



Mary-Ann Warmerdam
Director

MEMORANDUM

Arnold Schwarzenegger
Governor

TO: Pamela Wofford, Senior Environmental Scientist
Environmental Monitoring Branch

FROM: Shifang Fan Ph.D., Environmental Scientist
Environmental Monitoring Branch
(916) 324-4096

Original signed by

DATE: April 21, 2008

SUBJECT: SUMMARY OF AMBIENT AIR MONITORING FOR METHYL BROMIDE AND
1,3-DICHLOROPROPENE IN VENTURA COUNTY IN 2005 AND 2006

BACKGROUND

Methyl bromide (MeBr) and 1,3-dichloropropene (1,3-D) are two of the most widely used pesticides in California. MeBr depletes the stratospheric ozone layer and is classified as a Class I ozone-depleting substance. It is being phased out and currently only exempted for quarantine and pre-shipment use, and critical use designated for agricultural users with no technically or economically feasible alternatives (U.S. EPA, 2007a). Therefore, in recent seven years (2000–2006), MeBr annual use in California has decreased approximately from 11 to 7 million pounds. As a replacement alternative, 1,3-D uses have increased approximately from 4 to 9 million pounds.

Both MeBr and 1,3-D are fumigants. MeBr is a gas that kills insects, mites, rodents, nematodes, termites, weeds, and organisms that cause plant diseases. Because it is colorless and odorless, MeBr is normally mixed with chloropicrin, a tear gas with a noticeable odor and also an effective fungicide (DPR, 2001). The fumigant 1,3-D is a colorless liquid with a sweet smell and dissolves in water and evaporates easily. It is a multi-purpose fumigant and may be formulated with various percentages of chloropicrin to control nematodes, wireworms, and certain soil borne diseases in cropland. It also has secondary insecticidal and fungicidal activities (Tomlin, 1997).

Farmers use MeBr to treat soil before planting vegetable, fruit and nut crops, and flower and forest nurseries. Depending on the crop, field applications may occur annually, or once every several years. MeBr is injected into the soil with specialized application equipment. After harvest, MeBr fumigation protects crops from pest damage during storage and transportation. It is also used for termite eradication in homes and other structures, and to control insects in mills, ships, railroad cars, and other transportation vehicles (DPR, 2001). The fumigant 1,3-D is used for pre-planting control of most species of nematode in deciduous fruit and nuts, citrus fruit, berry fruit, vines, field crops, vegetables, tobacco, ornamental and flower crops and tree nurseries. In California, growers primarily use 1,3-D for pre-plant soil applications on carrots, strawberry, almond, sweet potatoes, grapes, peach, walnut, and seedbed preparation. Depending on the crop, 1,3-D products are broadcast injected or applied in rows by shanking or dripping into soil with



specialized application equipment. Upon being released into soil, 1,3-D liquid volatilizes and moves as a vapor. Therefore, soil should be sealed immediately after application to reduce 1,3-D emissions into air and to maintain its effective concentration within the soil. The U.S. Environmental Protection Agency (U.S. EPA) has designated 1,3-D as a restricted use pesticide because animal tests in rats, mice, and rabbits have demonstrated 1,3-D to have moderate acute toxicity from inhalation, high acute toxicity from dermal exposure, and classified it as a Group B2, probable human carcinogen (U.S. EPA, 2007b).

The Department of Pesticide Regulation (DPR) and the county agricultural commissioners (CACs) have implemented extensive restrictions on the uses of MeBr and 1,3-D, such as buffer zones surrounding treated fields, reentry time after application, equipment and procedures for application, worker safety requirements, and notification to people near fumigated fields. In 1990, as directed by DPR, the CACs revoked all use permits for 1,3-D after elevated air concentrations were monitored. After the registrant developed modified 1,3-D application methods to reduce air emission, DPR authorized a limited reintroduction with restricted conditions. These conditions eventually matured into a township cap. This township cap limits 1,3-D use in six by six mile areas (townships) throughout the state. In 2004, new DPR regulations limited the monthly average air concentration for methyl bromide to no more than nine parts per billion (ppb). This limit is also achieved by limiting use within townships on a monthly basis.

