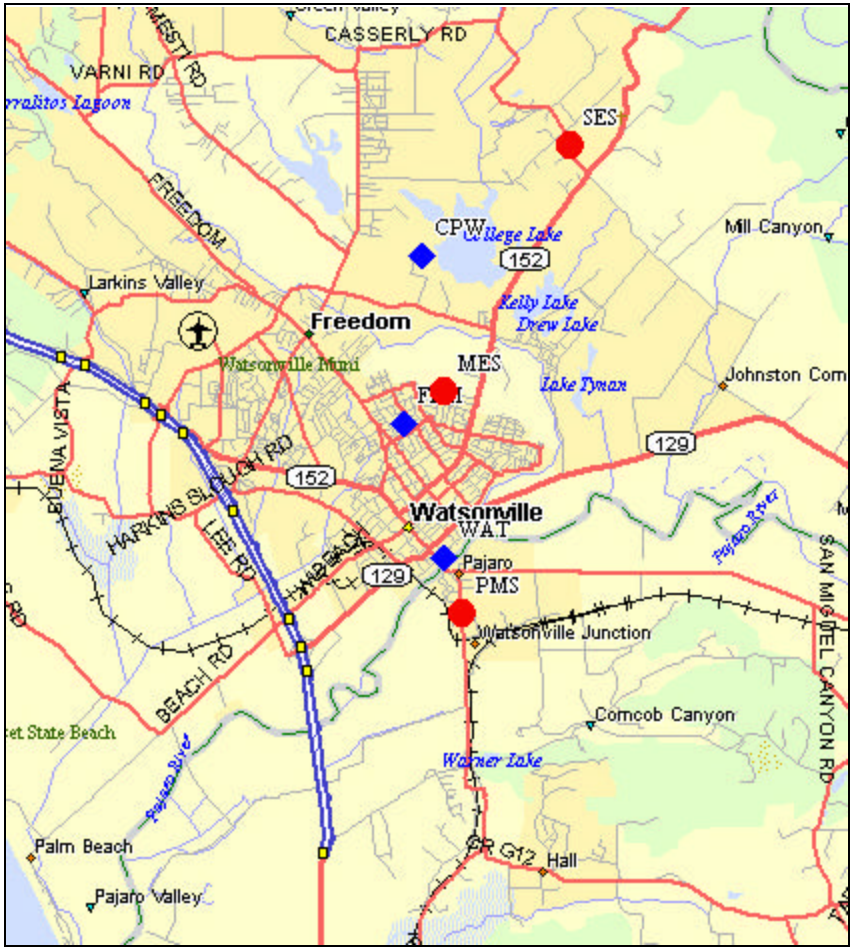

Figure 3. Salinas Sites

2.1.2.1 Sampling Schedule

Sampling was conducted over 24-hour periods from Wednesday to Saturday each week for eight weeks, starting on September 4. 2002 and ending on October 27, 2002. The start and end times for the samples were approximately early morning.

The monitoring period was scheduled to coincide with the main usage season for methyl bromide fumigation activities, which peaks in the September and October for the northern counties.

2.2 Background Locations and Sampling Schedules

Several background locations were used during the 2002 monitoring:

- San Luis Obispo background site. This site was adjacent to the laboratory in SLO, at the same point used in 2001. Site coordinates are: 35° 14.755, -120° 40.237. A total of 8 samples were collected at this location during October 16-19, 2002 and November 6-9, 2002. Samples were collected in the regular 24-hour integrated fashion.

- Santa Cruz Fire Station. This site was the same as used by CDPR/CARB in 2001, although the AMBI site was located on top of a higher building than the CDPR/CARB sampler was sited. Site coordinates are: -36° 57.704°, -122° 02.595°. Samples were collected during two weeks of the regular program: September 11-14, 2002, and October 16-19, 2002. Samples were collected in the regular 24-hour integrated fashion.

- Grab samples at several remote and urban locations at the noted dates:

Sylmar, CA	6/25/2002
Mountain Pass, CA	6/27/2002
SJ Valley, along I-5 north of Fresno	6/24/2002
Berkeley Marina	7/2/2002

All background samples were processed in the same fashion as regular field samples.

2.3 Sampling and Analysis Methods

2.3.1 Sampling Methods

Sampling was conducted with Summa canisters, stainless steel flow controllers, and stainless steel inlets. Sampling was conducted for 24 hour periods, with start times varying for each four-day sampling period and for each sampler. Due to the distance between each of the sampling locations and the transit and set up times, the start and stop times of the four locations were not the same, but were as close as possible. The circuit to start all sampling

locations required between one and two hours, so the majority of sampling start and end times were within a two hour period.

Sampling canisters were located on rooftops at the selected sampling locations. The canister was placed on a tripod holding the micrometeorological monitoring station at each site. The inlet for the sampling line was at a height of approximately 6 feet above the surface of the roof-top or other surface where the tripod was placed. Figure 4 shows an example placement on the roof of the Sharps Automotive location in Oxnard (SHA).

The beginning vacuum in the canister was –29.95 to –27 in Hg, which are considered commonly acceptable limits in the sampling community. The flow rate was set to fill the canister from the nominal –29.95 inches of Hg to approximately –5-8 inches of Hg, corresponding to a flow rate of approximately 3 mL/min. The target volume was 4 liters of sample. The inlet was fashioned from ¼ inch OD 304 stainless steel with the tip curved downward to prevent entry of rain. A 1 micron stainless steel frit filter was inserted in the sampling line before the flow controller.

A Veriflo flow controller or the equivalent was used to control the flow into the canisters. New flow controllers were used for this program given that past experiences were problematic.

Flow controllers were calibrated on a daily basis. The sampler was flow and leak checked prior to the start of each sample. The leak check procedure consisted of placing the flow controller on the canister, closing off the inlet with a cap, and opening and subsequently closing the valve. The pressure gauge was watched for any movement. Given the small volume of the inlet line and pressure gauge, a small leak could be detected. If any movement was detected over a 2 minute period, all fittings were checked and tightened.

Flow was measured at the start and end of the sampling period with a J&W ADM-3000 digital flow meter, NIST certified and accurate to ±3%. Deviations to the expected flow of ±25% were allowed before disqualifying the sample. Vacuum gauges were integrated with the inlet system so that the pressure in addition to flow was monitored without removing the inlet.

A small number of samples were invalidated due to flow controller deviations. It was concluded that the leak check procedure was critical in maintaining correct flow rates.

Following collection, individual samples were labeled with notation encoding the sampling location and date. The sample tag included type of sample information, project information (client, etc), and field technician name. Chain of custody forms were prepared for each batch of canisters sent to the laboratory.

Figure 4. Sampler and micromet set up at SHA rooftop site.

Samples were stored at ambient temperature until analysis, which typically was less than one week after sample collection. Stability of the collected sampled was not considered a problem due to the large amount of documentation in the literature regarding the stability of methyl bromide and other similar toxic compounds for periods of at least two weeks or more.[i,ii,iii]

Detailed notes on the start and end times, start and ending pressures, and flow rate measurements are included in the appendix.

2.3.2 Laboratory analysis

Laboratory analysis was conducted at Environmental Analytical Service (EAS) in San Luis Obispo, California, using Modified EPA Compendium Method TO-14A. This method uses a cryogenic preconcentration of an aliquot of the field sample, with subsequent desorption into the gas chromatograph column and detection by mass spectrometry with selected ion monitoring (SIM). Specific method details relating to the performance of the laboratory analysis were detailed in the work plan. It should be noted that this analysis utilized the stable isotope dilution technique to provide accurate results. This modified method is more sophisticated than the usual method of quantitation and provides for a determination of matrix effects to the target compound. EAS is an experienced practitioner of this technique which is unusual for standard air analysis.

A method detection limited study was performed based on the standard EPA method for determining method detection limits as noted in 40 CFR part 36, Appendix B. A standard at concentration of 0.0082 ppbv was analyzed seven times to yield a standard deviation of

0.00084, which was multiplied times 3.14 to provide the method detection limit of 0.003ppbv. Table 4 contains the data from this study.

Std	0.0082
Run	Result
1	0.0082
2	0.0076
3	0.0067
4	0.0063
5	0.0076
6	0.0058
7	0.0072
Ave.	0.0071
Std. Dev.	0.00084
MDL	0.0026

All conc. in ppbv.

Table 4. MDL Study

All data above the MDL was reported and used in statistical calculations. All data above the MDL were reported by the laboratory and were used in data calculations (except for data rejected due to specific QA issues). No field samples were below the MDL.

2.3.3 Meteorological Data Collection

Two types of meteorological monitoring were conducted during the program. First, each sampling site had a site-specific micrometeorological station to collect wind speed, wind direction, and temperature. These stations were called "micrometeorological stations." These stations were a Spectrum Technologies, Inc. Model 525 weather station, which measured wind speed, wind direction, and temperature. The station was at the same height and location as each canister sampler so that specific site micro-conditions could be recorded. Wind data was recorded at 60 minute intervals and downloaded weekly with each sample set.

The second meteorological monitoring station was located at a central location and was used for general regional conditions. This system is identified as the "main meteorological station." This system was a Novalynx WS-16 system which measured wind speed, wind direction, temperature, relative humidity, and barometric pressure. The main sensor set (wind speed and direction) were NIST certified and met PSD performance specifications. Data was recorded as 60 minute averages for the duration of the program. In Oxnard/Camarillo, the main met station was located at the UVW site, on top of a pump building, at a height of approximately 8 meters. In Watsonville, the main met station was situated at the FRM site, at a height of approximately 5 meters. Meteorological data for the MAQ site was obtained from the Monterey County Unified Air Pollution Control District, which maintains a 10 meter tower at the site.

2.4 External Comparison Samples

Comparison samples were collected alongside CDPR samplers over a 2-day period in both the Ventura and Monterey/Santa Cruz areas. AMBI data from these dates has been submitted to CDPR, but comparison data has been provided, so no evaluation of this intercomparison can be performed at this point.

2.5 Excluded Periods

As cited in the work plan, any nearby fumigation would be considered grounds for exclusion of any samples collected at that time. This circumstance occurred on two occasions at the UWC site in Camarillo. On August 23 and 24, 2002, the field immediately to the north of the UWC site was fumigated by Trical, starting at 6:30 AM on each day. Figure 5 demonstrates the proximity of the field to the sampler.

Figure 5. UWC Site adjacent to fumigated field

Therefore, no samples were analyzed for these two dates.

3. DATA VALIDATION

Data validation was performed on that data sets from Ventura and Monterey/Santa Cruz area by examining the following quality assurance indicators:

- Completeness—the ratio of valid samples to total possible samples. The usual criterion is a completeness ratio of 75%. Valid samples were determined according to meeting flow deviation criteria.
- Comparability—use of standard procedures to ensure comparability with other monitoring data.
- Representativeness—evaluation of how closely the sampling design represents the true concentrations of ambient air in the area.
- Accuracy—adequate recovery of daily laboratory spikes. Evaluation of field and trip spike recoveries.
- Precision—adequate precision between field and laboratory duplicate samples.

3.1 Completeness

In the Monterey/Santa Cruz area, a total of 165 valid samples were collected, out of a possible total of 168. Three samples were lost due to flow controller exceedances outside of the ±25% criterion, one of which was at the background site. This yields a completeness of 98.2%.

In Ventura County, there was a total of 121 valid samples out of a possible total of 128, which yields a completion rate of 94.5%. A total of seven samples were invalidated due to not meeting the flow controller criterion, however one of these was in a duplicate sample pair so the primary sample was still valid. In addition, two samples were not analyzed due to a nearby fumigation on August 23 and 24, 2002 adjacent to the UWC site, as noted above. As the elimination of these two samples due to proximity to a fumigation was part of the work plan, these samples were not considered to be part of the invalidated sample list.

3.2 Comparability

The use of standard approved sampling and analytical techniques provides for comparable data. All procedures were based on USEPA sampling and analytical methods. Therefore, the data collected in this program are comparable to that collected in other programs.

3.3 Representativeness

The representativeness of a program is based on adherence to the stated objectives of the program as well as following standard sampler and probe sampling criteria. The objective of this program has been understood to be an assessment of the impact to ambient air of fumigation activities in heavy use areas. Therefore, a key aspect was the selection of appropriate sampling sites that represent a balance between being close to populations at risk but not so far from agricultural operations to render the sampling data unusable. This balance

is subjective, and it is believed that the site selection was appropriate for the objectives of the program.

Adherence to the siting and probe placement guidelines has been met in all sites except for the WAT site in Watsonville in which the sampler was slightly closer to some trees than the criteria state. It is believed that this slight difference does not impact the data.

3.4 Accuracy

The accuracy of the analytical data relies on several types of indicator samples: laboratory check standard analyses, trip spikes, and field spikes. In addition, while blanks are not a direct an indicator of accuracy, they can affect the accuracy of the sample data, so they will be considered here along with the more traditional means of assessing accuracy.

- Laboratory check standards

  The laboratory checks standards (LCS) are the primary means to assess laboratory accuracy, which is the major portion of the accuracy breakdown. A total of 13 laboratory check samples were analyzed for the Ventura sample set, and a total of 17 were analyzed for the Monterey/Santa Cruz sample set.

  Table 5 contains the results of the Ventura LCS samples. Figure 6 shows a quality control chart with these data point. These data show that the system was in statistical control throughout the sampling program, with an average recovery of 96.3% on the LCS samples.

Date	Recovery	Ave.
7/17/02	97	96.3
7/26/02	92	96.3
8/1/02	93	96.3
8/2/02	73	96.3
8/8/02	92	96.3
8/9/02	105	96.3
8/15/02	97	96.3
8/22/02	100	96.3
8/29/02	98	96.3
8/30/02	96	96.3
8/31/02	99	96.3
9/5/02	111	96.3
9/6/02	99	96.3

Table 5. Ventura LCS Recoveries

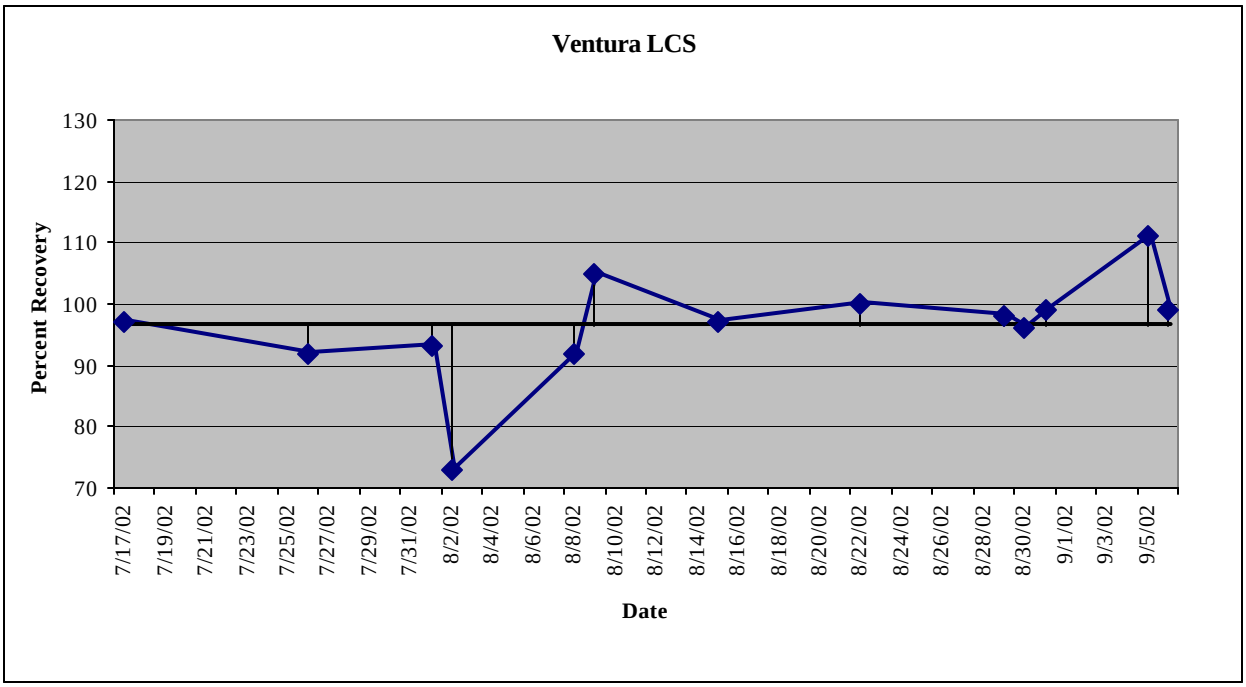

Figure 6. Ventura LCS Quality Control Chart

Table 6 contains the results from the Monterey/Santa Cruz LCS samples. The average recovery was 107.9%. Figure 7 shows the Monterey/Santa Cruz QC chart.

Date	Recovery
9/10/02	110
9/11/02	118
9/17/02	118
9/18/02	103
9/23/02	96
9/24/02	109
9/25/02	96
10/1/02	106
10/2/02	106
10/7/02	95
10/9/02	103
10/14/02	100
10/15/02	96
10/21/02	108
10/23/02	122
10/25/02	129
10/29/02	120

Table 6. Monterey/Santa Cruz LCS Recoveries

These sets of data show that the system was in statistical control and that the average recoveries are satisfactory and indicative of a well-functioning system.

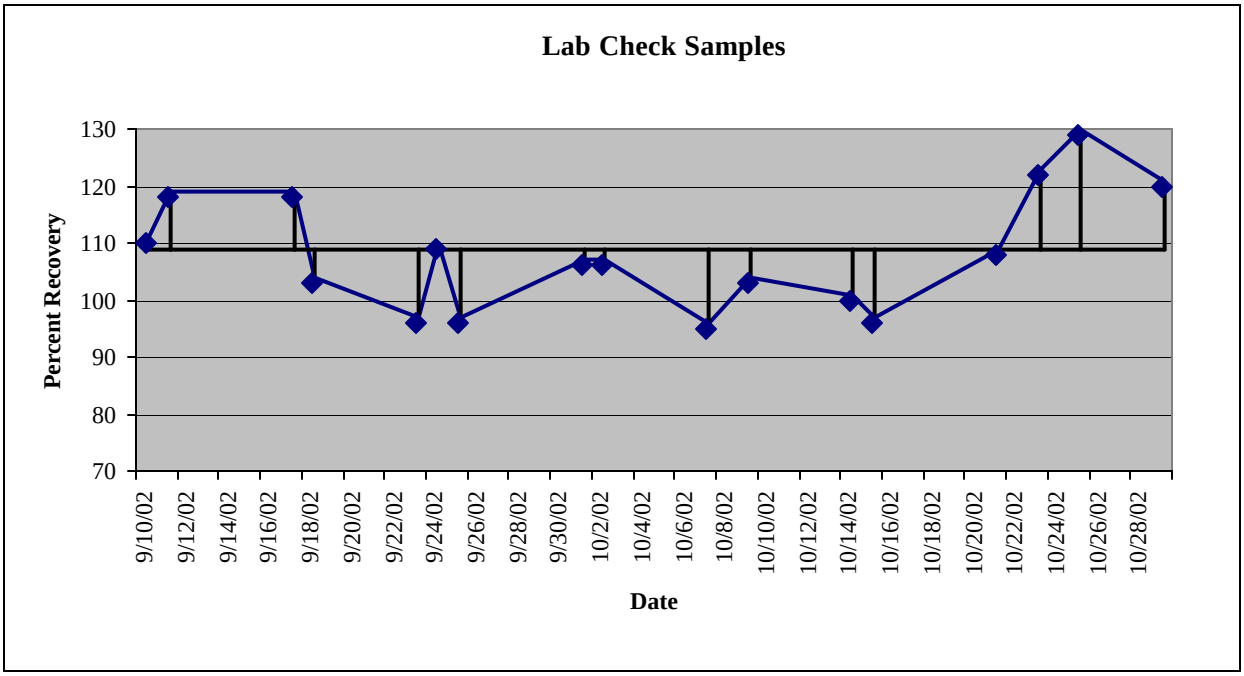

Figure 7. Monterey/Santa Cruz QC Chart

- Trip Spikes

  A total of 10 trip spikes were prepared and analyzed for the Ventura and Monterey/Santa Cruz programs. Table 7 contains the results from these spikes.