As required by state law, DPR evaluates, identifies, and controls pesticides as toxic air contaminants. Under this program, both MeBr and 1,3-D were identified as toxic air contaminants in 1996 (DPR, 2007a). As part of the toxic air contaminant program, the Air Resources Board (ARB) monitors pesticides at the request of DPR. ARB conducted ambient air monitoring for MeBr and 1,3-D (ARB, 1990; ARB, 1993; ARB, 1995a and b; ARB, 1996; ARB, 2000a and b; ARB, 2001a and b; ARB, 2006; and ARB, 2007). The results of these monitoring studies, and a summary of MeBr results and preliminary risk evaluation based on ARB's monitoring in 2000 (DPR, 2001) can be found on DPR's Web site (DPR 2007b). DPR requested monitoring in an ongoing effort to evaluate seasonal exposures to MeBr and 1,3-D, and to determine the effectiveness of current restrictions. This document summarizes the monitoring results and preliminary risk evaluation based on ARB's monitoring data in 2005 and 2006 in Ventura County.

AIR RESOURCES BOARD SAMPLING PLAN

The studies in 2005 and 2006 were originally recommended as an eight-week monitoring to cover the peak use periods for MeBr in August and 1,3-D in September (weeks 31-39). However, in 2005 the study was plagued by various laboratory instrument failures and resulted in monitoring shortened to six weeks from August 22 to September 30 (weeks 34-39). It was conducted within the areas and periods of the highest 1,3-D use (Figures 1 and 5), but missed MeBr peak use period during weeks 31-33 (Figures 1 and 3). The study in 2006 was conducted from June 14 to August

6 (weeks 24-31). This monitoring period caught half of the MeBr peak use period (weeks 30-31), but missed the other half peak (weeks 32-33) as shown on Figures 2 and 4. The peak use period for 1,3-D (weeks 35-37) was missed (Figures 2 and 6). In other words, ARB 2005 study covered 1,3-D peak use period, and the 2006 study caught the half of MeBr peak use period in Ventura County. ARB collected ambient air samples using evacuated, six-liter Silcosteel® canister at target airflow rate of three ml per minute. Five monitoring locations were selected in high pesticide use areas with frequent human activities in Ventura County. An additional location, Lincoln Elementary School near downtown Ventura in 2005 and Thousand Oak High School in 2006, designated as a background site because they were relatively away from agricultural areas (Figures 3 to 6). At each location, one-day samples (24 hours ± 1 hour) were collected four days per week for six weeks in 2005 and eight weeks in 2006, except for one week of Labor Day holiday in 2005, only three days were sampled. Therefore, total of 23 and 32 results were reported at each location in 2005 and 2006, respectively. Additional samples were collected for quality control.

RESULTS AND DISCUSSION

ARB's monitoring report for each study consisted of a main report and six appendices (A-F). The method detection limit (MDL) and estimated quantification limit (EQL), as well as a few sample results were inconsistent in different documents of the 2005 study. In this summary, the data in Appendix C (Laboratory Results Report) and the following values of MDLs and EQLs were used for calculations. These values were assumed sample pressurization dilution of 1:1.5 for the 2005 study and 1:1.79 for the 2006 study.

	<u>MeBr</u> ng/m ³	ppb	<u>cis- / trans-1,3-D</u> ng/m ³	ppb
For 2005 study				
MDL	11.6	0.003	8.7 / 6.6	0.0019 / 0.0015
EQL	58	0.015	44 / 33	0.0096 / 0.0073
For 2006 study				
MDL	9.99	0.0026	55.07 / 40.99	0.0121 / 0.0090
EQL	49.94	0.0129	275.34 / 205.00	0.0607 / 0.0452

For the samples with concentrations greater than MDL, but less than EQL, ARB reported as "detected" in the 2005 monitoring report. The value of half the (MDL+EQL) was used for these samples. In the 2006 study report, ARB estimated concentration values for samples less than EQL. Some values were greater than the above listed laboratory analytical EQL due to individual sample dilution. These estimated values were used for calculation in this summary. Calculation was based on ARB's day-by-day monitoring results and converted concentration unit from ng/m³

to ppb for comparison with other monitoring studies. For collocated samples, the average of the two samples was used in the calculations. If one of the collocated samples was invalid, the valid result was reported and used for calculation.