Ventura					
Type of Sample	**Date**	**Sample (ppbv)**	**FS (ppbv)**	**Spiked Amt (ppbv)**	**Recovery**
Trip Spikes	07/19/02		1.183	1.2	**98.6%**
In house Trip Spike	08/03/02		1.119	1.2	**93.3%**
Trip Spikes	08/03/02		1.183	1.2	**98.6%**
Trip Spikes	08/09/02		0.954	1.2	**79.5%**
Trip Spikes	08/17/02		0.718	1.2	**59.8%**
Trip Spikes	08/30/02		0.670	1.2	**55.8%**
Monterey/Santa Cruz					
Trip Spikes	09/12/02		0.804	1.2	**67.0%**
Trip Spikes	09/26/02		1.759	1.2	**146.6%**
Trip Spikes	10/10/02		1.254	1.2	**104.5%**
Trip Spikes	10/24/02		1.727	1.2	**143.9%**
				Average	**94.8%**

Table 7. Trip Spike Results

Figure 8 shows the recoveries over time.

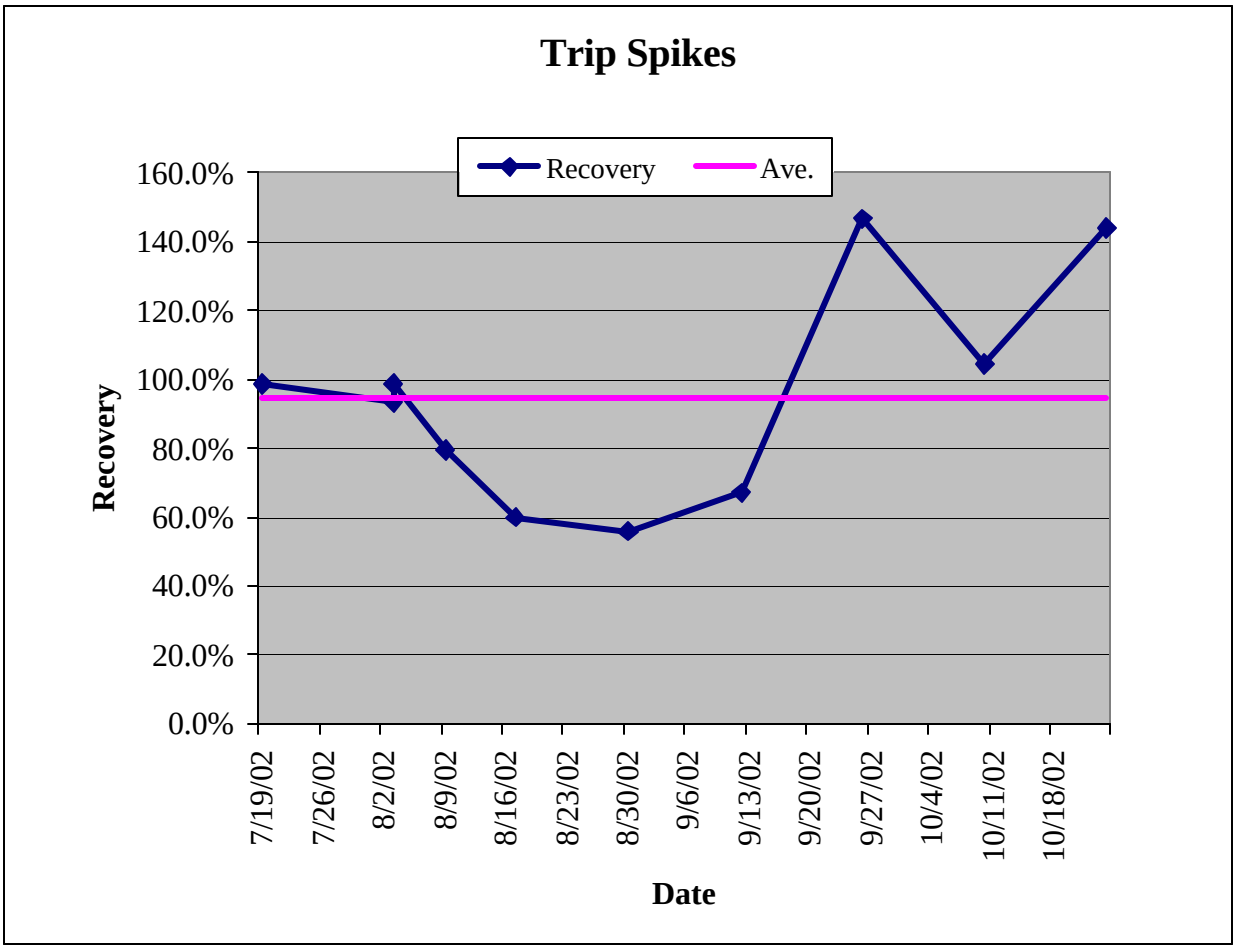

Figure 8. Trip Spike Recovery QC Chart

While the overall average of 94.8% is satisfactory, several individual results are outside of the usual bounds for satisfactory recovery. There appears to be a trend towards low recoveries during the July time frame, but that is broken by some high and normal values that follow.

The reason for this kind of variability is hard to diagnose. Two main possibilities are 1) instability of methyl bromide in the canisters, and 2) a spiking process that is poorly controlled.

Attempts were made to duplicate the CARB as understood. Both dry and humid canisters were tested. Unfortunately, the on-going nature of the study did not allow an opportunity to develop and test the procedure adequately. The laboratory had to resort to testing along with conducting routine analyses.

The first possibility for reasons behind this variability is shown to be moot—there are several well-regarded studies that show the long-term stability of methyl bromide in Summa canisters. No statements regarding unstable behavior for methyl

bromide in canisters is ever seen in the literature, nor among discussions with several commercial laboratories or experienced analysts. Indeed, the CARB laboratory does not make any assertions regarding possible poor stability.

Therefore, it is concluded that the reason for the poor performance of the trip spike results is due to an out of control spike production process. The performance during the month of August may be explained by the absence of the laboratory director and the subsequent reliance upon less experienced personnel, but the later high values cannot be explained in this fashion.

While it is a reasonable explanation regarding the laboratory processes, the question that remains is whether these results indicate anything about the quality and accuracy of the data that has been reported.

Based on the above statements regarding the wide-spread positive experience with methyl bromide in summa canisters, the use of the trip spike canisters to evaluate stability is of little use, with subsequent poor results doing nothing to disqualify marginal data. The conclusion, therefore, is that the variable trip spike results alone do not affect the overall quality of the data. A discussion of the ensemble of the QA/QC data follows the individual data indicator reviews that takes into account the results from the various quality assurance procedures.

- Field spikes

  Ostensibly, the use of field spikes was designed to assess the process of sampling and the stability of the sample in the canister. In reality, it appears to primarily assess the skill of the operator in spiking the canister. The field spike results from 2002 were extremely variable, which mirrors the experience from 2001. Table 8 contains the results of these spikes.

Type of Sample	Date	Sample (ppbv)	FS (ppbv)	Spiked Amt (ppbv)	Recovery	Comments
Ventura						
Field Spike (1)	07/19/02	0.304	0.278	1.2	**-2.2%**	This was the first spike, dry
In House Field Spike	08/03/02	1.183	0	1.2	**-98.6%**	
Field Spike	08/09/02	2.22	5.139	1.2	**243.3%**	Highly variable site (3)
Field Spike	08/17/02	1.449	1.649	0.24 (2)	**83.3%**	Used higher duplicate result
Field Spike	08/30/02	0.224	1.175	1.2	**79.3%**	
Monterey/Santa Cruz						
Field Spike	09/13/02	0.846	1.742	1.2	**74.7%**	
Field Spike	09/26/02	1.045	3.224	1.2	**181.6%**	
Field Spike	10/10/02	0.247	2.358	1.2	**175.9%**	
Field Spike	10/24/02	0.745	2.317	1.2	**131.0%**	

Comments:

The field spike recovery was calculated as the difference between two measurements each of which has an uncertainty of about 30%. In addition the sample result is an estimate based on a duplicate canister collected at the same time and location as the spiked canister.

(1) The first field spike was spiked into a dry canister and had poor recovery as expected. Subsequent field spikes were made into a humidified canister.
(2) This can was prepared as a trip spike then evacuated and sent as a field spike. No additional methyl bromide was spiked into the canister. Two analysis were made on this sample for comparison the higher was used.
(3) This site had high and sometimes variable values even in replicate canisters. Two analysis were made on this sample, for comparison the higher was used.

Table 8. Field Spike Results

These results show a great amount of variability and can be interpreted in several ways. As with the trip spikes, the question boils down to whether the behavior of methyl bromide in Summa canisters is under question, or whether the spike preparation process is inadequate. Again, ultimately, the question to be answered in assessing this data is whether the data accurately represents the performance of the sampling and analytical system.

Between the 2001 and 2002 data, the majority of the satisfactory results can be seen in the few spike samples prepared by the laboratory director and the AMBI study director, both experienced PhD chemists. The primary information that the spiking process has shown over two years of monitoring is the skill of the persons doing the spiking. In addition, in a query to USEPA OAQPS staff, it was determined that no Federal programs ever use this kind of spike technique because of these kinds of difficulties. In addition, no commercial laboratory queried has seen this kind of spiking regimen.

The trip spike results assessed solely the performance of methyl bromide in a clean canister. The field spike assesses the additional factor of the sample matrix. Hence the question becomes whether the sample matrix could likely affect the recovery to the extent that is seen in these spike results?

The answer to this question is believed to be no—the ambient air matrix for this study is not so unusual to contradict the wide-spread experience of many laboratories and studies. The atmospheric environment that was sampled would not be expected to cause difficulties. The areas are not heavily industrialized so no high burden of reactive species would be expected to be present, the humidity is not high nor low causing surface issues, and the particulate levels would be expected to be low due to the high marine air content. There does not appear to be any reason to expect the air matrix to contribute negatively to recoveries in the Summa canisters. Indeed, the preponderance of evidence is that these atmospheres are benign and that they would be a good matrix for methyl bromide recoveries.

Therefore, as with the trip spike results, the evaluation of the field spike results leads to the conclusion that the spike production procedure was flawed at the laboratory and that the system was out of statistical control. Indeed, it is likely that the same technician that prepared the trip spike would have prepared the field spikes, thus perpetuating similar errors. The final evaluation of the field spikes will be made in Section 3.6 Data Quality Assessment.

- Trip and Laboratory Blanks

A total of 8 trip blank samples in both Ventura and Monterey/Santa Cruz were prepared and assessed. Table 9 shows the results of the trip blank samples. All were non-detect, thus no contamination from field sources or from contaminated canisters is indicated.

Date	Result	MDL
Ventura		
7/13/2002	<MDL	0.003 ppbv
7/18/2002	<MDL	0.003 ppbv
7/26/2002	<MDL	0.003 ppbv
8/2/2002	<MDL	0.003 ppbv
8/7/2002	<MDL	0.003 ppbv
8/15/2002	<MDL	0.003 ppbv
8/28/2002	<MDL	0.003 ppbv
8/29/2002	<MDL	0.003 ppbv
Monterey/Santa Cruz		
7-Sep	<MDL	0.003 ppbv
12-Sep	<MDL	0.003 ppbv
19-Sep	<MDL	0.003 ppbv
26-Sep	<MDL	0.003 ppbv
3-Oct	<MDL	0.003 ppbv
10-Oct	<MDL	0.003 ppbv
17-Oct	<MDL	0.003 ppbv
24-Oct	<MDL	0.005 ppbv

Table 9. Trip Blank Results

All the laboratory blanks were non-detect at the 0.003 ppbv MDL, thus no laboratory-based contamination need be considered to affect the data.

3.5 Precision

Table 10 contains the results of the field duplicates from Ventura. Table 11 contains the results of the laboratory duplicate analysis.

Date	Primary	Duplicate	RPD
7/12/02	0.263	0.242	8.3%
7/17/02	0.095	0.116	19.9%
7/25/02	3.105	3.357	7.8%
7/26/02	0.702	0.296	81.4%
7/27/02	0.173	0.178	2.8%
7/27/02	1.07	0.746	35.7%
7/27/02	0.712	0.561	23.7%
7/27/02	0.731	0.35	70.5%
7/31/02	0.764	0.697	9.2%
8/2/02	0.986	1.039	5.2%
8/7/02	6.415	5.125	22.4%
8/16/02	0.964	1.111	14.2%
8/28/02	0.039	0.050	24.7%
8/29/02	0.073	0.070	4.2%
Average			23.6%

Units: ppbv
RPD=Relative Percent Difference

Table 10. Field Duplicate Sample Results

Date	Primary	Duplicate	RPD
7/11/02	0.595	0.524	12.7%
7/17/02	0.398	0.414	3.9%
7/25/02	0.229	0.224	2.2%
7/27/02	0.086	0.066	26.3%
8/3/02	7.594	7.386	2.8%
8/8/02	14.216	12.128	15.9%
8/14/02	0.612	0.728	17.3%
8/16/02	0.163	0.153	6.3%
8/23/02	0.893	0.831	7.2%
8/29/02	0.358	0.364	1.7%
8/31/02	0.023	0.025	8.3%
Average			9.5%

Units: ppbv
RPD=Relative Percent Difference

Table 11. Laboratory Duplicate Analysis Results

While the average of 23.6% is satisfactory for the field duplicates, it is largely driven by the two large values—81.45 and 70.5%. This average RPD suggests an adequately precise sampling and analysis system.

Tables 12 and 13 contain the field and laboratory duplicate results from Monterey/Santa Cruz.

Date	Result	Dup	RPD
9/11/02	0.302	0.435	36.1%
9/13/02	2.176	2.295	5.3%
9/20/02	2.757	2.526	8.7%
9/25/02	1.28	1.24	3.2%
10/3/02	1.391	1.275	8.7%
10/9/02	0.813	0.729	10.9%
10/16/02	1.868	1.891	1.2%
10/23/02	1.094	0.613	56.4%
Average			16.3%

Units: ppbv
RPD=Relative Percent Difference

Table 12. Field Duplicate Results for Monterey/Santa Cruz

Date	Result	Dup	RPD
9/12/02	0.205	0.215	4.8%
9/14/02	0.836	0.816	2.4%
9/20/02	3.039	3.734	20.5%
9/21/02	1.801	2.278	23.4%
9/27/02	1.498	1.474	1.6%
10/4/02	0.743	0.835	11.7%
10/11/02	3.251	3.133	3.7%
10/9/02	0.673	0.785	15.4%
10/16/02	0.262	0.295	11.8%
10/16/02	0.016	0.019	17.1%
10/19/02	0.643	0.635	1.3%
10/24/02	1.677	1.651	1.6%
10/25/02	0.473	0.336	33.9%
10/26/02	0.401	0.301	28.5%
Average			12.7%

Units: ppbv
RPD=Relative Percent Difference

Table 13. Laboratory Duplicate Results for Monterey/Santa Cruz

The field precision results from Monterey/Santa Cruz of 16.3% is satisfactory, as is the laboratory result of 12.7%. Both these results suggests a system that is in control and that produces valid data.

3.6 Data Quality Assessment

For the final validation of these data sets, the question remains about to reconcile conflicting results. The variable field and trip spike results suggest either problems with the fundamental basis for sampling methyl bromide in canisters or a poorly controlled spiking system. These results are contradicted by the appearance of a highly controlled quantitative analysis system, as evidenced by the LCS recoveries plus the favorable precision results from the duplicate analyses. Furthermore, the other field and laboratory data quality indicators suggest an adequately controlled system that can provide satisfactory data for program uses. How are these results reconciled?

In regards to the spike question, it is believed that there is no question regarding the stability of methyl bromide in Summa canisters. Therefore, assuming that stability is not a variable, the high variability in the field and trip spikes suggests a spiking system that is out of statistical control. On the other hand, the satisfactory LCS recoveries, the clean laboratory and trip blanks, and satisfactory field and laboratory precision data results suggest a system that is indeed under control and producing satisfactory and usable results.

When one considers the spiking process, it is apart from the normal part of the laboratory analysis process. It was performed on canisters leaving the laboratory, not entering it for analysis. Therefore, the errors that originated in that process would not be expected to affect the analysis portion of the entire system. Indeed, the other quality assurance indicators suggest that this is what happened. With the exception of the spiking process, both the field and laboratory processes appear to have been performed adequately.

Therefore, the combination of results leads to the conclusion that although a substantial portion of the intended quality process has been compromised due to unknown errors, the overall quality of the data has not been compromised. Consequently, it is concluded that that the data can be used for the intended purpose. Based on this analysis, the conclusion is that there is no justification for any wide-scale disqualification of the data on the basis of the spike results, and the data can be used as desired.

4. RESULTS AND DISCUSSION

4.1 Ventura County

4.1.1. Methyl Bromide Concentrations

The data from the valid data set as described above were combined into one data set for review and interpretation. The field duplicate pairs were averaged, as were the laboratory duplicate pairs. Sets of laboratory and duplicate pairs were averaged with the same type first and then together.

Table 14 contains the results from Ventura County-2002. The dashes (--) indicate lost samples.

Table 14. Results from Ventura County

Ventura County-2002					
Date	Day	ABD	SHA	PVW	UWC
7/7/02	Sun				
7/8/02	Mon				
7/9/02	Tue				
7/10/02	Wed	0.042	0.028	0.21	--
7/11/02	Thu	0.092	0.031	0.56	--
7/12/02	Fri	0.25	0.013	0.49	0.17
7/13/02	Sat	0.18	0.087	0.35	0.36
7/14/02	Sun				
7/15/02	Mon				
7/16/02	Tue				
7/17/02	Wed	--	0.11	0.10	0.41
7/18/02	Thu	0.39	0.15	0.63	1.0
7/19/02	Fri	0.14	0.028	0.30	0.42
7/20/02	Sat	0.16	--	0.15	--
7/21/02	Sun				
7/22/02	Mon				
7/23/02	Tue				
7/24/02	Wed	0.88	0.37	0.86	2.1
7/25/02	Thu	1.9	0.45	0.23	3.2
7/26/02	Fri	0.50	0.63	0.91	0.54
7/27/02	Sat	0.18	0.08	0.38	0.64
7/28/02	Sun				
7/29/02	Mon				
7/30/02	Tue				
7/31/02	Wed	--	0.041	0.73	--
8/1/02	Thu	0.41	0.060	0.62	0.77
8/2/02	Fri	1.0	0.059	0.85	1.5
8/3/02	Sat	0.99	0.43	1.6	7.5

Ventura County-2002					
Date	Day	ABD	SHA	PVW	UWC
8/4/02	Sun				
8/5/02	Mon				
8/6/02	Tue				
8/7/02	Wed	2.0	5.8	5.2	5.2
8/8/02	Thu	3.4	1.9	6.0	13
8/9/02	Fri	3.4	1.3	9.5	8.8
8/10/02	Sat	2.0	0.11	3.6	4.7
8/11/02	Sun				
8/12/02	Mon				
8/13/02	Tue				
8/14/02	Wed	0.67	0.18	1.3	2.4
8/15/02	Thu	0.36	0.12	1.2	1.5
8/16/02	Fri	0.16	0.089	1.0	1.2
8/17/02	Sat	0.57	0.64	1.2	1.4
8/18/02	Sun				
8/19/02	Mon				
8/20/02	Tue				
8/21/02	Wed	0.59	1.4	3.2	1.9
8/22/02	Thu	0.62	2.2	3.1	1.7
8/23/02	Fri	0.65	0.86	2.4	DNA
8/24/02	Sat	0.34	1.2	1.8	DNA
8/25/02	Sun				
8/26/02	Mon				
8/27/02	Tue				
8/28/02	Wed	0.19	0.04	0.28	0.37
8/29/02	Thu	0.072	0.004	0.36	0.34
8/30/02	Fri	0.22	0.14	1.2	0.44
8/31/02	Sat	0.98	0.024	1.5	1.2

Units: ppbv
(--)=invalidated or lost samples
DNA= Do not analyze, due to nearby fumigation

4.1.2 Statistical Description of Ventura County Concentration Data

Table 15-A contains a statistical summary of the methyl bromide concentrations in the Ventura data set as an ensemble. Table 15-B contains the breakdown of the data set into the individual data sets, and Table 15-C shows the weekly average concentrations. Figure 9 shows the plot of weekly concentrations over the study period.

Number	158
Max	16
Min	0.004
Overall Normal Ave.	2.3
95% Conf. Lim.	0.40
Overall Std Dev.	2.6
95th Percentile	2.7
Geometric mean	1.4
Median	1.5
Lognormal Ave.	2.6

Units: ppbv

Table 15-A. Ventura County Data Description

Sampling Site	**ABD**	**SHA**	**PVW**	**UWC**
Number	30	31	32	26
Max	3.4	5.8	9.5	13
Min	0.042	0.004	0.10	0.17
Normal Ave.	0.78	0.60	1.6	2.4
95% Conf. Lim.	0.32	0.40	0.70	1.20
Std Dev	0.90	1.1	2.0	3.1
95th Percentile	1.1	1.0	2.3	3.6
Geometric Mean	0.44	0.17	0.90	1.3
Median	0.46	0.12	0.89	1.3
Lognormal	0.82	0.72	1.7	2.4

Units: ppbv

Table 15-B. Ventura County Sampling Site Data Description

Week	**ABD**	**SHA**	**PVW**	**UWC**
7/10/02	0.141	0.040	0.400	0.266
7/14/02	0.227	0.096	0.297	0.624
7/24/02	0.852	0.379	0.594	1.633
7/31/02	0.805	0.149	0.942	3.259
8/7/02	2.701	2.278	6.053	7.961
8/14/02	0.438	0.259	1.208	1.623
8/21/02	0.550	1.424	2.610	1.783
8/28/02	0.364	0.052	0.847	0.585

Units: ppbv

Table 15-C. Weekly Ventura Sampling Site Concentrations

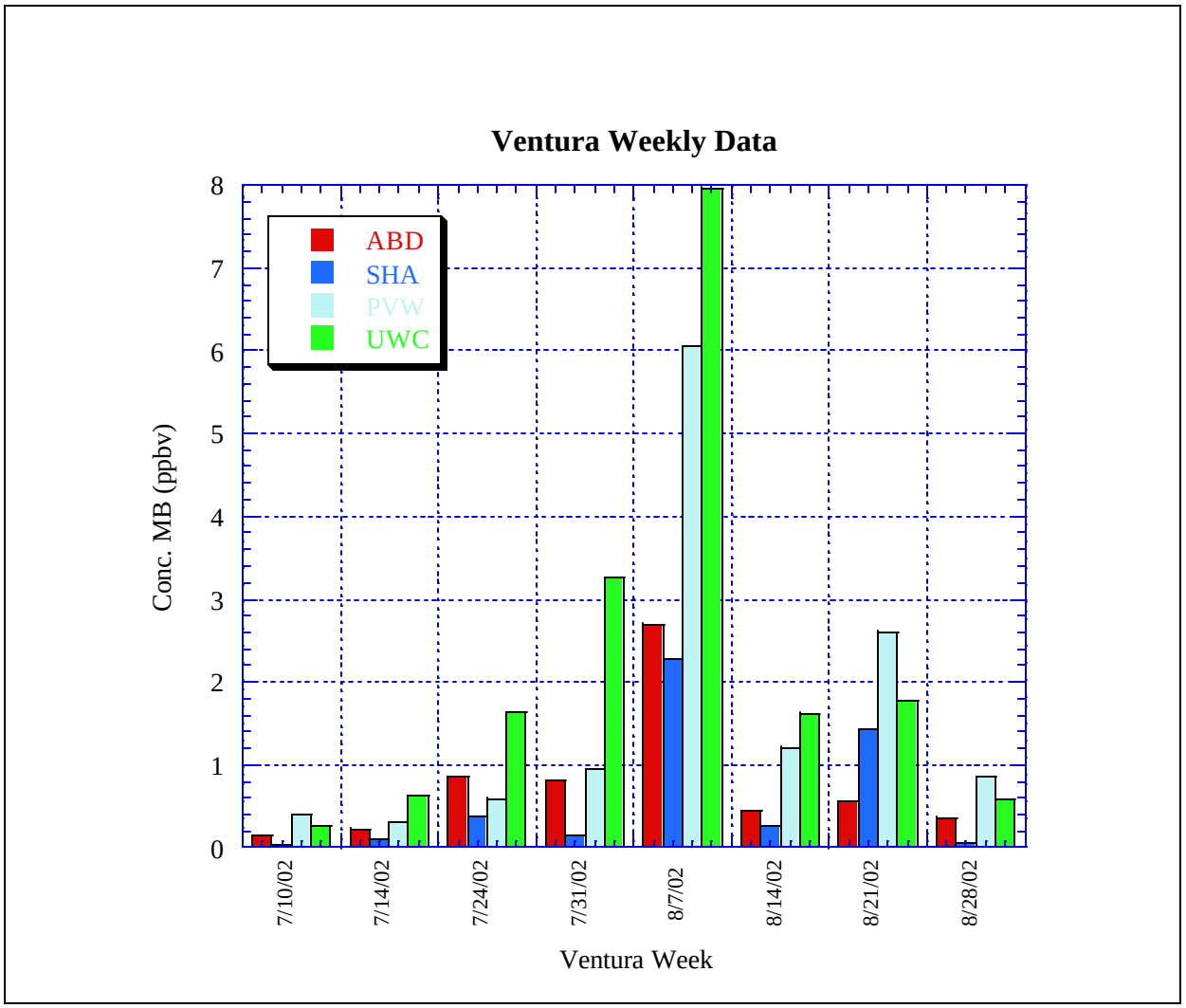

Figure 9. Plot of Weekly Ventura County Concentrations by Sampling Sites

4.1.3 Ventura County Meteorological Data

The meteorological data from 2002 was similar to 2001. The wind comes predominately from the south. Figure 9 contains the wind rose for the study period from the main met tower at the UVW site. This data shows that the majority of winds come from the SW to NW sectors. This is consistent with an off-shore/on-shore pattern for coastal areas. This also shows how emissions from fumigated fields to the south and southwest of the northern-most UVW site would impact the urban areas to the north side of the 101 freeway.

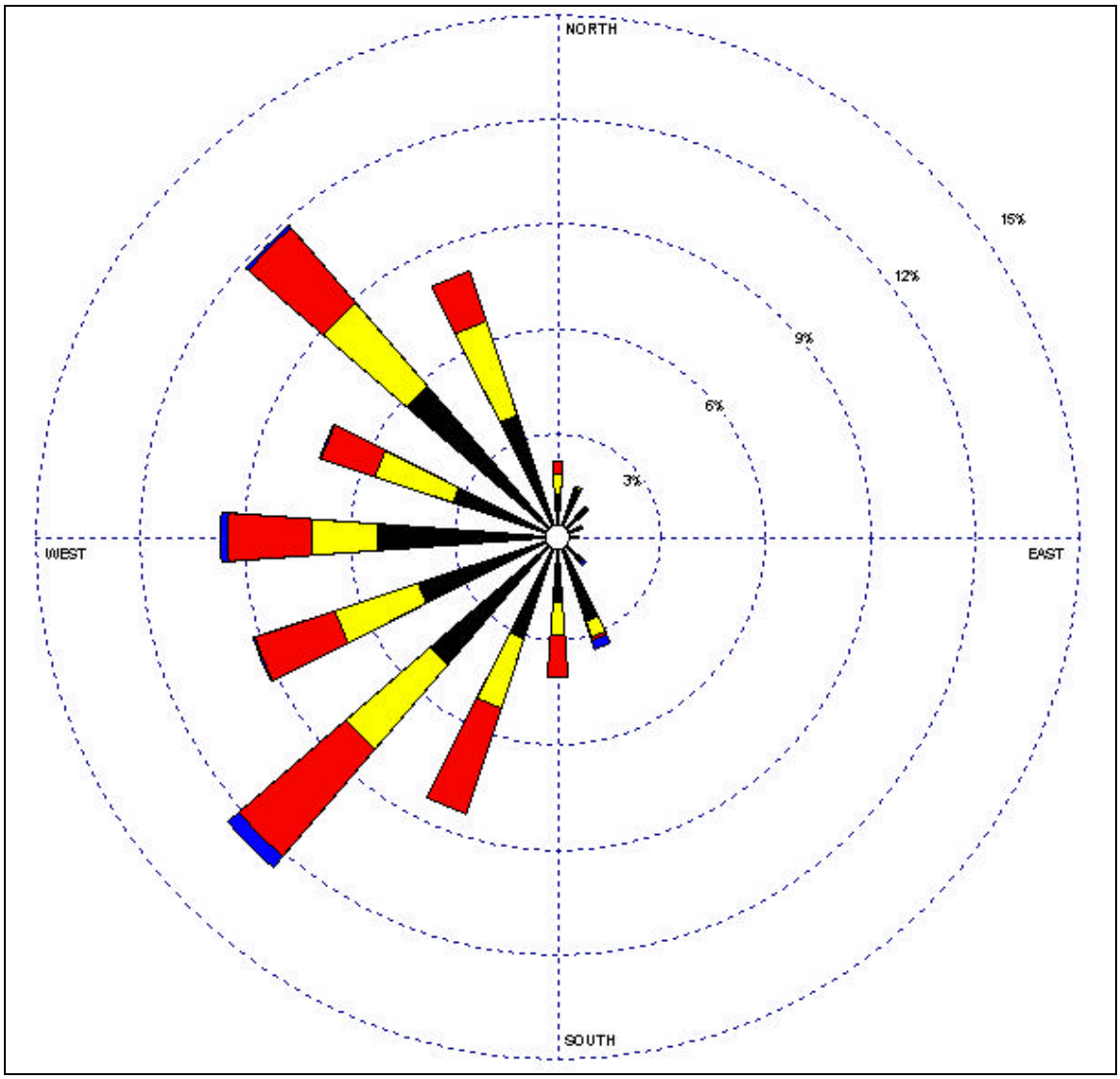

Figure 9. Wind Rose for Ventura County Area

The wind pattern represented in this wind rose is different from the later fall period when monitoring was conducted in 2001. That data showed a more westerly pattern, which is probably related to the time of year, as the previous monitoring was conducted in the August to October time frame.

4.2 Monterey/Santa Cruz Counties

4.2.1. Methyl Bromide concentrations

Table 15 contains the results from Monterey/Santa Cruz Counties.

Table 15. Results from Monterey/Santa Cruz County

Monterey/Santa Cruz Data							
Date	**Day**	**MAQ**	**BBC**	**WAT**	**FRM**	**CPW**	**SCF**
4-Sep	Wed	0.36	4.1	9.9	2.8	--	
5-Sep	Thu	0.86	2.9	7.5	4.2	0.003	
6-Sep	Fri	1.1	2.0	4.0	5.7	3.5	
7-Sep	Sat	1.2	1.0	--	14.0	2.8	
8-Sep	Sun						
9-Sep	Mon						
10-Sep	Tue						
11-Sep	Wed	0.092	0.37	1.2	0.72	2.3	0.12
12-Sep	Thu	0.21	0.80	0.65	0.47	0.90	0.24
13-Sep	Fri	0.64	0.85	2.2	1.9	1.2	--
14-Sep	Sat	0.83	1.6	2.1	2.1	1.5	0.69
15-Sep	Sun						
16-Sep	Mon						
17-Sep	Tue						
18-Sep	Wed	2.5	6.3	16.4	6.8	3.0	
19-Sep	Thu	4.5	5.5	12	9.8	11	
20-Sep	Fri	2.7	3.4	4.1	2.6	2.2	
21-Sep	Sat	0.80	6.3	0.94	2.0	2.8	
22-Sep	Sun						
23-Sep	Mon						
24-Sep	Tue						
25-Sep	Wed	0.18	0.81	0.83	0.83	1.3	
26-Sep	Thu	0.077	0.50	0.95	0.60	1.0	
27-Sep	Fri	0.43	1.2	3.1	0.45	1.5	
28-Sep	Sat	0.48	0.004	5.7	4.1	4.1	
29-Sep	Sun						
30-Sep	Mon						
1-Oct	Tue						
2-Oct	Wed	1.2	0.54	4.0	1.5	3.2	
3-Oct	Thu	1.3	1.8	3.4	3.6	3.5	

Monterey/Santa Cruz Data							
Date	**Day**	**MAQ**	**BBC**	**WAT**	**FRM**	**CPW**	**SCF**
4-Oct	Fri	2.1	2.5	3.9	0.79	2.7	
5-Oct	Sat	2.5	2.2	5.8	5.3	4.6	
6-Oct	Sun						
7-Oct	Mon						
8-Oct	Tue						
9-Oct	Wed	0.77	2.0	0.89	0.25	0.38	
10-Oct	Thu	0.25	4.6	3.0	0.51	0.82	
11-Oct	Fri	1.8	3.2	6.5	1.8	1.4	
12-Oct	Sat	1.5	3.1	0.24	1.5	1.5	
13-Oct	Sun						
14-Oct	Mon						
15-Oct	Tue						
16-Oct	Wed	0.63	2.2	3.5	1.9	0.28	0.018
17-Oct	Thu	0.22	0.24	1.7	1.3	0.53	0.14
18-Oct	Fri	0.32	0.25	1.0	1.0	0.64	0.094
19-Oct	Sat	0.51	0.93	1.3	1.0	0.64	0.43
20-Oct	Sun						
21-Oct	Mon						
22-Oct	Tue						
23-Oct	Wed	0.11	0.30	0.85	0.50	0.49	
24-Oct	Thu	2.4	1.7	3.0	2.0	2.2	
25-Oct	Fri	3.1	3.3	4.4	1.0	0.41	
26-Oct	Sat	0.39	0.32	0.75	0.60	0.35	

Units: ppbv
(--)=invalidated or lost samples

4.2.2. Statistical Description of Data

Table 16-A contains a statistical summary of the results from the Monterey/Santa Cruz Counties data set. Table 16-B contains statistics from this data set for the individual sampling sites. Table 16-C contains the weekly concentrations by sampling site. Figure 10 shows a plot of the weekly site concentrations.