The highest one-day concentration, the highest Time-Weighted-Average (TWA) of one-week concentration, and the average concentration for the entire monitoring period for each monitoring site were calculated and summarized in Table 1 for MeBr and Table 2 for 1,3-D for the two monitoring studies. Background sample results were excluded in these calculations. Tables 3 and 4 list MeBr concentrations for the 2005 and 2006 studies respectively, on each sampling day at each location. Tables 5 and 6 list 1,3-D concentrations on each sampling day at each location for the 2005 and 2006 studies respectively. Table 7 summarizes percentages of positive results, which were equal to or greater than MDL, for MeBr and 1,3-D in the two monitoring studies. Table 8 compares ARB ambient air monitoring results of six monitoring studies from 2000 to 2006 in four counties. For the two studies in Ventura County, MeBr peak use period was missed in 2005 and so was 1,3-D in 2006. Therefore, monitoring results of MeBr in the 2006 study though its peak use period was partially missed, and 1,3-D in the 2005 study will be further discussed in this summary.

For MeBr in the 2006 study, all 147 valid samples from five monitoring locations, as well as all 30 valid background samples were positive, i.e. equal to or greater than MDL (Table 4 and 7). The overall average concentration for the 5 monitoring sites was 0.656 ppb, which was 3 times high as that for the background site, 0.221 ppb. The highest 1-day individual sample concentration was 5.92 ppb. The highest 1-week TWA concentration was 2.99 ppb. The highest average concentration for the study period (8 weeks) was 0.88 ppb (Table 1). All the highest concentrations occurred at one location southeast of Ventura County (Figure 4). These results were lower than those in ARB previous monitoring studies in Kern and Monterey/Santa Cruz Counties (Table 8).

For 1,3-D in 2005 study, 20 out of 21 (95%) valid background samples had positive results (Table 5). All valid samples from other five locations contained positive 1,3-D (Table 5 and 7). The overall average concentration for the five monitoring sites was 0.910 ppb, which was 13 times high as that for the background site, 0.070 ppb. The highest 1-day concentration was 16.9 ppb. The highest 1-week TWA concentration was 9.33 ppb. The highest average concentration for the study period (6 weeks) was 2.33 ppb (Table 2). All the highest concentrations occurred at one location east of Ventura County (Figure 5). These results were comparable with ARB previous monitoring studies (Table 8).

EVALUATION OF HEALTH RISKS

MeBr and 1,3-D can cause a variety of health effects in experimental animals and humans. To evaluate health risks, DPR has calculated reference concentrations as benchmarks based on the

toxicity properties of MeBr and 1,3-D for regulatory programs. These reference concentrations are generally 100 times lower than doses that do not cause adverse effects, or the no-observed effect level (NOEL) in animal, adjusting for breathing rate differences between animals and humans. The 100-fold factor accounts for species extrapolation and variation in sensitivity between individuals. For a 1-day average exposure, the reference concentration of MeBr is 250 ppb/210 ppb for children/adults—it is higher for children than adults in this case because the reference concentration for adults was derived based on end-point of acute developmental toxicity data from pregnant rabbit (DPR, 2002). The reference concentration of 1,3-D for 1-day exposure is 40 ppb based on children's breathing rate to account for higher exposure per body weight than adults (Reed, 2001). For a 1-week average exposure, the reference concentration of MeBr is 70 ppb/ 120 ppb for children/adults (DPR, 2002), and that of 1,3-D is 26 ppb based on children's breathing rate (Reed, 2001).

DPR compares the reference concentrations with the monitoring data to establish and modify regulations and restrictions of MeBr and 1,3-D uses. In these studies, the air concentrations for all one-day and one-week periods were lower than the reference concentrations (Tables 1 and 2). The results of these two studies were not adequate to evaluate for a long-term exposure of chronic and oncogenic effects because the 2005 study was shortened from eight weeks to six weeks and the 2006 study missed half of the use peak for methyl bromide and the entire use peak for 1,3-D.

PRELIMINARY CONCLUSIONS

The six-week monitoring between August 22 and September 30 in 2005 was conducted in the high use area and period for 1,3-D in Ventura County. The eight-week monitoring conducted in the same area between June 14 and August 6 in 2006 caught half of the peak use period for MeBr. Therefore, only the one-day and one-week air concentrations of 1,3-D in the 2005 study and those of MeBr in the 2006 study can be used for evaluation of health risks.

The one-day air concentrations of MeBr and 1,3-D met DPR's goal (i.e., lower than the one-day reference concentrations) at all locations.

The one-week air concentrations of MeBr and 1,3-D met DPR's goal (i.e., lower than the one-week reference concentrations) at all locations.

The 2005 study was shortened from eight weeks to six weeks and missed MeBr peak use period. The 2006 study missed half of peak use period for MeBr and the entire peak use period for 1,3-D. In addition, 5% of samples were invalid plus 3% of samples were not collected for various reasons in the 2006 MeBr monitoring.

REFERENCE

ARB, 1990. 1,3-Dichloropropene Ambient Air Monitoring Data in Merced County. California Air Resources Board, Sacramento, CA. Available at:
<<http://www.cdpr.ca.gov/docs/emprm/pubs/tac/dichlo13.htm>>.

ARB, 1993. Ambient Air Monitoring in Monterey County for Telone II during DowElanco's Commercial Use Project. California Air Resources Board, Sacramento, CA. Available at:
<<http://www.cdpr.ca.gov/docs/emprm/pubs/tac/dichlo13.htm>>.

ARB, 1995a. Ambient Air Monitoring in Merced County for Telone (1,3-Dichloropropene) during DowElanco's Commercial Reintroduction. California Air Resources Board, Sacramento, CA. Available at: <<http://www.cdpr.ca.gov/docs/emprm/pubs/tac/dichlo13.htm>>.

ARB, 1995b. Ambient Air Monitoring in Kern County for Telone (1,3-Dichloropropene) during DowElanco's Commercial Reintroduction. California Air Resources Board, Sacramento, CA. Available at: <<http://www.cdpr.ca.gov/docs/emprm/pubs/tac/dichlo13.htm>>.

ARB, 1996. Report for 1996 Ambient Monitoring of Telone in Kern County. California Air Resources Board, Sacramento, CA. Available at:
<<http://www.cdpr.ca.gov/docs/emprm/pubs/tac/dichlo13.htm>>.

ARB, 2000a. Final Report for the 2000 Methyl Bromide and 1,3-Dichloropropene Air Monitoring in Kern County. California Air Resources Board, Sacramento, CA. Available at:
<<http://www.cdpr.ca.gov/docs/emprm/pubs/tac/dichlo13.htm>>.

ARB, 2000b. Final Report for the 2000 Methyl Bromide and 1,3-Dichloropropene Air Monitoring in Monterey and Santa Cruz Counties. California Air Resources Board, Sacramento, CA. Available at: <<http://www.cdpr.ca.gov/docs/emprm/pubs/tac/dichlo13.htm>>.

ARB, 2001a. Final Report for the 2000 Methyl Bromide and 1,3-Dichloropropene Air Monitoring in Kern County. California Air Resources Board, Sacramento, CA. Available at:
<<http://www.cdpr.ca.gov/docs/emprm/pubs/tac/dichlo13.htm>>.

ARB, 2001b. Final Report for the 2000 Methyl Bromide and 1,3-Dichloropropene Air Monitoring in Monterey and Santa Cruz Counties. California Air Resources Board, Sacramento, CA. Available at: <<http://www.cdpr.ca.gov/docs/emprm/pubs/tac/dichlo13.htm>>.

Pamela Wofford
April 21, 2008
Page 7

ARB, 2006. Report on Ambient Air Monitoring for Methyl Bromide and 1,3-Dichloropropene Air Monitoring in Ventura County during August and September 2005. California Air Resources Board, Sacramento, CA. Available at:

<<http://www.cdpr.ca.gov/docs/empm/pubs/tac/dichlo13.htm>>.

ARB, 2007. Report on Ambient Air Monitoring for Methyl Bromide and 1,3-Dichloropropene Air Monitoring in Ventura County during June, July, and August 2006. California Air Resources Board, Sacramento, CA. Available at:

<<http://www.cdpr.ca.gov/docs/empm/pubs/tac/dichlo13.htm>>.

DPR, 2001. Summary of Ambient Air Monitoring for Methyl Bromide. California Department of Pesticide Regulation, Sacramento, CA. Available at:

<<http://www.cdpr.ca.gov/docs/dprdocs/methbrom/msum2000.pdf>>.