Number	158
Max	16
Min	0.004
Overall Normal Ave.	2.3
95% Conf. Lim.	0.40
Overall Std Dev.	2.6
95th Percentile	2.7
Geometric mean	1.4
Median	1.5
Lognormal Ave.	2.6

Units: ppbv

Table 16-A. Monterey/Santa Cruz Counties Data Description

Site Specific	**MAQ**	**BBC**	**WAT**	**FRM**	**CPW**
Number	32	32	31	32	31
Max	4.5	6.3	16	14	11
Min	0.077	0.004	0.24	0.25	0.28
Normal Average	1.1	2.1	3.7	2.6	2.1
95% Conf.	0.37	0.61	1.3	1.0	0.73
Std Dev	1.1	1.8	3.7	3.0	2.1
95th Percentile	1.5	2.7	5.0	3.6	2.8
Geometric Mean	0.69	1.2	2.4	1.6	1.4
Median	0.78	1.7	3.0	1.7	1.5
Lognormal	1.2	3.3	4.0	2.6	3.2

Units: ppbv

Table 16-B. Monterey/Santa Cruz Counties Sampling Site Data Description

Week	**MAQ**	**BBC**	**WAT**	**FRM**	**CPW**
9/4/02	0.88	2.49	7.13	6.64	2.08
9/11/02	0.44	0.91	1.54	1.32	1.47
9/18/02	2.62	5.35	8.44	5.31	4.77
9/25/02	0.29	0.62	2.65	1.49	1.98
10/2/02	1.79	1.74	4.26	2.81	3.48
10/9/02	1.06	3.22	2.64	1.03	1.02
10/16/02	0.42	0.92	1.86	1.30	0.52
10/23/02	1.49	1.41	2.25	1.01	0.86

Table 16-C. Weekly Monterey/Santa Cruz Counties Sampling Site Concentrations

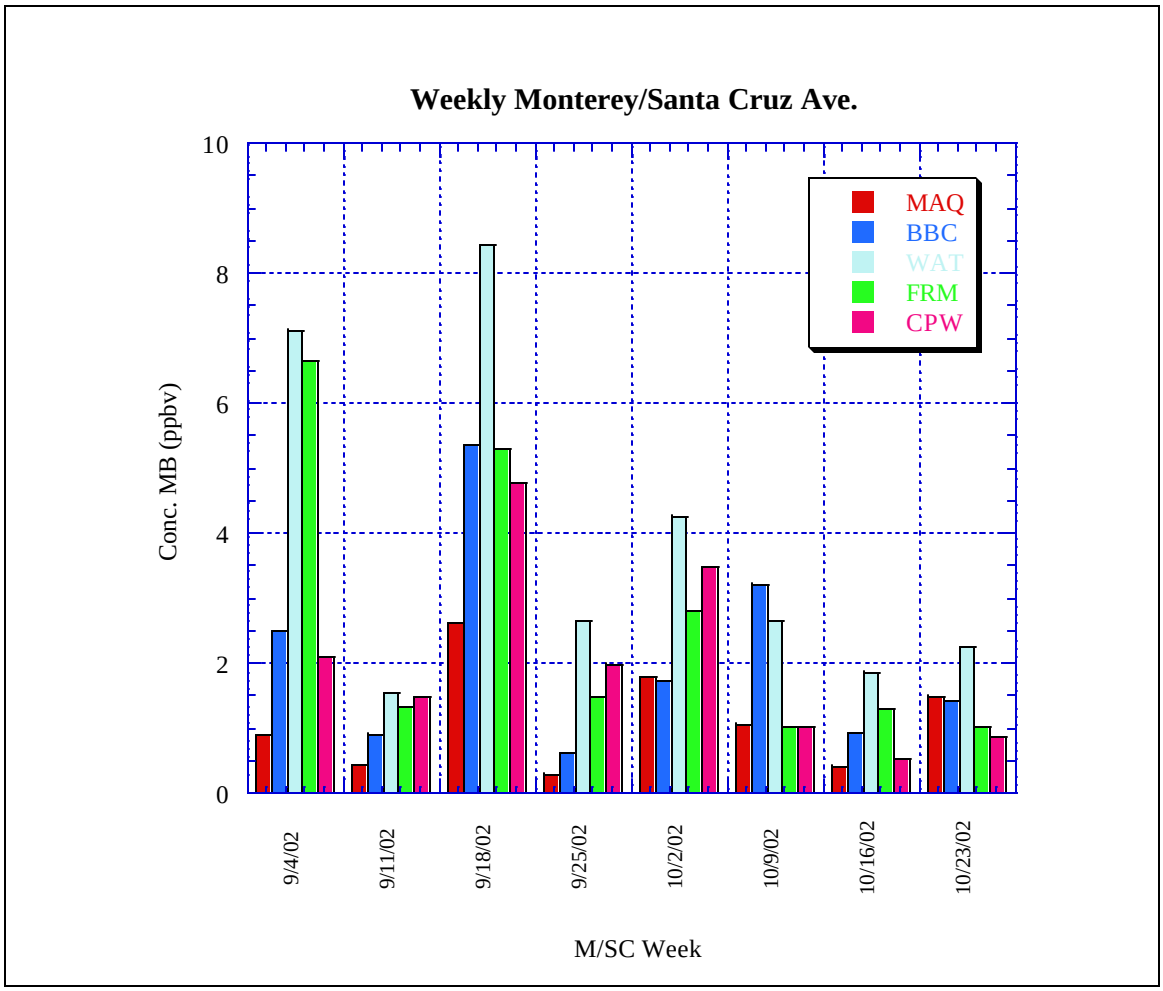

Figure 10. Plot of Weekly Monterey/Santa Cruz Counties Concentrations by Sampling Sites

4.2.3. Meteorological Data

Figures 11 and 12 show the wind roses for Watsonville and Salinas, respectively. The wind field is substantially different for the two locales due to the differences in terrain. In Watsonville, the wind comes primarily from the west in an on-shore pattern, plus a component of an off-shore pattern consistent with coastal areas. This wind pattern suggests that much of the fumigations that occur to the west of the city would produce impacts to the east. In addition, the on/off-shore pattern would reverse that tendency and disperse emissions from the east and northeast toward the city again.

The wind pattern for Salinas reflects the valley in which it sits at the entrance. The wind comes from the northwest, with a partial pattern from the southeast, in a remnant of the on-

shore/off-shore pattern. This pattern would affect the transport of emissions from the higher use area around Watsonville.

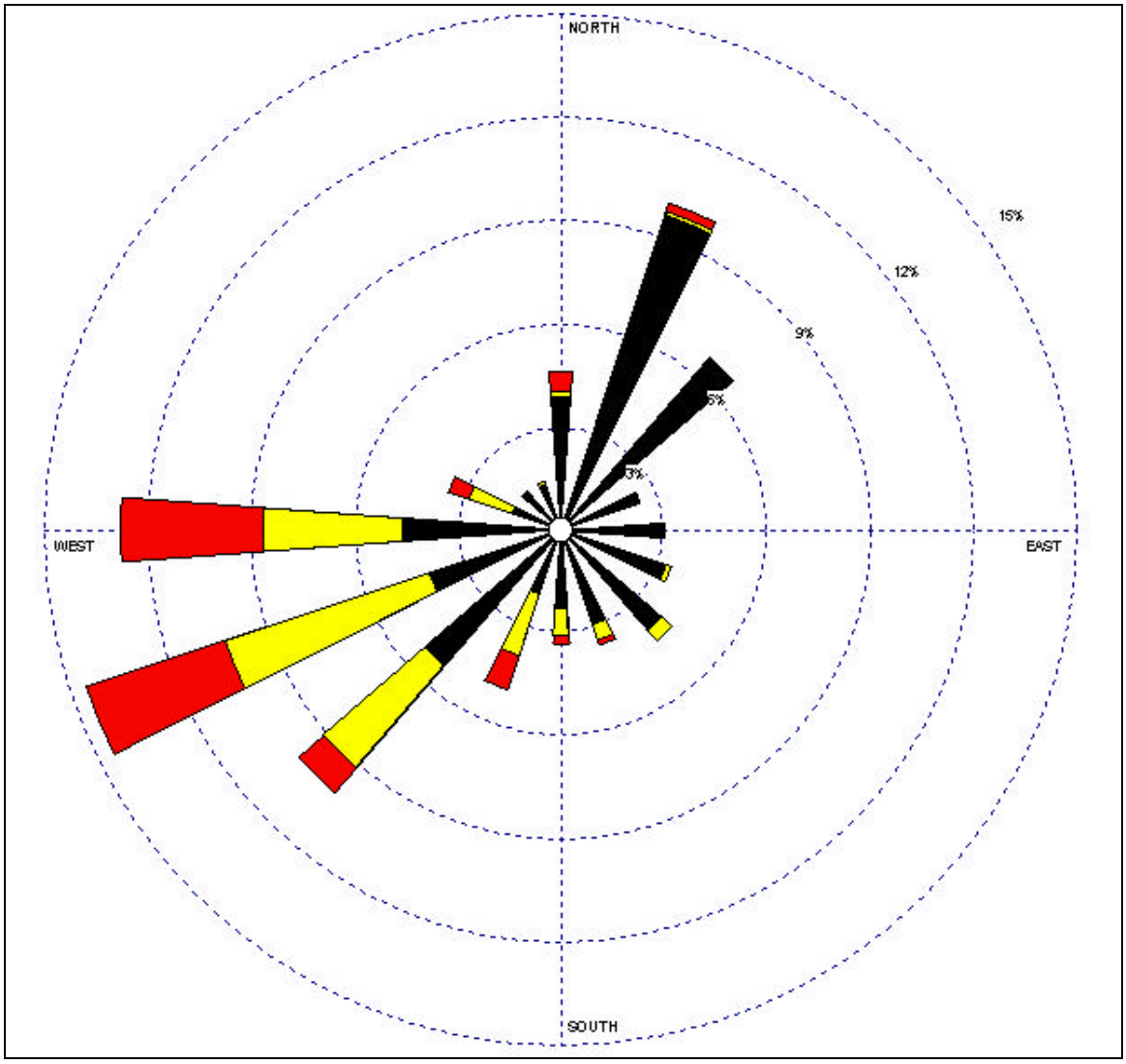

Figure 11. Watsonville Wind Rose

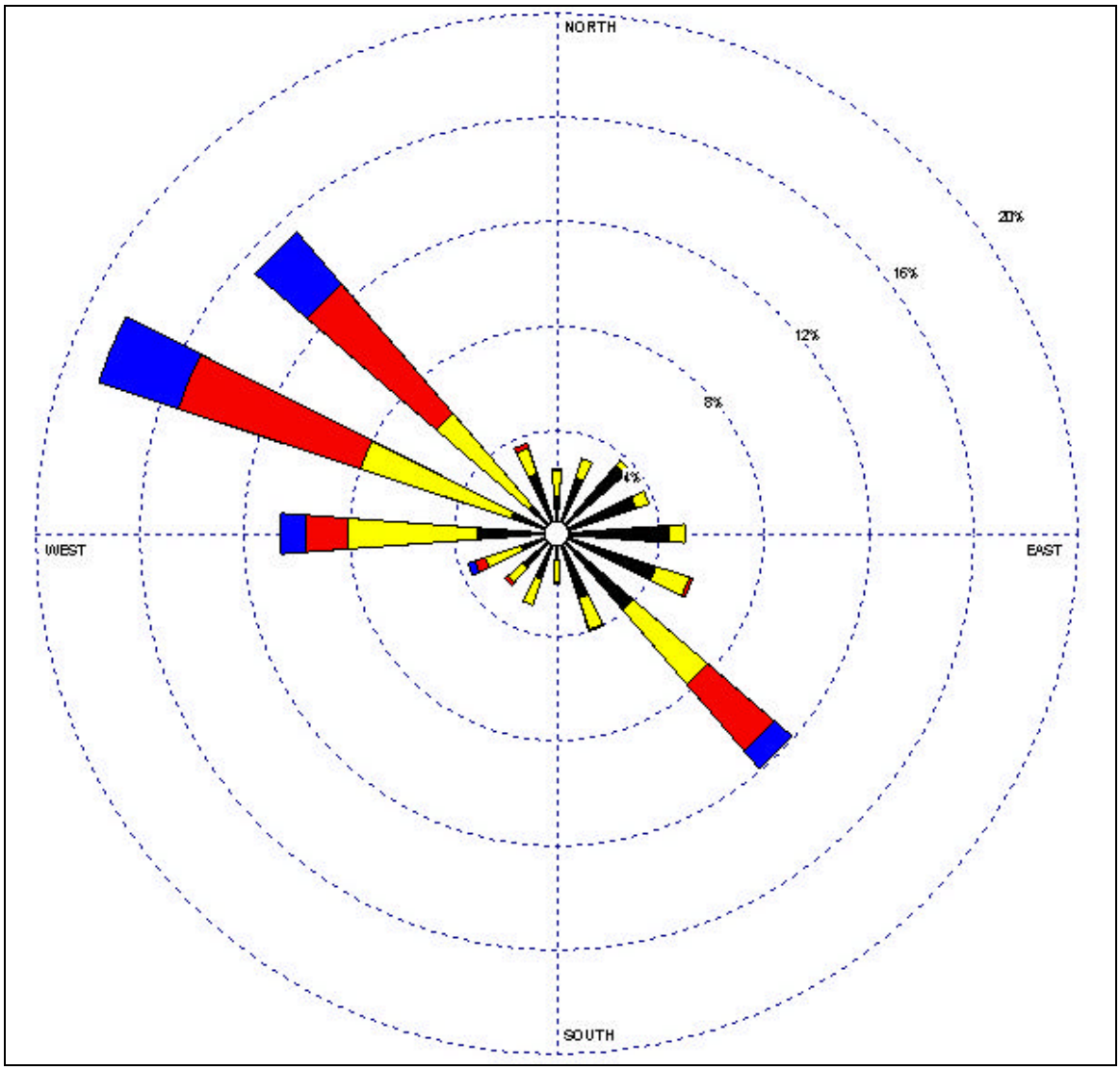

Figure 12. Wind Rose for Salinas Area

4.3 Background Data

The background data was collected in several different locations, as noted in Table 17.

The data collected in San Luis Obispo, with an average of 0.029 ppbv, is lower than what was found in 2001, an average of 0.084 ppbv. With an average of 0.249 ppbv, the background data from Santa Cruz were considerably higher than other background locations. Several of the measured concentrations are similar to regular ambient levels detected at the regular sampling locations.

The background data collected at other locations in California averaged 0.014 ppbv. The lowest level at 0.009 ppbv is from the marina Berkeley which is affected by winds coming directly through the Golden Gate bridge that originate in the Pacific Ocean. The concentration collected at Sylmar (Northern LA area) is close to that collected far inland from any fumigation sources—Mountain Pass, California, a point approximately 50 miles south of Las Vegas on the Nevada/California border. As this is a distinct desert area, no fumigations would be expected in the area

Background			
Location	**Date**	**Sample**	**Average**
Santa Cruz, CA	9/11/2002	0.124	0.247
	9/12/2002	0.235	
	9/13/2002	--	
	9/14/2002	0.685	
	10/16/2002	0.018	
	10/17/2002	0.140	
	10/18/2002	0.094	
	10/19/2002	0.432	
San Luis Obispo, CA	10/16/2002	0.035	0.029
	10/17/2002	0.032	
	10/18/2002	0.044	
	10/19/2002	0.063	
	11/6/2002	0.031	
	11/7/2002	0.012	
	11/8/2002	0.010	
	11/9/2002	0.005	
Sylmar, CA	6/25/2002	0.011	0.014
Mountain Pass, CA	6/27/2002	0.013	
SJ, CA Valley	6/24/2002	0.024	
Berkeley, CA Marina	7/2/2002	0.009	

Units: ppbv

Table 17. Background Data

4. Comparison with Past Data

Comparisons with past data are useful for elucidating trends. For the data in this report, the most direct comparison can be made for the Monterey/Santa Cruz data set, as the two data sets were collected during the exact time period from year to year. The sampling sites did differ, which may explain part of the differences.

A comparison with past data is contained in Table 18 which contains the 2001 DPR data alongside the 2002 AMBI data. Table 19 contains site specific data from the two years. The data in Table 18 show that the overall 95th percentile concentration is lower in 2002 compared to 2001, 2.7 ppbv vs. 3.8 ppbv.

Year	2001 (DPR)	2002 (AMBI)
Number	144	158
Max	37	16
Min	0.069	0.004
Overall Normal Ave.	2.9	2.3
95% Conf. Lim.	0.83	0.40
Overall Std Dev.	5.1	2.6
95th Percentile	3.8	2.7
Geometric mean	1.1	1.4
Median	1.0	1.5
Lognormal Ave.	2.9	2.6

Units: ppbv

Table 18. Comparison of 2001 and 2002 Data

Part of the reason for this lower concentration can be seen from examining individual site concentrations. Table 19 contains the site-specific concentration data. While the DPR and AMBI sites differed, the spatial siting appears to be of less effect than the proximity to active fields. The LJE and MES sites from 2001 had substantially higher concentrations than the BBC and FRM sites in 2002. Both the LJE and MES sites were considerably closer to active agricultural areas where fumigations were possibilities. For example it was noted that the MES site was just a few hundred feet from an active strawberry field. Although no notes pertaining to a fumigation that impacted the data set are recorded, the proximity to active agricultural areas may be an explanation for the observed difference. The observed differences are consistent with the locations of the sampling sites, confirming the need for sampling sites away from agricultural areas.

	2001 DPR Monitoring						2002 AMBI Monitoring				
Site	**SAL/MAQ**	**LJE/BBC**	**PMS/WAT**	**MES/FRM**	**SES/CPW**		**MAQ/SAL**	**BBC/LJE**	**WAT/PMS**	**FRM/MES**	**CPW/SES**
Number	31	32	30	26	25		32	32	31	32	31
Max	9.3	15	21	37	5.3		4.5	6.3	16	14	11
Min	0.10	0.142	0.15	0.069	0.071		0.077	0.004	0.24	0.25	0.28
Normal Average	1.4	2.9	3.4	6.1	1.2		1.1	2.1	3.7	2.6	2.1
95% C.I..	0.8	1.3	1.7	3.4	0.44		0.37	0.61	1.3	1.0	0.73
Std Dev.	2.3	3.9	4.9	8.9	1.1		1.1	1.8	3.7	3.0	2.1
95th Percentile	2.2	4.2	5.1	9.5	1.6		1.5	2.7	5.0	3.6	2.8
Geometric Mean	0.59	1.1	1.6	2.4	0.8		0.69	1.2	2.4	1.6	1.4
Median	0.48	0.73	1.6	2.5	1.0		0.78	1.7	3.0	1.7	1.5
Lognormal	1.3	3.1	3.4	7.5	1.3		1.2	3.3	4.0	2.6	3.2

4.5 Methyl Bromide Usage Comparison

Comparing the data for methyl bromide use with ambient air concentration was determined to be overwhelming for the timing of this report. The most appropriate approach to presentation of this kind of data would be as a GIS project. Misinformation about the status of the counties GIS capabilities along with a mis-estimation of the level of effort to perform such an analysis lead to a shortage of time to complete this aspect. Santa Cruz County has advanced capabilities in this regard, but Monterey and Ventura Counties do not have adequate information available for even a simple exploration.

Therefore, this interpretation is left open for future efforts.

5. CONCLUSIONS

Ambient air monitoring for Ventura, Monterey, and Santa Cruz Counties has been conducted during the periods of high use of July and August for Ventura, and September and October for Monterey/Santa Cruz. Four sampling locations were monitored for four days each over an eight week period in Ventura, and 5 locations in Monterey/Santa Cruz. Samples were collected at sites selected to provide insight into the exposure patterns for the populated areas surrounding the regular fumigation areas. Samples were collected over 24-hours and analyzed for concentrations down to 0.003 ppbv.

The measured concentrations varied from close to the detection limit up to tens of ppbv. Usage data for correlation of these measured concentrations is available but was too complex for a rapid processing and interpretation.

References

[i] Brymer, David, LD Ogle, CJ Jones, DL Lewis, "Viability of using SUMMA Polished Canisters for the Collection and Storage of Parts per Billion by Volume Level Volatile Organics," Environ. Sci. Tech. 1996, 30, 188-195.

[ii] McClenny, WA, JD Pleil, GF Evans, KD Oliver, MW Holdren, WT Winberry, "Canister-Based Method for Monitoring Toxic VOCs in Ambient Air," J. Air and Waste Management Assoc., **1991**, *41*, 1308-1318.

[iii] Keith, L.H., ed. Principles of Environmental Sampling, Second Edition, American Chemical Society, 1996, page 430.