DPR, 2002. Methyl Bromide Risk Characterization Document for Inhalation Exposure (Volume I). California Department of Pesticide Regulation, Sacramento, CA.

DPR, 2007a. California Code of Regulations, Title 3, Food and Agriculture, Division 6 Pesticides and Pest Control Operations, Chapter 4 Environmental Protection, Subchapter 2. Air Article 1 Toxic Air Contaminants, 6860 Toxic Air Contaminants List. Available at:

<<http://www.cdpr.ca.gov/docs/inhouse/calcode/040201.htm>>.

DPR, 2007b. Monitoring Reports. Toxic Air Contaminant Program. California Department of Pesticide Regulation, Sacramento, CA. Available at:

<<http://www.cdpr.ca.gov/docs/empm/pubs/tac/tacstdys.htm>>.

Reed, Nu-may. 2001. Exposure Criteria for 1,3-Dichloropropene. Memorandum from Nu-may Reed to Gary Patterson, Medical Toxicology Branch, February 8, 2001. California Department of Pesticide Regulation, Sacramento, CA.

Tomlin, C. (ed) 1997. The Pesticide Manual: Eleventh Edition. Crop Protection Publications, British Crop Protection Council and the Royal Society of Chemistry. United Kingdom.

US EPA, 2007a. The Phaseout of Methyl Bromide. U.S. Environmental Protection Agency. Available at: <<http://www.epa.gov/ozone/mbr/>>.

U.S. EPA, 2007b. 1,3-Dichloropropene (542-75-6) Hazard Summary-Created in April 1992; Revised in January 2000. Technology Transfer Network Air Toxics. Available at:

<<http://www.epa.gov/ttn/atw/hlthef/dichl-pe.html>>.

Table 1. Summary of MrBr air monitoring results* (ppb) in Ventura County

Sampling Location	Highest 1-Day Concentration	Highest TWA 1-Week Concentration	Average Concentration for Monitoring Period
August 22 to September 30, 2005			
LS – a background site (Lincoln Elementary School)	0.15	0.04	0.02
UD/WD (United Water Conservation District)	3.52	0.97	0.29
CF/DF (California Department of Forest)	3.90	1.12	0.39
VC/FS (Ventura County Fire station)	1.04	0.38	0.17
LV (Laguna Vista Elementary School)	1.11	0.78	0.22
CT (CalTrans Station)	0.83	0.58	0.14
June 14 to August 6, 2006			
TO – a background site (Thousand Oaks High School)	0.93	0.60	0.22
UD/WD (United Water Conservation District)	2.58	1.61	0.57
CF/DF (California Department of Forest)	2.11	1.39	0.52
VC/FS (Ventura County Fire station)	4.51	1.89	0.80
LV (Laguna Vista Elementary School)	5.92	2.99	0.88
CT (CalTrans Station)	1.85	1.30	0.45
Reference Concentration			
Child	250	70	
Adult	210	120	

*For tables 1 to 7, in case of collocated samples collected, average of the two samples was used in calculation.

Table 2. Summary of 1,3-D air monitoring results (ppb) in Ventura County

Sampling Location	Highest 1-Day Concentration	Highest TWA 1-Week Concentration	Average Concentration for Monitoring Period
August 22 to September 30, 2005			
LS – a background site (Lincoln Elementary School)	0.56	0.21	0.07
UD/WD (United Water Conservation District)	1.20	0.72	0.33
CF/DF (California Department of Forest)	1.07	0.42	0.31
VC/FS (Ventura County Fire station)	2.86	1.44	0.55
LV (Laguna Vista Elementary School)	4.40	2.98	0.97
CT (CalTrans Station)	16.92	9.33	2.33
June 14 to August 6, 2006			
TO – a background site (Thousand Oaks High School)	0.45	0.30	0.09
UD/WD (United Water Conservation District)	2.29	1.09	0.39
CF/DF (California Department of Forest)	9.69	4.43	0.84
VC/FS (Ventura County Fire station)	1.78	1.07	0.39
LV (Laguna Vista Elementary School)	0.97	0.80	0.31
CT (CalTrans Station)	2.20	1.59	0.31
Reference Concentration Children	40	26	

Table 3. MeBr air monitoring results (ppb) in Ventura County, 2005

Sample start date	Monitoring location*					
	LS (background)	UD/WD	CF/DF	VC/FS	LV	CT
8/22/05	Invalid	0.08	0.23	0.11	Invalid	Invalid
8/23/05	0.04	0.17	0.20	0.19	0.58	Invalid
8/24/05	0.06	0.08	0.63	0.18	0.64	0.33
8/25/05	**DET	1.51	1.91	1.04	1.11	0.83
8/29/05	0.15	3.52	3.90	1.01	0.44	0.20
8/30/05	DET	0.13	0.35	0.14	0.17	0.10
8/31/05	DET	DET	0.13	0.04	0.07	0.07
9/1/05	**<MDL	0.23	0.09	<MDL	0.12	0.16
9/6/05	0.04	0.48	0.21	0.36	0.54	0.37
9/7/05	0.06	0.02	0.05	0.15	0.78	0.11
9/8/05	DET	DET	Invalid	0.21	0.10	Invalid
9/12/05	DET	DET	DET	DET	DET	Invalid
9/13/05	DET	DET	DET	DET	DET	Invalid
9/14/05	<MDL	0.02	0.02	DET	DET	DET
9/15/05	DET	0.09	0.03	Invalid	DET	0.03
9/19/05	DET	DET	DET	DET	<MDL	<MDL
9/20/05	Invalid	DET	0.05	DET	DET	DET
9/21/05	DET	0.03	0.07	0.06	DET	0.13
9/22/05	DET	0.05	DET	DET	0.11	0.08
9/26/05	DET	DET	0.03	0.03	0.06	0.04
9/27/05	DET	0.04	Invalid	0.04	0.05	DET
9/28/05	DET	DET	0.03	DET	DET	DET
9/29/05	<MDL	0.04	0.14	0.06	DET	<MDL

*Monitoring locations are indicated on Figures 3 to 6.

**For tables 3 to 6, <MDL refers to less than MDL. The quantity of half MDL was used for concentration calculations. DET refers to detected result less than EQL, but greater than MDL. The quantity of half (EQL+MDL) was used for 2005 data calculations (tables 3 and 5). In ARB's 2006 study report, The DET was reported as actual estimated values. These values were used for calculations in this summary. The values less than the laboratory reported EQL were reported as italic in Table 6.

Table 4. MeBr air monitoring results (ppb) in Ventura County, 2006

Sample start date	Monitoring location					
	TO (background)	UD/WD	CF/DF	VC/FS	LV	CT
6/14/06	Invalid	Invalid	Invalid	1.24		0.12
6/15/06	0.06	0.63	0.28	0.43	0.59	0.13
6/16/06	0.10	0.77	0.54	0.70	0.34	0.49
6/17/06	0.08	0.52	0.18	0.12	0.08	Invalid
6/19/06	0.09	0.64	0.41	0.25	0.11	0.10
6/20/06	0.12	0.26	0.34	0.17	0.16	0.12
6/21/06	0.23	0.36	0.52	0.21	0.18	0.21
6/22/06	0.26	Invalid	0.28	0.13	0.07	Invalid
6/26/06	0.34	0.20	0.35	0.49	0.23	Invalid
6/27/06	Invalid	0.07	0.77	0.17	0.15	Invalid
6/28/06	0.06	0.10	0.26	0.57	2.55	0.18
6/29/06	0.08	0.22	0.13	0.19	0.59	Invalid
7/5/06	0.17	0.90	0.44	0.31	1.70	0.23
7/6/06	0.23	1.06	0.49	0.54	1.66	0.54
7/7/06	0.10	0.31	0.47	0.67	0.39	
7/8/06	0.10	0.28	0.22	0.15	0.26	
7/10/06	0.04	0.08	0.08	0.04	0.07	0.05
7/11/06	0.04	0.18	0.18	1.34	0.16	0.06
7/12/06	0.03	0.06	0.08	1.13	0.19	0.11
7/13/06	0.04	0.17	0.21	0.46	0.13	0.08
7/17/06	0.13	0.10	0.50	0.75	0.10	0.10
7/18/06	0.11	0.20	0.90	2.06	0.08	0.10
7/19/06	0.41	0.09	0.34	0.52	0.57	0.46
7/20/06	0.57	0.03	0.12	1.16	2.01	1.00
7/24/06	0.59	0.44	1.88	1.39	0.80	1.34
7/25/06	0.46	0.15	0.97	0.32	0.21	0.79
7/26/06	0.41	0.19	0.62	0.80	0.62	1.24
7/27/06	0.93	2.58	2.11	1.67	1.31	1.85
8/2/06	0.26	2.36	0.88	4.51	5.92	0.59
8/3/06	0.11	2.52	0.93	1.11	0.21	0.46
8/4/06	0.22	0.58	0.34	0.80	3.99	
8/5/06	0.28	0.98	0.41	1.16	1.82	