APPENDICES

A. VENTURA FIELD DATA SHEETS

Applied Measurement Science

Client: AMBI Project: Ventura MB Station ID: ABD

Date	Time	Filter #	Flow Cont.#	Canister #	Canister Pressure	Flow ml/min.
7/10/02	1430	F13	972	214	-29.92	3.75
	2010					3.4
	2020					3.3
7/11/02	1051					3.5
	1441					3.43
	1444	F13	972	412	-29.92	3.62
	1454					3.44
7/12/02	1426					3.31
	1431	F14	617	651	-29.92	3.93
	1433	F11	619	FD 615	-28.5	3.48
	1441	F14	617	651	-29.92	3.88
	1443	F11	619	FD 615	-28.5	3.40
	1918			651	-24.5	3.58
	1918			FD 615	-24	3.21
7/13/02	1353			651	-5	3.25
	1354			FD 615	-5.5	3.26
	1356	F14	617	726	-30	3.64
	1406					3.69
7/14/02	1411				-5	3.28
7/17/02	1314	F11	619	667	-30	3.31
	1324					3.16
7/18/02	1333				-1	1.75
	1345	F11	33	727	-30	3.80
	1355					3.67
7/19/02	1318				-4	3.68
	1330	F11	33	817	-30	3.68
	1340					3.63
7/20/02	1230				-10	3.85
	1233	F11	33	661	-30	3.84
	1243					3.69
7/21/02	1242	F11	33		-8	3.41
7/24/02	1250		974	617	-30	3.54
	1300					3.37
7/25/02	1321				-4	3.21
	1323		974	651	-30	3.41

	1333					3.16
7/26/02	1339				-4	3.45
	1342		974	725	-30	3.49
	1345		6	720	-30	2.84
	1352		974	725		3.36
	1355		6	720		2.88
	1928		974	725	-24	3.53
	1929		6	720	-24	3.08
7/27/02	730		974	725	-12	3.75
	730		6	720	-14	3.25
	1303		974	725	-6	3.47
	1303		6	720	-10	2.18
	1307		974	213	-30	3.25
	1307		6	191	-30	2.80
	1317		974	213		3.19
	1317		6	191		2.75
7/28/02	1254		974	213	-5	3.45
	1254		6	191	-9	1.95
8/1/02	1507	F21	972	776	-30	3.62
	1517			776		3.38
8/2/02	1308			776	-8	3.52
	1313	F21	972	634	-30	3.51
	1314		764	779	-30	3.97
	1323	F21	972	634		3.40
	1324		764	779		3.77
8/3/02	1158	F21	972	634	-7	3.50
	1159		764	779	-8	3.41
	1204	F21	972	753	-30	3.45
	1214			753		3.38
8/4/02	1120			753	-7	3.52
8/7/02	1247	F22	971	737	-30	3.64
	1257					3.26
8/8/02	1323				-8	3.33
	1325	F22	971	179	-30	3.36
	1335					3.18
8/9/02	1340				-6	3.37
	1343	F22	971	616	-30	3.42
	1353					3.29
8/10/02	1315				-6	3.46
	1318	F22	971	709	-30	3.50
	1328					3.20
8/11/02	1242				-8	3.36
8/14/02	1354		764	776	-30	3.51
	1402					3.35
8/15/02	1248				-10	3.16
	1250		764	407	-30	3.21

	1300					3.03
8/16/02	1300				-10	2.99
	1301		764	220	-30	3.14
	1311					2.91
8/17/02	1200				-11	3.00
	1208		764	648	-29	3.67
	2128					3.61
8/18/02	1140				-9	3.79
8/21/02	1454	F22	971	405	-30	3.51
	1504					3.28
8/22/02	1337				-8	3.44
	1340	F22	971	635	-30	3.45
	1350					3.25
8/23/02	1714				-7	3.96
	1315	F22	971	615	-30	4.09
	1326					3.78
8/24/02	1240				-8	3.44
	1245	F22	971	756	-30	3.31
			764	725	-30	1.70
	1255	F22	971	756		3.16
			764	725		1.61
8/25/02	1245	F22	971	756	-6	3.40
			764	725	-26	0.95
8/28/02	1602	F22	971	629	-30	3.99
	1612					3.98
8/29/02	1436				-8	3.97
	1438	F22	971	761	-30	4.01
	1440	F21	972	695	-30	3.96
	1448			761		3.94
	1450			695		3.86
8/30/02	1429			761	-9	3.99
	1431			695	-9	4.00
	1435	F22	971	771	-30	4.03
	1435	F21	972	648	-30	4.04
	1445			771		3.69
	1446			648		3.70
8/31/02	1250			648	-6	4.00
	1252			771	-9	4.07
	1254	F22	971	639	-30	4.05
	1304					3.88
9/1/02	1107				-9	4.12

Applied Measurement Science

Client: AMBI Project: Ventura MB Station ID: SHA

Date	Time	Filter #	Flow Cont.#	Canister #	Canister Pressure	Flow ml/min.
7/10/02	1505	F15	974	784	-29.92	3.9
	1515					3.9
7/11/02	1009				-10	3.55
	1535				-4	3.44
	1538	F15	974	749	-29.92	3.60
	1548					3.44
7/12/02	1513				-5	3.49
	1515	F15	974	619	-29.92	3.56
	1525					3.35
	1940				-25	3.59
7/13/02	1430				-5	3.43
	1431	F15	974	191	-30	3.53
	1441					3.39
7/14/02	1435				-4	3.24
7/17/02	1347	F15	974	190	-30	3.74
	1350	F14	617	FD 189	-30	4.16
	1357	F15	974	190		3.40
	1400	F14	617	FD 189		3.79
7/18/02	1418	F15	974	190	-3.5	3.30
	1418	F14	617	FD 189	-4	3.57
	1421	F15	974	718	-30	3.54
	1431					3.39
7/19/02	1407				-5	3.41
	1411		974	652	-30	3.39
	1421					3.34
7/20/02	1316				-6	3.45
	1320		974	712	-30	3.40
	1330					3.32
7/21/02	1313				-0.5	1.10
7/24/02	1330		972	692	-30	3.54
	1340					3.31
7/25/02	1354				-6	3.03
	1355		972	416	-30	3.34
	1405					3.24
7/26/02	1425				-5	3.35
	1426		972	709	-30	3.37
	1436		33	415	-30	3.70
	1438		972	709		3.35

	1446		33	415		3.70
	1959		972	709	-24	3.53
	2000		33	415	-24	4.03
7/27/02	800		972	709	-12	3.55
	800		33	415	-11	3.89
	1338		972	709	-8	3.32
	1338		33	415	-5	1.92
	1343		972	602	-30	3.28
	1343		33	726	-30	3.64
	1353		972	602		3.27
	1353		33	726		3.58
7/28/02	1327		972	602	-6	3.25
	1327		33	726	-8	3.56
7/31/02	1356	F24	974	405	-30	3.77
	1406					3.44
8/1/02	1548				-3	3.20
	1553	F24	974	413	-30	3.50
	1603					3.43
8/2/02	1354				-8	3.60
	1403	F24	974	688	-30	3.43
	1413					3.36
8/3/02	1239				-7	3.55
	1242	F24	974	786	-30	3.45
	1252					3.30
8/4/02	1148				-7	3.71
8/7/02	1323	F24	974	766	-30	3.67
	1324	F23	9000	690	-30	3.59
	1333			766		3.50
	1334			690		3.46
8/8/02	1354			690	-5	3.25
	1358			766	-6	3.30
	1359	F23	9000	602	-30	3.46
	1409					3.38
8/9/02	1414				-6	3.51
	1415	F23	9000	784	-30	3.61
	1417	F24	974	FS 629	-30	3.85
	1425			784		3.44
	1427			FS 629		3.56
8/10/02	1342			784	-6	3.43
	1344	F23	9000	412	-30	3.46
	1347			FS 629	-4	3.33
	1352			412		3.42
8/11/02	1307				-7	3.44
8/14/02	1423	F21	972	413	-30	3.49
	1433					3.50
8/15/02	1324				-6	3.48

	1326	F21	972	180	-30	3.48
	1336					3.18
8/16/02	1429				-6	3.40
	1432	F21	972	720	-30	3.47
	1442					3.37
8/17/02	1245				-8	4.13
	1250	F21	972	619	-30	4.08
	1300					3.99
8/18/02	1205				-7	4.19
8/21/02	1520	F21	972	627	-30	3.57
	1530					3.57
8/22/02	1708				-6	3.41
	1711	F21	972	769	-30	3.40
	1721					3.35
8/23/02	1347				-6	3.82
	1349	F21	972	605	-30	3.81
	1359					3.69
8/24/02	1315				-6	3.35
	1318	F21	972	616	-30	3.35
	1328					3.31
8/25/02	1305				-6	3.38
8/28/02	1635	F24	974	709	-30	4.30
	1637	F21	972	687	-29	4.14
	1645			709		4.16
	1647			687		4.05
8/29/02	1516			709	-6	3.73
	1518			687	-6	3.55
	1520	F24	974	217	-30	3.71
	1530					3.65
8/30/02	1502				-5	3.40
	1503	F24	974	677	-30	3.54
	1514					3.44
8/31/02	1329				-6	3.99
	1331	F24	974	160	-30	3.86
	1341					3.67
9/1/02	1153				-7	4.16

Applied Measurement Science

Client: AMBI Project: Ventura MB Station ID: PVW

combo - 4431

Date	Time	Filter #	Flow Cont.#	Canister #	Canister Pressure	Flow ml/min.
7/10/02	1530	F17	971	416	-29.95	3.7
	1540					3.6
7/11/02	925				-13	3.5
	1609				-7	3.58
	1612	F17	971	737	-29.95	3.51
	1622					3.37
7/12/02	1547				-13	2.54
	1550	F17	971	709	-30	2.53
	1600					2.51
	1957				-27	2.50
7/13/02	1459				-16	2.51
	1501	F17	971	415	-30	2.51
	1511					2.42
7/14/02	1453				-16	2.24
7/17/02	1419	F17	971	182	-30	3.77
	1436					3.47
7/18/02	1449			Leaking Gauge		2.61
	1511	F14	617	702	-30	3.75
	1514	F17	971	710	-30	3.48
	1521	F14	617	702		3.63
	1524	F17	971	710		3.34
7/19/02	1453	F14	617	702	-5	3.56
	1454	F17	971	710	-7	3.27
	1503		617	178	-30	3.98
	1508		971	186	-30	3.57
	1513		617	178		3.56
	1518		971	186		3.26
7/20/02	1350		617	178	-6	3.57
	1352		971	186	-7	3.30
	1355		971	688	-30	3.37
	1405					3.34
7/21/02	1335				-6	3.17
7/24/02	1358		971	158	-30	3.39
	1408					3.26
7/25/02	1421				-7	3.26
	1423		971	784	-30	3.26
	1433					3.16
7/26/02	1503				-6	3.32
	1509		971	621	-30	3.38

	1516	17	15	412	-30	3.58
	1519		971	621		3.31
	1526	17	15	412		3.53
	2033		971	621	-24	3.53
	2037	17	15	412	-26	3.91
7/27/02	818		971	621	-13	3.47
	818	17	15	412	-13	3.82
	1410		971	621	-8	3.32
	1410	17	15	412	-8	2.55
	1414		971	756	-30	3.28
	1414	17	15	649	-30	3.59
	1424		971	756		3.26
	1424	17	15	649		3.67
7/28/02	1346		971	756	-8	3.24
	1346	17	15	649	-6	2.18
7/31/02	1457	F22	971	418	-30	3.31
	1447					3.27
8/1/02	1630				-5	3.30
	1635	F22	971	407	-30	3.37
	1645					3.37
8/2/02	1434				-9	3.38
	1436	F22	971	627	-30	3.39
	1446					3.36
8/3/02	1310				-8	3.25
	1315	F22	971	180	-30	3.18
	1325					3.09
8/4/02	1209				-8	3.43
8/7/02	1358	F21	972	729	-30	3.47
	1408					3.36
8/8/02	1441				-6	3.20
	1444	F21	972	726	-30	3.37
	1454					3.25
8/9/02	1445				-6	3.38
	1446	F21	972	605	-30	3.44
	1456					3.30
8/10/02	1404				-6	3.34
	1406	F21	972	756	-30	3.33
	1416					3.23
8/11/02	1325				-8	3.25
8/14/02	1457	F22	971	418	-30	3.60
	1507					3.47
8/15/02	1409				-7	3.40
	1410	F22	971	786	-30	3.44
	1420					3.37
8/16/02	1503				-6	3.33
	1504	F22	971	417	-30	3.39

	1506		974	657	-30	3.72
	1514		971	417		3.27
	1536		974	657		3.57
8/17/02	1317	F22	971	417	-9	4.02
	1318		974	657	-6	4.20
	1320	F22	971	651	-30	4.01
	1330					3.94
8/18/02	1224				-8	4.06
8/21/02	1546	F24	974	780	-30	3.90
	1556					3.76
8/22/02	1436				-4	3.45
	1439	F24	974	601	-30	3.49
	1449					3.42
8/23/02	1409				-5	3.86
	1411	F24	974	175	-30	3.88
	1421					3.72
8/24/02	1345				-6	3.45
	1348	F24	974	784	-30	3.49
	1358					3.25
8/25/02	1325				-5	3.44
8/28/02	1710	F23	9000	416	-30	4.18
	1720					4.13
8/29/02	1548				-8	3.80
	1550	F23	9000	762	-30	3.76
	1600					3.80
8/30/02	1530				-7	3.37
	1534	F23	9000	633	-30	3.38
	1544					3.23
8/31/02	1355				-8	3.68
	1357	F23	9000	770	-30	3.67
	1407					3.51
9/1/02	1220				-8	3.86

Applied Measurement Science

Client: AMBI Project: Ventura MB Station ID: UWC combo - 4431

Date	Time	Filter #	Flow Cont.#	Canister #	Canister Pressure	Flow ml/min.
7/10/02	1600	F14	6	791	-29.95	3.7
	1610					3.8
7/11/02	700					3.3
	1641				-10	**1.39**
	1644	F14	6	723	-29.95	3.81
	16.54					3.69
	2020				-28	3.85
	2021					3.01
	2031					2.96
7/12/02	1030	Removed Canister				**1.73**
	1623	F13	972	621	-30	3.54
	1633					3.50
	2012				-23	3.69
7/13/02	1527				-4	3.55
	1529	F13	972	725	-30	3.58
	1539					3.32
7/14/02	1508				-4	3.39
7/17/02	1537	F13	972	668	-30	3.71
	1547					3.33
7/18/02	1541				-4	3.17
	1552	F13	972	910	-30	3.65
	1602					3.62
7/19/02	1558				-6	3.28
	1602	F13	972	172	-30	3.31
	1612					3.27
7/20/02	1425				-8	3.27
	1430		972	790	-30	3.26
	1440					3.22
7/21/02	1355				-1	1.75
7/24/02	1421		617	704	-30	3.96
	1431					3.81
7/25/02	1448				-4	3.51
	1450		617	951	-30	3.76
	1457		9000	FD 749	-30	3.70
	1500		617	951		3.53
	1507		9000	FD 749		3.58
7/26/02	1543		617	951	-4	3.56
	1543		9000	FD 749	-4.5	3.18
	1548		617	214	-30	3.70

	1548		9000	FD 737	-30	3.64
	1558		617	214		3.69
	1559		9000	FD 737		3.61
	2058		617	214	-25	3.85
	2102		9000	FD 737	-24	3.82
7/27/02	835		617	214	-12	3.91
	835		9000	FD 737	-12	3.74
	1439		617	214	-5	3.76
	1439		9000	FD 737	-7	3.51
	1443		617	616	-30	3.78
	1443		9000	179	-30	3.56
	1453		617	616		3.77
	1453		9000	179		3.55
7/28/02	1402		617	616	-4	3.64
	1402		9000	179	-6	3.39
8/1/02	1701	F23	9000	685	-30	3.81
	1711					3.75
8/2/02	1500				-7	3.61
	1505	F23	9000	780	-29	3.69
	1515					3.63
8/3/02	1337				-7	3.37
	1345	F23	9000	661	-30	3.42
	1355					3.44
8/4/02	1228				-7	3.59
8/7/02	1427		764	749	-30	3.57
	1437					3.49
8/8/02	1506				-6	3.29
	1512		764	214	-30	3.40
	1522					3.26
8/9/02	1510				-8	3.27
	1513		764	615	-30	3.33
	1523					3.28
8/10/02	1439				-8	3.24
	1442		764	621	-30	3.20
	1452					3.12
8/11/02	1340				-10	3.06
8/14/02	1526	F23	9000	688	-30	3.64
	1536					3.64
8/15/02	1438					3.46
	1439	F23	9000	753	-29.5	3.56
	1449					3.51
8/16/02	1602					3.23
	1603	F23	9000	783	-30	3.55
	1613					3.39
8/17/02	1349					4.12
	1354	F24	974	610	-25	4.29

	1356	F23	9000	698	-29	4.13
	1404	F24	974	610		4.08
	1406	F23	9000	698		3.98
8/18/02	1247	F23	9000	698	-5	4.17
	1249	F24	974	610	-2	3.12
8/21/02	1611	F23	9000	779	-30	3.74
	1621					3.68
8/22/02	1505				-7	3.40
	1509	F23	9000	980	-30	3.45
	1519					3.45
8/23/02	1435				-7	3.81
	1437	F23	9000	412	-30	3.86
	1447					3.76
8/24/02	1405				-7	3.35
	1408	F23	9000	726	-30	3.40
	1418					3.39
8/25/02	1335				-7	3.34
8/28/02	1736		3057	214	-30	4.53
	1746					4.48
8/29/02	1620				-6	3.85
	1622		3057	751	-30	4.20
	1632					4.08
8/30/02	1610				-6	3.63
	1614		3057	789	-30	3.95
	1624					3.48
8/31/02	1421				-7	3.75
	1423		3057	630	-30	3.75
	1433					3.72
9/1/02	1245				-8	3.60