Table 5. 1,3-D air monitoring results (ppb) in Ventura County, 2005

Sample start date	Monitoring location					
	LS (background)	UD/WD	CF/DF	VC/FS	LV	CT
8/22/05	Invalid	0.26	0.21	0.200	0.08	0.36
8/23/05	0.09	0.57	0.21	0.31	0.39	1.11
8/24/05	0.04	0.83	0.20	0.31	0.30	1.67
8/25/05	0.12	1.20	1.07	0.49	1.00	1.63
8/29/05	0.05	0.58	0.24	0.25	0.08	0.10
8/30/05	<MDL	0.10	0.14	0.15	DET	0.08
8/31/05	DET	0.07	0.26	0.13	0.38	0.57
9/1/05	DET	0.13	0.63	0.24	0.68	0.50
9/6/05	0.05	0.16	0.60	2.74	4.40	2.30
9/7/05	DET	0.08	0.23	0.48	3.24	1.47
9/8/05	0.15	0.23	Invalid	0.32	1.31	1.09
9/12/05	0.10	0.44	0.40	2.86	4.37	16.92
9/13/05	0.56	0.57	0.26	1.36	1.30	13.71
9/14/05	0.12	0.83	0.37	0.76	3.33	5.12
9/15/05	0.07	0.59	0.28	0.78	0.30	1.58
9/19/05	DET	0.24	0.66	0.44	0.21	2.38
9/20/05	Invalid	0.38	0.22	0.44	0.25	0.90
9/21/05	DET	0.13	0.16	0.30	0.37	0.84
9/22/05	DET	0.03	0.07	DET	0.06	0.65
9/26/05	DET	0.05	0.03	0.09	0.03	0.11
9/27/05	0.01	0.04	Invalid	0.03	0.09	0.34
9/28/05	0.02	0.03	0.02	0.03	0.05	0.18
9/29/05	0.03	0.02	0.03	0.02	0.08	0.09

Table 7. Summary of ARB's ambient monitoring in 2005 and 2006

Year of monitoring	2005	2006
MeBr		
Number of total invalid or missed samples	9	13
Number of total valid samples*	106	147
Number of samples equal or above MDL	102	147
Percent of samples equal or above MDL	96%	100%
1,3-D		
Number of total invalid or missed samples	2	13
Number of total valid samples*	113	147
Number of samples equal or above MDL	113	102
Percent of samples equal or above MDL	100%	69%

*Background samples were not included.

Table 8. Comparing ARB's ambient air monitoring results in different counties

Year	Monitoring Months	County	2000-2006			
			Methyl bromide Highest 1-day concentration (ppb)	Pesticide Use* (pounds)	1,3-dichloropropene Highest 1-day concentration (ppb)	Pesticide Use (pounds)
2000	7-9	Kern	14.2	669622	29.7	603270
2000	9-11	Monterey Santa Cruz	30.7	1878150 662195	1.0	396280 53836
2001	6-8	Kern	25.3	85425	21.1	263439
2001	9-11	Monterey Santa Cruz	36.6	1503912 558122	4.2	270860 81760
2005	8-9	Ventura	3.9	1008903	16.9	945435
2006	6-8	Ventura	5.9	1037732	9.7	983959