Oxnard/Camarillo										
						Field QA				Lab QA
Date	Day	ABD	SHA	PVW	UWC	FS	TS	FD	TB	LS
7-Jul	Sun									
8-Jul	Mon									
9-Jul	Tue									
10-Jul	Wed	1	1	1	0					
11-Jul	Thu	1	1	1	0					
12-Jul	Fri	1	1	1	1			ABD	ABD	
13-Jul	Sat	1	1	1	1					
14-Jul	Sun									
15-Jul	Mon									
16-Jul	Tue									
17-Jul	Wed	0	1	0	1			SHA		1
18-Jul	Thu	1	1	1	1			PVW	SHA	
19-Jul	Fri	1	1	1	1	PVW	SHA			
20-Jul	Sat	1	0	1	0					
21-Jul	Sun									
22-Jul	Mon									
23-Jul	Tue									
24-Jul	Wed	1	1	1	1					
25-Jul	Thu	1	1	1	1			UWC		
26-Jul	Fri	1	1	1	1			A,P,U	PVW	
27-Jul	Sat	1	1	1	1			S,U		
28-Jul	Sun									
29-Jul	Mon									
30-Jul	Tue									
31-Jul	Wed	0	1	1	0					1
1-Aug	Thu	1	1	1	1					
2-Aug	Fri	1	1	1	1			ABD	UWC	
3-Aug	Sat	1	1	1	1					
4-Aug	Sun									
5-Aug	Mon									
6-Aug	Tue									
7-Aug	Wed	1	1	1	1			SHA	ABD	
8-Aug	Thu	1	1	1	1					
9-Aug	Fri	1	1	1	1	SHA	ABD			
10-Aug	Sat	1	1	1	1					
11-Aug	Sun									
12-Aug	Mon									
13-Aug	Tue									
14-Aug	Wed	1	1	1	1					1
15-Aug	Thu	1	1	1	1			PVW	SHA	
16-Aug	Fri	1	1	1	1					
17-Aug	Sat	1	1	1	1	UWC	PVW			

18-Aug	Sun									
19-Aug	Mon									
20-Aug	Tue									
21-Aug	Wed	1	1	1	1					
22-Aug	Thu	1	1	1	1					
23-Aug	Fri	1	1	1	1					
24-Aug	Sat	1	1	1	1			0	0	
25-Aug	Sun									
26-Aug	Mon									
27-Aug	Tue									
28-Aug	Wed	1	1	1	1			SHA	UWC	1
29-Aug	Thu	1	1	1	1			ABD	PVW	
30-Aug	Fri	1	1	1	1	ABD	UWC			
31-Aug	Sat	1	1	1	1					
1-Sep	Sun									
2-Sep	Mon									
3-Sep	Tue									
4-Sep	Wed									
5-Sep	Thu									
All O/C Total	154	30	31	31	28	4	4	14	8	4

FS=Field Spike	Specific QA samples are indicated for that particular sampling period. The day in which the QA sample is collected will vary by each week.
TS=Trip Spike	
FD=Field Dup (collated)	
TB=Trip Blank	
LS=Lab Spike	

B. MONTEREY/SANTA CRUZ FIELD DATA SHEETS

	Daily Field Log M-SC - Week 1											
Site	**Date**	**Start**	**Stop**	**Sample**	**Can #**	**FC #**	**Initial**	**Leak**	**Flow 1**	**Flow 2**	**Final**	**Final Flow**
		Time	**Time**				**Vac.** ("Hg)	**Check**	(mL/min)	(mL/min)	**Vac.** ("Hg)	(mL/min)
MAQ	######	9:10		MAQ090402	728	416	30	Y	3.6	3.7	**8**	**NA**
BBC		10:00		BBC090402	174	813	29.5	Y	3.5	3.6	**10**	**NA**
WAT		10:50		WAT090402	760	972	30	Y	3.5	3.7	**7**	**3.2**
FRM		12:15		FRM090402	693	57	29.5	Y	3.5	3.5	**7**	**3.5**
CPW		NA		NA	NA	NA	NA	NA	NA	NA	**NA**	**NA**
MAQ	######	7:00		MAQ090502	734	671	29	Y	3.5	3.5	**6.5**	**3.5**
BBC		8:00		BBC090502	655	813	29.5	Y	3.4	3.4	**6**	**3.4**
WAT		8:30		WAT090502	631	670	29.5	Y	3.3	3.3	**6**	**3.2**
FRM		9:15		FRM090502	645	57	30	Y	3.55	3.5	**7.5**	**3.3**
CPW		14:15		CPW090502	403	663	30	Y	3.6	3.7	**10**	**3.5**
				shipped 9/6/02								
MAQ	######	6:50		MAQ090602	615	671	29	Y	3.3	3.3	**6**	**3.3**
BBC		7:20		BBC090602	601	813	29	Y	3.3	3.3	**6**	**3.3**
WAT		8:00		WAT090602	643	670	29	Y	3.2	3.3	**6**	**3.1**
FRM		8:45		FRM090602	621	57	30	Y	3.5	3.5	**7.5**	**3.2**
CPW		9:45		CPW090602	980	663	30	Y	3.5	3.5	**6**	**3.3**
MAQ	######	6:45	6:40	MAQ090702	635	671	29	Y	3.25	3.2	**6**	**3.2**
BBC		7:15	7:00	BBC090702	651	813	29.5	Y	3.2	3.2	**6**	**3.2**
~~WAT~~		NA	NA	NA	634	NA	17	NA	NA	NA	**NA**	**NA**
FRM		8:30	7:45	FRM090702	404	57	29	Y	3.2	3.2	**7**	**3.2**
CPW		9:00	8:25	CPW090702	753	663	30	Y	3.25	3.25	**6**	**3.3**
Trip Blank		9:45	NA	090702TB	720	NA	NA	NA	NA	NA	**NA**	**NA**
				shipped 9/9/02								

	Daily Field Log M-SC - Week 2												
Site	**Date**	**Start**	**Stop**	**Sample**	**Can #**	**FC#**	**Initial**	**Leak**	**Flow 1**	**Flow 2**	**Final**	**Final Flow**	**Comments**
		Time	**Time**				Vac.("Hg)	**Check**	(mL/min)	(mL/min)	Vac.("Hg)	(mL/min)	
MAQ	09/11/02	6:30		MAQ091102	740	813	29	Y	3.3	3.3	**7**	**3.1**	Foggy
BBC		7:05		BBC091102	695	57	30	Y	3.7	3.6	**6**	**3.1**	Foggy
BBC		7:05		BBC091102D	214	663	29	Y	3.7	3.6	**5**	**3.5**	
WAT		8:00		WAT091102	416	671	29.5	Y	3.4	3.3	**6**	**2.7**	
FRM		8:30		FRM091102	756	18	29	Y	3.3	3.3	**5**	**3.8**	
CPW		9:05		CPW091102	635	51	29	Y	3.2	3.1	**6.5**	**3.0**	Fumigation 1mi So
SCF		11:00		SCF091102	650	670	30	Y	4.1	3.1	**12**	**2.5**	
MAQ	09/12/02	6:35		MAQ091202	405	813	29.5	Y	3.2	3.2	**6**	**3.2**	
BBC		7:05		BBC091202	769	57	30	Y	3.5	3.6	**6**	**3.2**	
BBC		7:05		BBC091201FS	605	663	29.5	Y	3.5	3.5	**5**	**3.4**	Provided by EAS
WAT		7:45		WAT091202	779	671	28	Y	2.7	2.7	**8**	**2.7**	
FRM		8:05		FRM091202	220	18	29	Y	3.7	3.8	**5**	**3.8**	
CPW		8:30		CPW091202	704	51	29	Y	3.7	3.4	**5**	**3.7**	
SCF		9:30		SCF091202	687	670	29	Y	3.2	3.2	**10**	**2.8**	Re-set Flow
Trip Blank		NA		091202TB	762	NA	NA	NA	NA	NA	**NA**	**NA**	Provided by EAS
Trip Spike		NA		091202TS	179	NA	NA	NA	NA	NA	**NA**	**NA**	Provided by EAS
				shipped 9/13/02									
MAQ	09/13/02	6:35		MAQ091302	725	813	29	Y	3.2	3.2	**7.5**	**3.2**	
BBC		7:00		BBC091302	780	57	30	Y	3.6	3.6	**6**	**3.1**	
WAT		7:45		WAT091302	766	671	29	Y	3.1	3.2	**6**	**3.1**	
WAT		7:45		WAT091302D	726	663	30	Y	3.5	3.5	**6**	**3.6**	
FRM		8:10		FRM091302	717	18	29	Y	3.7	3.6	**4**	**3.9**	
CPW		8:40		CPW091301	751	51	29	Y	3.6	3.5	**5**	**3.1**	
SCF		9:20		SCF091302	778	670	29	Y	3.3	3.2	**0**	**0**	re-set flow

MAQ	09/14/02	6:25	6:30	MAQ091402	771	813	29	Y	32	3.2	**7**	**3.2**	
BBC		6:50	6:45	BBC091402	629	57	30	Y	3.7	3.7	**6**	**3.1**	
WAT		7:30	7:15	WAT091402	782	663	30	Y	3.6	3.6	**6**	**3.5**	
FRM		7:55	7:30	FRM091402	789	18	29	Y	3.6	3.6	**6**	**3.9**	
CPW		8:15	7:50	CPW091402	709	671	29.5	Y	3.3	3.3	**6**	**3.4**	
SCF		9:00	8:30	SCF091402	633	670	29	Y	3.1	3.1	**8**	**2.7**	Adjusted FC/fittings
				shipped 9/16/02									

	Daily Field Log M-SC - Week 3												
Site	**Date**	**Start**	**Stop**	**Sample**	**Can #**	**FC#**	**Initial**	**Leak**	**Flow 1**	**Flow 2**	**Final**	**Final Flow**	**Comments**
		Time	**Time**				**Vac.** ("Hg)	**Check**	(mL/min)	(mL/min)	**Vac.** ("Hg)	(mL/min)	
MAQ	09/18/02	7:05		MAQ091802	160	813	29	Y	3.5	3.4	**8**	**3.4**	Ground Fog
BBC		7:50		BBC091802	627	57	29.5	Y	3.6	3.6	**8.5**	**3.4**	Ground Fog
WAT		8:25		WAT091802	172	18	29	Y	3.2	3.4	**6**	**3.8**	Hazy Fog
FRM		8:50		FRM091802	627	663	30	Y	3.7	3.7	**6**	**3.5**	Hazy Fog
CPW		9:15		CPW091802	600	671	29.5	Y	3.4	3.4	**6**	**3.5**	Clear
MAQ	09/19/02	6:40		MAQ091902	175	813	29	Y	3.6	3.5	**6**	**3.4**	Clear
BBC		7:05		BBC091902	194	57	30	Y	3.4	3.4	**9**	**3.2**	Clear
WAT		7:45		WAT091902	166	18	28.5	Y	3.3	3.3	**5**	**3.8**	Clear
FRM		8:10		FRM091902	990	663	30	Y	3.4	3.4	**5**	**3.4**	Clear
CPW		8:35		CPW091902	681	671	30	Y	3.5	3.5	**6**	**3.5**	Clear
Trip Blank		NA		091902TB	640	NA	NA	NA	NA	NA	**NA**	**NA**	Provided by EAS
				shipped 9/20/02									
MAQ	09/20/02	6:35		MAQ092002	761	813	29.5	Y	3.4	3.4	**7.5**	**2.8**	Clear
BBC		7:00		BBC092002	701	57	30	Y	3.2	3.3	**8.5**	**3.1**	Clear
WAT		7:30		WAT092002	159	18	28	Y	3.5	3.5	**5**	**3.9**	Clear
FRM		8:05		FRM092002	715	663	30	Y	3.3	3.3	**6**	**3.3**	Clear
FRM		8:05		FRM092002D	637	51	30	Y	3.1	2.9	**12**	**3.7**	Clear, Adjusted FC
CPW		8:45		CPW092002	724	671	30	Y	3.5	3.4	**6**	**3.5**	Clear
MAQ	09/21/22	6:25	6:25	MAQ092102	680	813	29	Y	3.4	3.4	**6.5**	**3.6**	Clear
BBC		6:45	6:40	BBC092102	714	57	30	Y	3.1	3	**9**	**3.3**	Clear
WAT		7:35	7:10	WAT092102	784	18	29	Y	3.6	3.6	**5**	**3.9**	Clear
FRM		8:00	7:25	FRM092102	167	663	30	Y	3.4	3.4	**6**	**3.7**	Clear
CPW		8:20	8:00	CPW092102	616	671	30	Y	3.5	3.5	**8**	**3.5**	Clear
				shipped 9/23/02									

	Daily Field Log M-SC - Week 4												
Site	**Date**	**Start**	**Stop**	**Sample**	**Can #**	**FC#**	**Initial**	**Leak**	**Flow 1**	**Flow 2**	**Final**	**Final Flow**	**Comments**
		Time	**Time**				**Vac.**("Hg)	**Check**	(mL/min)	(mL/min)	**Vac.**("Hg)	(mL/min)	
MAQ	09/25/02	6:20		MAQ092502	647	813	29	Y	3.7	3.6	**6.5**	**3.3**	
BBC		6:45		BBC092502	720	663	30	Y	3.7	3.7	**5**	**3.5**	
WAT		7:20		WAT092502	192	18	29	Y	3.6	3.6	**4**	**3.8**	Wet at take down
FRM		7:40		FRM092502	753	671	29.5	Y	3.5	3.5	**5**	**3.3**	Wet at take down
CPW		8:05		CPW092502	170	57	30	y	3.3	3.3	**6.5**	**3.3**	Wet at take down
CPW		8:05		CPW092502D	757	639	30	Y	3.4	3.3	**8**	**3.2**	Wet at take down
MAQ	09/26/02	6:25		MAQ092602	626	813	29.5	Y	3.4	3.4	**7**	**3.5**	
BBC		6:45		BBC092602	662	663	30	Y	3.4	3.5	**6**	**3.5**	
WAT		7:35		WAT092602	672	18	29.5	Y	3.7	3.6	**4**	**3.8**	Heavy mist
FRM		7:55		FRM092602	169	671	29.5	Y	3.2	3.0	**7.5**	**3.2**	Heavy mist
CPW		8:20		CPW092602	686	57	30	Y	3.3	3.3	**6.5**	**3.3**	Heavy mist
CPW		8:20		CPW092602FS	649	639	29	Y	3.0	3.0	**11**	**3.4**	Heavy mist, Provided by EAS
Trip Spike		NA	NA	092602TS	705	NA	NA	NA	NA	NA	**NA**	**NA**	Provided by EAS
Trip Blank		NA	NA	092602TB	740	NA	NA	NA	NA	NA	**NA**	**NA**	Provided by EAS
				shipped 9/27/02									
MAQ	09/27/02	6:40		MAQ092702	663	813	29	Y	3.5	3.5	**7**	**3.4**	Clear
BBC		7:10		BBC092702	695	663	29.5	Y	3.5	3.5	**6**	**3.5**	Clear
WAT		7:55		WAT092702	668	18	29	Y	3.6	3.6	**6**	**4.0**	Clear
FRM		8:20		FRM092702	707	671	29	Y	3.1	3.1	**8**	**3.1**	Clear
CPW		8:50		CPW092702	739	57	30	Y	3.5	3.5	**7.5**	**3.6**	Clear
MAQ	09/28/02	6:25	6:25	MAQ092802	779	813	29	Y	3.5	3.5	**7.5**	**3.4**	Clear

BBC		6:50	6:40	BBC092802	214	663	30	Y	3.5	3.5	**6**	**3.4**	Clear
WAT		7:25	7:10	WAT092802	416	694	29	Y	3.6	3.6	**9**	**3.2**	Clear
FRM		7:50	7:25	FRM092802	186	637	29.5	Y	3.6	3.4	**7**	**3.1**	Clear
CPW		8:10	7:40	CPW092802	817	57	30	Y	3.5	3.4	**7.5**	**3.4**	Clear
				shipped 9/30/02									

	Daily Field Log M-SC - Week 5												
Site	**Date**	**Start**	**Stop**	**Sample**	**Can #**	**FC#**	**Initial**	**Leak**	**Flow 1**	**Flow 2**	**Final**	**Final Flow**	**Comments**
		Time	**Time**				**Vac.** ("Hg)	**Check**	(mL/min)	(mL/min)	**Vac.** ("Hg)	(mL/min)	
MAQ	10/0202	6:30		MAQ100202	756	57	30	Y	3.6	3.5	**7**	**3.5**	Clear
BBC		7:00		BBC100202	718	639	30	Y	3.4	3.3	**6.5**	**3.3**	Clear
WAT		7:35		WAT100202	681	18	29.5	Y	3.2	3.3	**6**	**4.1**	Clear
FRM		7:55		FRM100202	782	**694**	29	Y	3.4	3.3	**8.5**	**3.0**	Clear
CPW		8:10		CPW100202	726	813	29.5	Y	3.5	3.5	**6.5**	**3.3**	Clear
MAQ	10/03/02	6:30		MAQ100302	762	57	30	Y	3.4	3.4	**7**	**3.4**	Clear, wet at take down
MAQ		6:30		MAQ103002D	600	663	30	Y	3.6	3.5	**6**	**3.5**	Clear, wet at take down
BBC		6:55		BBC100302	769	639	29.5	Y	3.3	3.2	**6**	**2.8**	Clear, wet at take down
WAT		7:30		WAT100302	780	18	28.5	Y	3.4	3.4	**7.5**	**3.6**	Clear, adjust FC, wet at take down
FRM		8:05		FRM100302	759	**694**	29	Y	3.4	3.5	**7.5**	**2.8**	Clear, **adjust FC**, wet at take down
CPW		8:25		CPW100302	699	813	29.5	Y	3.4	3.4	**7**	**3.4**	Clear, wet at take down
Trip Blank		NA		100302TB	714	NA	NA	NA	NA	NA	**NA**	**NA**	Provided by EAS
				shipped 10/04/02									
MAQ	10/04/02	6:35		MAQ100402	618	57	30	Y	3.5	3.4	**7.5**	**3.4**	Clear
BBC		6:55		BBC100402	717	639	29.5	Y	3.3	3.5	**5**	**3.1**	Clear, adjust FC
WAT		7:40		WAT100402	736	18	28.5	Y	3.2	3.2	**8**	**3.6**	Clear
FRM		8:05		FRM100402	784	**694**	29	Y	3.4	3.3	**11**	**2.6**	Clear, **adjust FC**

CPW		8:35		CPW100402	175	818	29.5	Y	3.3	3.4	**8**	**3.2**	Clear
MAQ	10/05/02	6:25	6:35	MAQ100502	772	57	30	Y	3.5	3.2	**7**	**3.2**	Wet at take down
BBC		6:55	6:55	BBC100502	613	639	29	Y	3.3	3.3	**3**	**3.3**	Wet at take down, adjust FC
WAT		7:30	7:15	WAT100502	781	18	28.5	Y	3.2	3.2	**5**	**4.1**	Wet at take down
FRM		7:50	7:25	FRM100502	689	**663**	29	Y	3.6	3.6	**6**	**3.6**	Wet at take down, **change FC**
CPW		8:15	7:45	CPW100502	702	813	29.5	Y	3.2	3.3	**8**	**3.4**	Wet at take down, Fumigation of field SE of Site
				shipped 10/6/02									

	Daily Field Log M-SC - Week 6												
Site	**Date**	**Start Time**	**Stop Time**	**Sample**	**Can #**	**FC#**	**Initial Vac.** ("Hg)	**Leak Check**	**Flow 1** (mL/min)	**Flow 2** (mL/min)	**Final Vac.** ("Hg)	**Final Flow** (mL/min)	**Comments**
MAQ	10/09/02	6:30		MAQ100902	765	18	29.5	Y	3.4	3.3	**5**	**3.8**	Clear
MAQ		6:30		MAQ100902D	818	813	29	Y	3.5	3.5	**7**	**3.3**	Clear adjust FC
BBC		6:55		BBC100902	764	57	30	Y	3.3	3.3	**8**	**2.9**	Clear, adjust FC
WAT		7:35		WAT100902	409	663	30	Y	3.6	3.5	**6**	**3.5**	Foggy, adjust FC
FRM		7:55		FRM100902	732	673	29.5	Y	3.2	3.3	**6**	**3.2**	Clear
CPW		8:20		CPW100902	612	637	30	Y	3.3	3.3	**7.5**	**3.4**	Clear, fumigation 6AM @ 36'56.549N 121'45.220W
													completed well before 8:20AM
MAQ	10/10/02	6:25		MAQ101002	798	813	29	Y	3.3	3.3	**7**	**3.3**	Clear
MAQ		6:25		MAQ101002FS	628	18	28	Y	3.5	3.5	**6**	**3.8**	Clear, Provided by EAS
BBC		6:50		BBC101002	39	57	30	Y	3.3	3.2	**8**	**2.8**	Clear
WAT		7:35		WAT101002	713	663	30	Y	3.4	3.5	**6**	**3.5**	Clear, adjust FC
FRM		7:55		FRM101002	616	673	30	Y	3.2	3.2	**8**	**3.2**	Heavy mist, not quite rain
CPW		8:15		CPW101002	167	637	29.5	Y	3.2	3.2	**7**	**3.4**	Heavy mist, not quite rain
Trip Spike		NA		101002TS	401	NA	NA	NA	NA	NA	**NA**	**NA**	Provided by EAS
Trip Blank		NA		101002TB	723	NA	NA	NA	NA	NA	**NA**	**NA**	Provided by

													EAS
				shipped 10/11/02									
MAQ	10/11/02	6:20		MAQ101102	711	813	29.5	Y	3.3	3.3	**8**	**3.2**	Clear
BBC		6:55		BBC101102	673	18	29	Y	3.5	3.5	**5**	**4**	Clear, changed FC
WAT		7:35		WAT101102	408	663	30	Y	3.4	3.4	**6**	**3.6**	Clear
FRM		7:55		FRM101102	653	673	30	Y	3.2	3.3	**6**	**3.2**	Clear
CPW		8:20		CPW101102	679	637	29.5	Y	3.3	3.3	**6**	**3.1**	Clear
MAQ	10/12/02	6:25	6:30	MAQ101202	605	813	29.5	Y	3.3	3.2	**8**	**3.5**	Clear, very foggy - wet at take down
BBC		6:50	6:45	BBC101202	182		28.5	Y	3.2	3.4	**7**	**3.5**	Clear, changed FC, very foggy - wet at take down
													fumigation Russell & 101 (36' 44.083N 1221' 39.367W)
WAT		7:45	7:10	WAT101202	700	663	28	Y	3.5	3.4	**3**	**3.1**	Clear, adjust FC, very foogy - wet at take down
FRM		8:00	7:20	FRM101202	654	673	29	Y	3.2	3.2	**6**	**2.8**	Clear, very foogy - wet at take down
CPW		8:25	7:35	CPW101202	609	637	29.5	Y	3.3	3.4	**2**	**2.2**	Clear, adjust FC, very foogy - wet at take down
				shipped 10/14/02									

	Daily Field Log M-SC - Week 7												
Site	**Date**	**Start**	**Stop**	**Sample**	**Can #**	**FC#**	**Initial**	**Leak**	**Flow 1**	**Flow 2**	**Final**	**Final Flow**	**Comments**
		Time	**Time**				**Vac.**("Hg)	**Check**	(mL/min)	(mL/min)	**Vac.**("Hg)	(mL/min)	
MAQ	10/16/02	6:20		MAQ101602	775	673	29.5	Y	3.3	3.3	**7**	**3.2**	Clear
BBC		6:45		BBC101602	190	813	29	Y	3.4	3.4	**7**	**3.2**	Cle ar
WAT		7:25		WAT101602	656	663	30	Y	3.4	3.4	**6**	**3.3**	Clear
FRM		7:55		FRM101602	952	57	30	Y	3.2	3.2	**7.5**	**2.7**	Clear
FRM		7:55		FRM101602D	173	18	29	Y	3.4	3.5	**4**	**3.8**	Clear
CPW		8:15		CPW101602	768	637	29.5	Y	3.5	3.4	**7**	**3.4**	Clear
SCF		9:00		SCF101602	671	694	29	Y	3.2	3.2	**10**	**2.7**	Clear
MAQ	10/17/02	6:20		MAQ101702	769	673	29	Y	3.1	3.1	**8**	**3.2**	Clear
BBC		6:45		BBC101702	784	813	29	Y	3.2	3.2	**7**	**3.3**	Clear
WAT		7:25		WAT101702	699	663	30	Y	3.4	3.4	**6**	**3.5**	Clear
FRM		7:50		FRM101702	718	18	28.5	Y	3.6	3.6	**4**	**3.9**	Clear
CPW		8:15		CPW101702	403	637	30	Y	3.3	3.3	**6**	**3.5**	Clear
SCF		9:00		SCF101702	641	694	29.5	Y	3.6	3.6	**5.5**	**3.2**	Clear, adjusted FC
Trip Blank		NA	NA	101702TB	759	NA	NA	NA	NA	NA	**NA**	**NA**	Provided by EAS
				shipped 10/18/02									
MAQ	10/18/02	6:25		MAQ101802	782	673	29	Y	3.2	3.2	**7**	**3.2**	Clear
BBC		6:55		BBC101802	783	813	30	Y	3.3	3.3	**7.5**	**3.4**	Clear
WAT		7:35		WAT101802	756	663	30	Y	3.4	3.5	**6**	**3.5**	Clear
FRM		7:55		FRM101802	791	18	28.5	Y	3.6	3.6	**5.5**	**4.0**	Clear
CPW		8:20		CPW101802	777	637	29.5	Y	3.4	3.3	**7**	**3.4**	Clear
SCF		9:05		SCF101802	689	694	29.5	Y	3.4	3.5	**7.5**	**3.4**	Clear
MAQ	10/19/02	6:15	6:05	MAQ101902	762	673	30	Y	3.3	3.2	**5**	**3.2**	Clear

BBC		6:40	6:20	BBC101902	681	813	29.5	Y	3.3	3.3	**7.5**	**3.4**	Clear
WAT		7:20	6:45	WAT101902	714	663	30	Y	3.4	3.5	**7**	**3.4**	Clear
FRM		7:45	7:05	FRM101902	703	18	28.5	Y	3.6	3.6	**6**	**3.7**	Clear
CPW		8:05	7:20	CPW101902	747	637	29.5	Y	3.3	3.3	**8**	**3.1**	Clear
SCF		8:50	7:50	SCF101902	600	694	29.5	Y	3.3	3.3	**10.5**	**2.8**	Misty at take down
				shipped 10/21/02									

	Daily Field Log M-SC - Week 8											
Site	**Date**	**Start**	**Stop**	**Sample**	**Can #**	**FC#**	**Initial**	**Leak**	**Flow 1**	**Flow 2**	**Final**	**Final Flow**
		Time	**Time**				**Vac.**("Hg)	**Check**	(mL/min)	(mL/min)	**Vac.**("Hg)	(mL/min)
MAQ	######	6:15		MAQ102302	712	18	29	Y	3.6	3.6	**4**	**4.2**
BBC		6:45		BBC102302	182	673	30	Y	3.3	3.3	**7**	**3.2**
WAT		7:30		WAT102302	711	813	29	Y	3.4	3.4	**6.5**	**3.3**
WAT		7:30		WAT102302D	700	694	29	Y	3.3	3.3	**9**	**2.9**
FRM		7:50		FRM102302	608	637	30	Y	3.3	3.3	**6.5**	**3.4**
CPW		8:05		CPW102302	408	663	30	Y	3.3	3.2	**6.5**	**3.3**
MAQ	######	6:10		MAQ102402	673	51	30	Y	3.3	3.3	**8.5**	**3.7**
BBC		6:45		BBC102402	653	673	30	Y	3.2	3.2	**10**	**3.1**
WAT		7:40		WAT102402	679	813	29.5	Y	3.3	3.3	**7**	**3.3**
WAT		7:40		WAT102402FS	728	694	28.5	Y	3.3	3.3	**10**	**2.5**
FRM		8:10		FRM102402	645	637	30	Y	3.3	3.3	**8.5**	**2.6**
CPW		8:25		CPW102402	771	663	30	Y	3.2	3.2	**7**	**3.3**
Trip Spike		NA	NA	102402TS	638	NA	NA	NA	NA	NA	**NA**	**NA**
Trip Blank		NA	NA	102402TB	724	NA	NA	NA	NA	NA	**NA**	**NA**
				Delivered by RRF: 10/25/02								
MAQ	######	6:25		MAQ102502	183	51	30	Y	3.5	3.4	**9.5**	**3.9**
BBC		6:55		BBC102502	655	673	29.5	Y	3.2	3.3	**8.5**	**3.0**
WAT		7:40		WAT102502	702	813	29.5	Y	3.3	3.3	**7.5**	**3.2**
FRM		8:05		FRM102502	759	637	30	Y	3.2	3.3	**2**	**2.2**

CPW		8:25		CPW102502	680	663	30	Y	3.4	3.3	**6**	**3.3**
MAQ	######	6:10	6:25	MAQ102602	417	51	30	Y	3.5	3.4	**9**	**3.7**
BBC		6:35	6:35	BBC102602	402	673	29.5	Y	3.4	3.4	**8**	**3.5**
WAT		7:30	7:20	WAT102602	615	813	29	Y	3.2	3.2	**7.5**	**3.3**
FRM		7:45	NA	FRM102602	631	637	30	Y	3.5	3.5	**0**	**VOID**
FRM		8:30	7:45	FRM102602	610	18	29	Y	3.4	3.3	**6**	**3.8**
CPW		8:15	8:45	CPW102602	159	663	29.5	Y	3.4	3.4	**6**	**3.3**
				shipped 10/28/02								

C. MONTEREY/SANTA CRUZ COUNTIES WORK PLAN

Work Plan

Methyl Bromide Ambient Air Testing: Monterey and Santa Cruz Counties

Version 1.0

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1.0 Introduction

The purpose of this document is to present information on test methods and plans for conducting ambient air testing for methyl bromide in the townships around Watsonville and Salinas, California. This work is being conducted by the Alliance of the Methyl Bromide Industry, (Great Lakes Chemical Corporation, TriCal, Inc., Albermarle, Inc.)—AMBI, a group of California methyl bromide registrants, and is being administered by Bill Thomas, of Livingston & Mattesich. Eric Winegar of Applied Measurement Science will be the study director and Steve Hoyt of Environmental Analytical Service, Inc. will direct the analytical laboratory work.

We intend to conduct the following air monitoring study using sampling consistent with the Department of Pesticide Regulation's and California Air Resources Board protocol, with exceptions noted below in Sections 3.0—Sampling Protocol, 4.0—Meteorological Monitoring, and 5.0—Laboratory Protocol, and 6.0—Quality Assurance. Consistent with the protocols, standard EPA site selection and sampler placement guidance will be followed for all locations.

2.0 Sampling Locations

Several potential sampling locations were examined in Monterey and Santa Cruz Counties. Three sites were selected in the Watsonville area and two in the Salinas area. The sites were selected using the standard siting criteria as established in previous CDPR guidance. In addition, siting was attempted to be close to the previous CDPR sites where possible.

2.1 Monterey and Santa Cruz Sampling Sites

Table 1 contains a list of the 3 sites selected following the initial review. Figure 1 shows the locations of the sites on a map of the area. The previous CDPR sites are noted as black stars, with the proposed current sites shown as red squares.

2.1.1 Watsonville Sites

1. Number 3--Watsonville City Park Services yard (WAT). East Front St. and Union.

   Rationale: This location is within 0.5 miles of the Pajaro school site (PMS), is in an area of high population density, and is not directly adjacent to any potential fumigation sites.

2. Number 4—Farm Bureau Office (FRM). 141 Monte Vista Street.

   Rationale: In residential area, near the center of town. Located approximately 0.46 miles from MES site. No close agricultural areas.

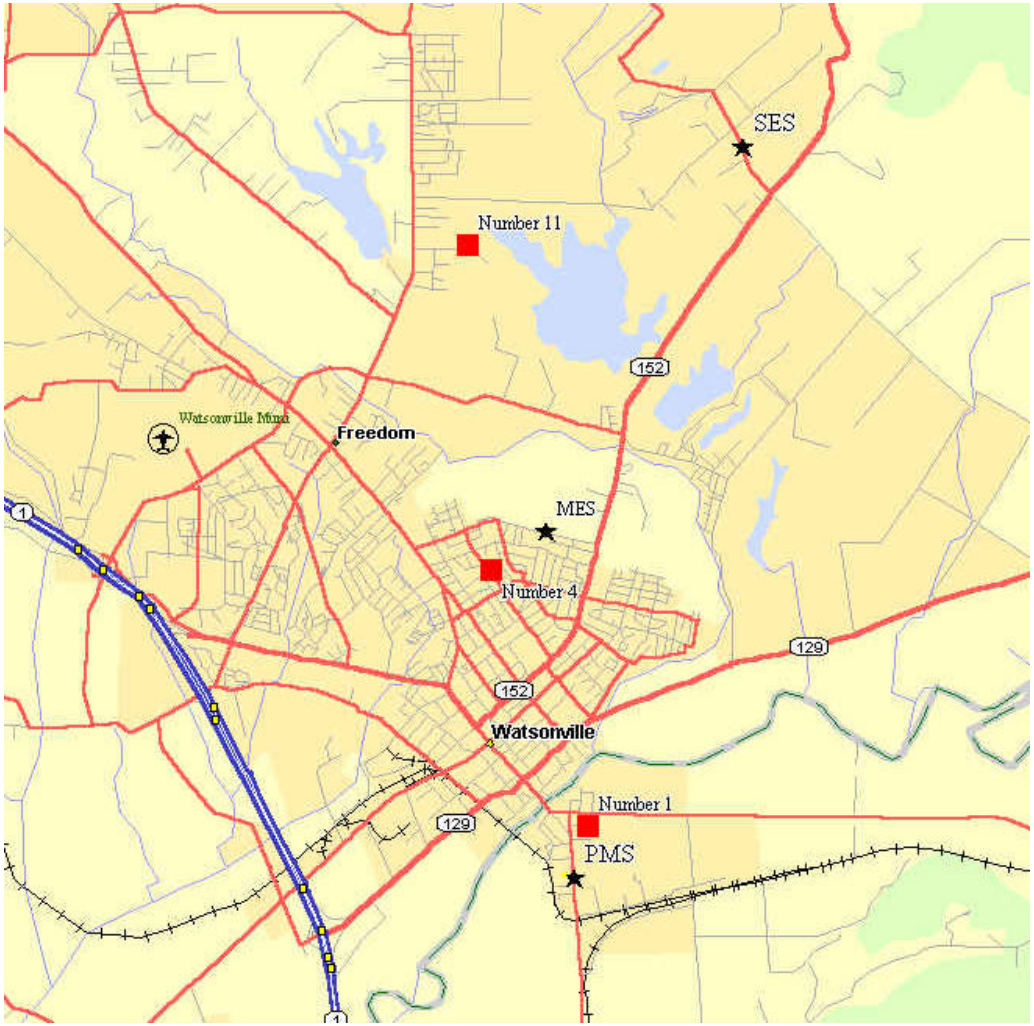
3. Number 11—PG&E substation. Minto Road.

Rationale: Adjacent to outlying residential area. Some agriculture in general area, but no large strawberry fields. As close as could be found to SES site, approximately 1.6 miles southwest.

Table 1. Watsonville Sampling Locations

Watsonville Area			Coordinates	
Map Site Code	**Name**	**Location**	**Latitude**	**Longitude**
Number 2 (WAT)	Watsonville Park Offices	East Front and Union	36.697615°	-121.628867°
Number 4 (FRM)	Farm Bureau	Prospect Dr.	36.698156°	-121.606950°
Number 11 (PGE)	PGE substation	Minto Road	36.951808°	-121.759225°

Figure 1. Watsonville Area Sites



2.2 Salinas

Table 2 contains a list of the two Salinas sites selected. Figure 2 shows a map of the site locations.

2.2.1 Salinas Sites

1. Monterey Bay Unified Air Pollution Control District monitoring site (MAQ). E. Laurel St.

   Rationale: In middle of town. Previous monitoring site.

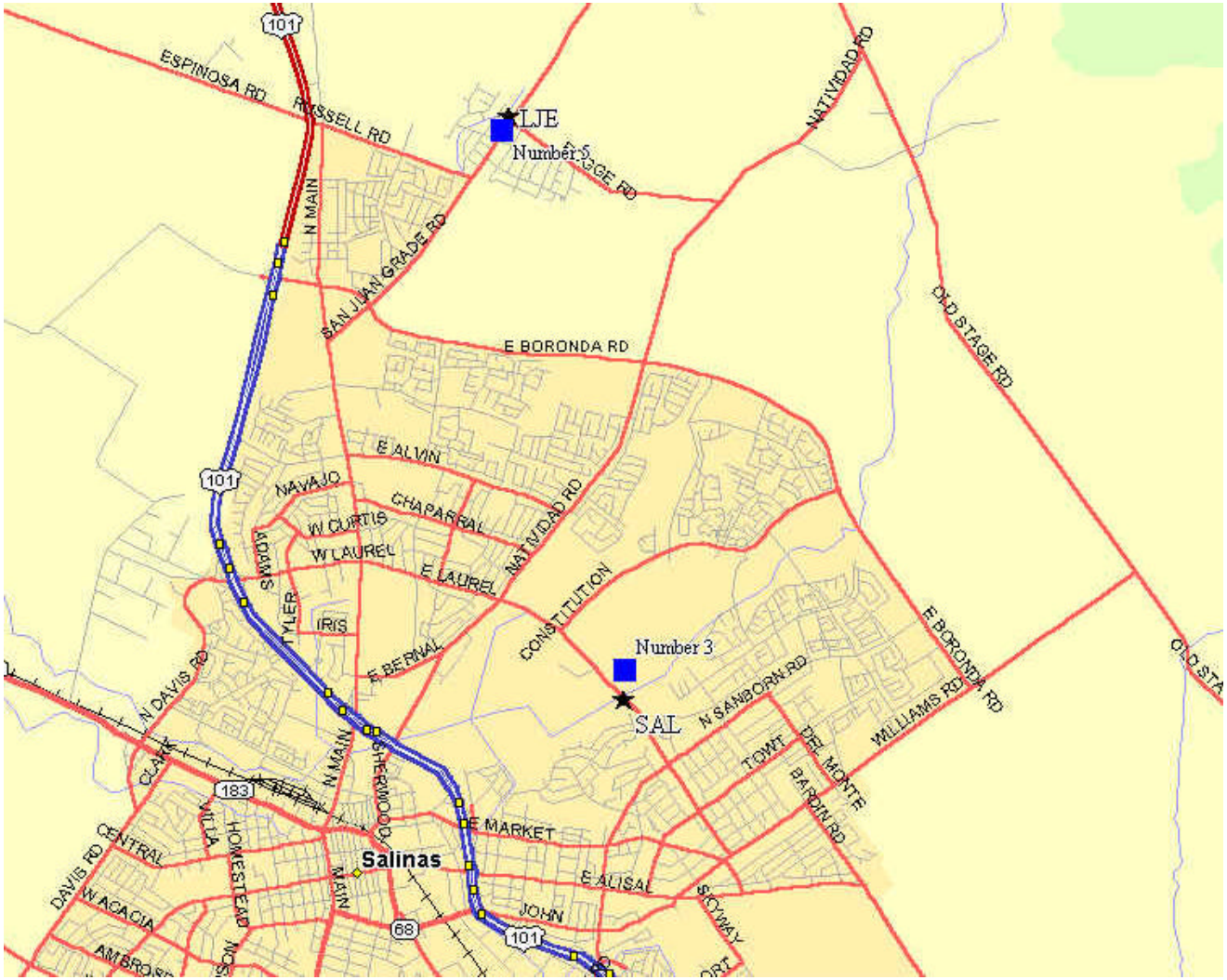
2. BB Construction (BBC). San Juan Grade Road.

   Rationale: Adjacent to both population and agricultural centers. Near previous site.

Table 2. Salinas Sites

Salinas Area			Coordinates	
Map Site Code	**Name**	**Location**	**Latitude**	**Longitude**
Number 3 (MAQ)	MBUAQMD monitoring site	E. Laurel Dr.	36.690444°	-121.625571°
Number 5 (BBC)	BB Construction	San Juan Grade Road	36.733859°	-121.637865°

Figure 2. Salinas Sites



3.0 Sampling Methodology

Sampling will be conducted with Summa canisters, stainless steel flow controllers, and stainless steel inlets. Sampling will be conducted for 24 hour periods, starting in the early morning. Due to the distance between each of the sampling locations, the start and stop times of the location locations will not be coordinated, but will be as close as possible due to transit and set up times, etc.

Samplers will be located on the rooftops of the selected sampling locations. The canister will be placed on a tripod holding the micrometeorological monitoring station at each site. The inlet for the sampling line will be at a height of approximately 6 feet above the surface of the roof-top or other surface where the tripod will be placed.

The acceptable beginning vacuum in the canister will be –29.95 to –27 in Hg. The flow rate will be set to fill the canister from the nominal –29.9 in Hg to approximately –5-8 in Hg—a target of 3 mL/min. The target volume will be 4 liters of sample. The inlet will be fashioned from ¼ inch OD 304 stainless steel with the tip curved downward to prevent entry of rain. A 1-7 micron stainless steel frit filter will be inserted in the sampling line before the flow controller. On a daily basis, flow controllers will be reused at each location.

A Veriflo flow controller or the equivalent will be used to control the flow into the canisters. Flows will be checked at the beginning of sampling, within 10 minutes of start, and then at the end of the sampling period. Flows will be measured using the Alltech HFC-DR flow sensor. The flow sensor will be within the recommended yearly period for recalibration and will not be calibrated specifically for this program.

Deviations from the starting flow of ±25% will be allowed before disqualifying the sample. Vacuum gauges will be integrated with the inlet system so that the pressure in addition to flow can be monitored without removing the inlet.

Samples will be handled in a standard fashion, including the use of proper labeling, chain of custody, and shipping procedures.

3.1 Exceptions to Standard Sampling

In order to ensure that only "ambient" samples are collected and to exclude "source-impacted" samples, if any fumigation occurs such that the buffer zone of that fumigation impacts the ambient sampling station, that sample will be collected but not analyzed by the laboratory. This assessment will be made from direct observation and from the Notice of Intent form filed with the County Agricultural Commissioner.

3.2 Differences with DPR Protocol

Instead of Silcosteel canisters, Summa canisters will be used. There are abundant references in the literature to the stability of methyl bromide in Summa canisters at low levels. In addition, a personal communication with Mr. Mike Poore of CARB confirmed that the Silcosteel canister reference in the DPR protocol was due to the intended use with reduced sulfur compounds.

4.0 Meteorological Monitoring

Two types of meteorological monitoring will be conducted during the program. First, each sampling site will have a site-specific micrometeorological station to collect wind speed, wind direction, and temperature. These stations will be termed "micrometeorological stations." This station will be a Spectrum Technologies, Inc. Model 525 weather station, with wind speed, wind direction, and temperature. The station will be at the same height and location of each canister sampler so that specific site micro-conditions can be recorded. Wind data will be collected on a 30 minute basis and downloaded weekly with each sample set.

The second meteorological monitoring station will be located at a central location and will be used for general regional conditions. This system will be termed the "main meteorological station." This system will be a Novalynx WS-16 system with wind speed, wind direction, temperature, relative humidity, and barometric pressure. Data will be collected on a 15 minute basis for the duration of the program. This main system will be situated at approximately a 5 meter height. A ten meter tower will not be used based on logistical constraints.

2.1 Differences with DPR Protocol

It is noted that DPR does not require meteorological monitoring for ambient monitoring, as stated in the draft protocols of May 8, 2001 which has been the basis for planning. However, the AMBI group believed that these data may prove useful in interpreting the collected data for each location and planned to collect data as noted above. However, a letter from Mr. Paul Gosselin of August 20, 2001 states that a 10 meter tower should be used. AMBI has oncluded that a 10 meter tower is not feasible due to time and logistical constraints, and only data as noted above will be collected.

5.0 Laboratory Protocol

Laboratory analysis will be conducted by Environmental Analytical Services, Inc. of San Luis Obispo. EAS has many years of experience in low-level VOC analysis, including methyl bromide.

Table 3 contains a list of the differences the CARB/DPR laboratory protocol and the EAS methodology. A full laboratory SOP for review will be available if desired. This method is based on the well-documented and widely used EPA Compendium Method TO-14/15.

Table 3. Analytical Protocol

Parameter	SOW	EAS
Estimated Quantitation Limit	5 X MDL	5 x MDL = 0.025 ppbv MDL = 5 pptv (estimated)
GC/MS Tune	Tune Daily with PFTBA	OK (24 hour window)
CCV	= 20% D	< 20% used as 1st CCS (same as ARB)
Laboratory Blank	< 20% of the lowest value reported	< 20% of Lowest Value or < 3 x MDL whichever is highest
Calibration Check Sample (CCS)	Analyze every 10 samples	Every 10 samples after CCS, <20%
Internal Standards	Bromomethane-d3	Bromomethane – d3, 50% to 200%
GC/MS Operating Conditions	Per ARB draft document	Same
Instrument Reproducibility	As per 6 (A) ARB draft	20%
Storage Stability	Conduct Study	14 days
Summa Canister Cleaning	AS per Appendix 1 ARB draft	Flushed 3 times with humidified UHP Nitrogen and baked at 100 mtorr at 150C. Batch Blank 1:10 < 25 pptv
Tuning Criteria	As per Appendix 2 ARB draft	Same – PFTBA Autotune Criteria
Initial Calibration	6 point 0.032 ug/m3 to 0.85 ug/m3	5 point 25 pptv to 500 pptv
Laboratory Control Sample		30% Theoretical
Laboratory Control Duplicate	Not used, Sample Duplicate every 10 samples	Not used, Sample Duplicate every 10 samples
Sample Pressurization	Pressurize to 5 psig	Pressurize to 5 psig
Method Detection Limit	3.14 x s (seven replicates)	3.14 x s (seven replicates)

5.1. Differences with DPR Protocol

The differences with DPR and CARB analysis protocol are noted in Table 3.

6.0 Quality Assurance

6.1 Field Quality Assurance

Quality assurance for the field samples will consist of the following:

- Field Spikes—the field spike will consist of two canisters. One will be prepared in the laboratory with an aliquot spiked into the evacuated canister prior to shipping to the field. This sample will be collected alongside a normal field sample. Both will be subjected to standard laboratory analysis. The spike concentration will be approximately 1.5-2 times the average field concentration for a particular location. This concentration will be adjusted as needed to produce usable results (e.g, not too high or low, based on field concentration results), so the concentration used cannot be stated in advance.
- Trip Spikes—a spiked canister prepared in the laboratory and transported to the field and back to the laboratory for analysis. The concentration for this sample will be 0.25 ppbv.
- Laboratory Spikes—a spiked sample prepared in the laboratory for the purpose of evaluating the gas chromatograph. The laboratory will determine the appropriate spike concentration based on the concentration of the field samples.
- Collocated Samples—a field sample collected at the same time and location with a second sample.
- Trip Blanks—a canister prepared in the laboratory with UHP air, carried in the field, and returned to the laboratory for analysis.

The frequency of each of these QA samples will be identical to the DPR protocol. The specific schedule is noted in Table 4.

6.2 Laboratory Quality Assurance

The laboratory quality assurance program was noted in Section 5.0.

No method validation study or stability study will be conducted as methyl bromide is known to be well suited to the TO-14/15 analysis as conducted by EAS.

6.3 Background Samples

Background samples will be collected at the Santa Cruz Fire Station Number 3, as had been done in previous years. Two weekly sampling periods will be performed—the second and seventh weeks in the study period. i

6.3.1 Differences with DPR Protocol

A letter from Mr. Paul Gosselin of August 20, 2001 stated that monitoring levels for methyl bromide should be checked before and after the fumigation season. However, due to the tight time constraints for start up of this program, no pre-season data could be collected—fumigations

were already in operation. Samples will be collected following the season as part of the background determination.

7.0 Schedules

Table 4 shows the schedule for this monitoring program. These schedules are tentative and small changes may occur based on site conditions or other circumstances. Substantial changes will be communicated to DPR in a timely manner. As requested, the sampling period runs from Wednesday to Saturday start times.

Table 4. Schedule

Monterey/Santa Cruz												
								Field QA				Lab QA
Date	Day	1	2	3	4	5	Bkg	FS	TS	FD	TB	LS
1-Sep	Sun											
2-Sep	Mon											
3-Sep	Tue											
4-Sep	Wed	1	1	1	1	1				1	1	
5-Sep	Thu	1	1	1	1	1						
6-Sep	Fri	1	1	1	1	1						
7-Sep	Sat	1	1	1	1	1						
8-Sep	Sun											
9-Sep	Mon											
10-Sep	Tue											
11-Sep	Wed	1	1	1	1	1	1	1	1	1	1	1
12-Sep	Thu	1	1	1	1	1	1					
13-Sep	Fri	1	1	1	1	1	1					
14-Sep	Sat	1	1	1	1	1	1					
15-Sep	Sun											
16-Sep	Mon											
17-Sep	Tue											
18-Sep	Wed	1	1	1	1	1				1	1	
19-Sep	Thu	1	1	1	1	1						
20-Sep	Fri	1	1	1	1	1						
21-Sep	Sat	1	1	1	1	1						
22-Sep	Sun											
23-Sep	Mon											
24-Sep	Tue											
25-Sep	Wed	1	1	1	1	1		1	1	1	1	1
26-Sep	Thu	1	1	1	1	1						
27-Sep	Fri	1	1	1	1	1						
28-Sep	Sat	1	1	1	1	1						
29-Sep	Sun											

Monterey/Santa Cruz												
								Field QA				Lab QA
Date	Day	1	2	3	4	5	Bkg	FS	TS	FD	TB	LS
30-Sep	Mon											
1-Oct	Tue											
2-Oct	Wed	1	1	1	1	1				1	1	
3-Oct	Thu	1	1	1	1	1						
4-Oct	Fri	1	1	1	1	1						
5-Oct	Sat	1	1	1	1	1						
6-Oct	Sun											
7-Oct	Mon											
8-Oct	Tue											
9-Oct	Wed	1	1	1	1	1		1	1	1	1	1
10-Oct	Thu	1	1	1	1	1						
11-Oct	Fri	1	1	1	1	1						
12-Oct	Sat	1	1	1	1	1						
13-Oct	Sun											
14-Oct	Mon											
15-Oct	Tue											
16-Oct	Wed	1	1	1	1	1	1					
17-Oct	Thu	1	1	1	1	1	1					
18-Oct	Fri	1	1	1	1	1	1					
19-Oct	Sat	1	1	1	1	1	1			1	1	
20-Oct	Sun											
21-Oct	Mon											
22-Oct	Tue											
23-Oct	Wed	1	1	1	1	1		1	1	1	1	1
24-Oct	Thu	1	1	1	1	1						
25-Oct	Fri	1	1	1	1	1						
26-Oct	Sat	1	1	1	1	1						
27-Oct	Sun											
28-Oct	Mon											
29-Oct	Tue											
30-Oct	Wed											
31-Oct	Thu											
Total	196	32	32	32	32	32	8	4	4	8	8	4
FS=Field Spike		Specific QA samples are indicated for that particular sampling period. The day in which the QA sample is collected will vary by each week.										
TS=Trip Spike												
FD=Field Dup (collated)												
TB=Trip Blank												
LS=Lab Spike												

8.0 Field Staff

Field staff will consist of technicians from Applied Measurement Science of Fair Oaks, CA. Dr. Eric Winegar will manage the program, with oversight for AMBI by Mr. Matt Gillis of Trical, Inc. Mr. Bill Thomas will administer the program on behalf of AMBI.

The laboratory work will be supervised by Dr. Steve Hoyt of Environmental Analytical Services, Inc.

9.0 Data Interpretation

9.1 Data Reporting

The MDL has previously been be determined using standard EPA protocol (40 CFR 136 Appendix B) of using a standard from 5-10 times the estimated detection limit and analyzing it seven times. A factor of 3.14 times the standard deviation yields the detection limit. A laboratory standard is used as a surrogate for ambient air for most r. The estimated quantitation limit (EQL) will be a factor of 5 times the MDL. Concentrations at and below the MDL will be reported as non-detected and flagged as "F." Concentrations below the EQL and above the MDL will be reported and flagged as "U."

For summary reporting, non-detects will be reported as one-half the MDL. All other data will be reported as generated by the laboratory.

Collocated field samples and laboratory duplicate analyses will be averaged and reported as one value.

Various summary statistics will be reported on the data set including a ranking of the highest concentrations detected.

Data above the EQL will be reported to 3 significant figures.

9.1.1 Differences with DPR Protocol

Data between the MDL and EQL will be reported as obtained from the laboratory.

9.2. Supporting Information

In addition to the measured methyl bromide concentrations, other supporting information such as pesticide usage and local meteorological data will be included in the final report.

9.3. Other Data Evaluation and Interpretation

Submittal of the entire data set will be provided to DPR within 4 months of completion of the study. The full range of data interpretation that will be included in the report has not been determined.

10 Summary of Differences between DPR and AMBI Protocols

Table 5 contains a summary of the major differences between the DPR protocol and the AMBI protocol. Individual points have already been noted in the main body of the text above and are summarized in this table for convenience.

Table 5. Summary of Differences between DPR and AMBI Protocol

Category	DPR Protocol	AMBI Protocol
Sampling-special conditions	none	Samples excluded and not analyzed if found to be within the buffer zone of a nearby fumigation.
Sampling	Silco canisters/flow controllers	Summa canisters/SS flow controllers
Meteorological Data	5/2001 protocol-none	Micro stations at each site, 4-5 meter tower at central site
	8/2001 letter-10 meter tower	4-5 meter tower at central site
Analysis	See Table 3	See Table 3
Background Samples	Before and after fumigation season	Two one-week samples
Data Management	<EQL, report as "detected"	Report value, flag "F"
	<EQL and >MDL, report as average of EQL and MDL	Report value, flag "U"

APPENDIX D. VENTURA COUNTY SCHEDULE—2002

Ventura Sampling Schedule										
						Field QA				Lab QA
Date	Day	ABD	SHA	PVW	UWC	FS	TS	FD	TB	LS
7-Jul	Sun									
8-Jul	Mon									
9-Jul	Tue									
10-Jul	Wed	1	1	1	1			1	1	
11-Jul	Thu	1	1	1	1					
12-Jul	Fri	1	1	1	1					
13-Jul	Sat	1	1	1	1					
14-Jul	Sun									
15-Jul	Mon									
16-Jul	Tue									
17-Jul	Wed	1	1	1	1	1	1	1	1	1
18-Jul	Thu	1	1	1	1					
19-Jul	Fri	1	1	1	1					
20-Jul	Sat	1	1	1	1					
21-Jul	Sun									
22-Jul	Mon									
23-Jul	Tue									
24-Jul	Wed	1	1	1	1			1	1	
25-Jul	Thu	1	1	1	1					
26-Jul	Fri	1	1	1	1					
27-Jul	Sat	1	1	1	1					
28-Jul	Sun									
29-Jul	Mon									
30-Jul	Tue									
31-Jul	Wed	1	1	1	1	1	1	1	1	1
1-Aug	Thu	1	1	1	1					
2-Aug	Fri	1	1	1	1					
3-Aug	Sat	1	1	1	1					
4-Aug	Sun									
5-Aug	Mon									
6-Aug	Tue									
7-Aug	Wed	1	1	1	1			1	1	
8-Aug	Thu	1	1	1	1					
9-Aug	Fri	1	1	1	1					
10-Aug	Sat	1	1	1	1					
11-Aug	Sun									
12-Aug	Mon									
13-Aug	Tue									

14-Aug	Wed	1	1	1	1	1	1	1	1	1
15-Aug	Thu	1	1	1	1					
16-Aug	Fri	1	1	1	1					
17-Aug	Sat	1	1	1	1					
18-Aug	Sun									
19-Aug	Mon									
20-Aug	Tue									
21-Aug	Wed	1	1	1	1					
22-Aug	Thu	1	1	1	1					
23-Aug	Fri	1	1	1	1					
24-Aug	Sat	1	1	1	1			1	1	
25-Aug	Sun									
26-Aug	Mon									
27-Aug	Tue									
28-Aug	Wed	1	1	1	1	1	1	1	1	1
29-Aug	Thu	1	1	1	1					
30-Aug	Fri	1	1	1	1					
31-Aug	Sat	1	1	1	1					
1-Sep	Sun									
2-Sep	Mon									
3-Sep	Tue									
4-Sep	Wed									
5-Sep	Thu									
All O/C Total	152	124				4	4	8	8	4

FS=Field Spike	Specific QA samples are indicated for that particular sampling period. The day in which the QA sample is collected will vary by each week.
TS=Trip Spike	
FD=Field Dup (collated)	
TB=Trip Blank	
LS=Lab Spike	