*Total annual use of the active ingredient in the entire county

Figure 1. Weekly use percentages of MeBr and 1,3-D in Ventura County in 2005

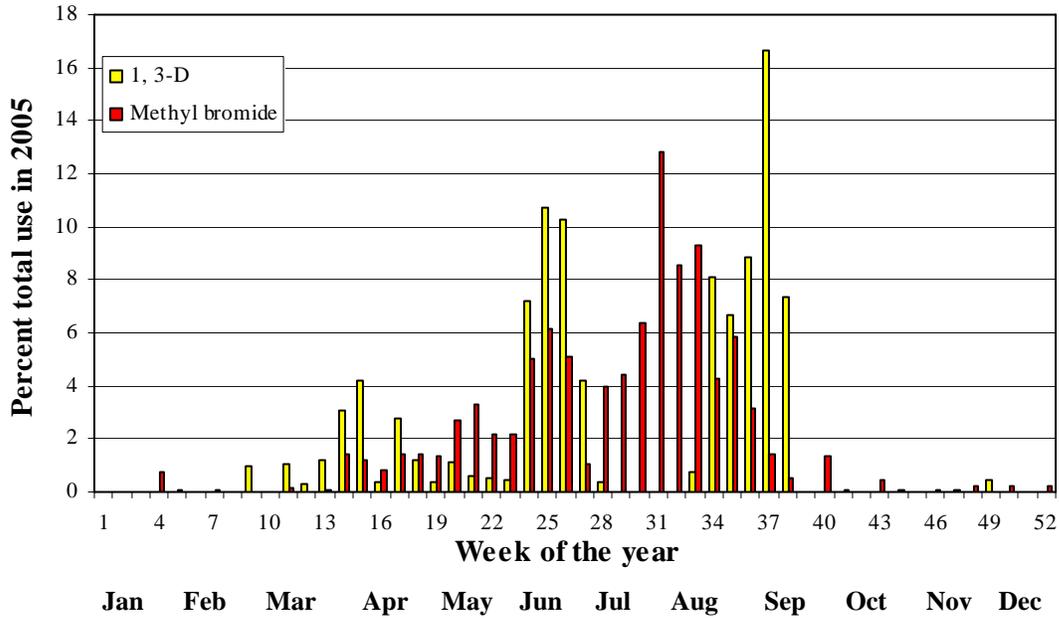


Figure 2. Weekly use percentages of MeBr and 1,3-D in Ventura County in 2006

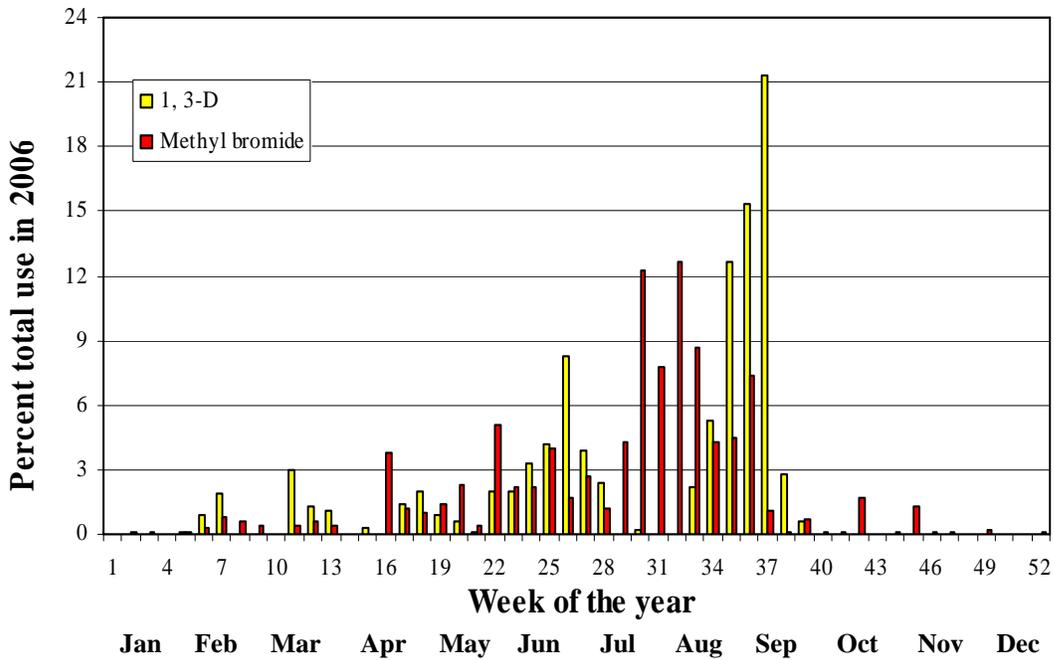


Figure 3. Monitoring sites and MeBr use in 2005

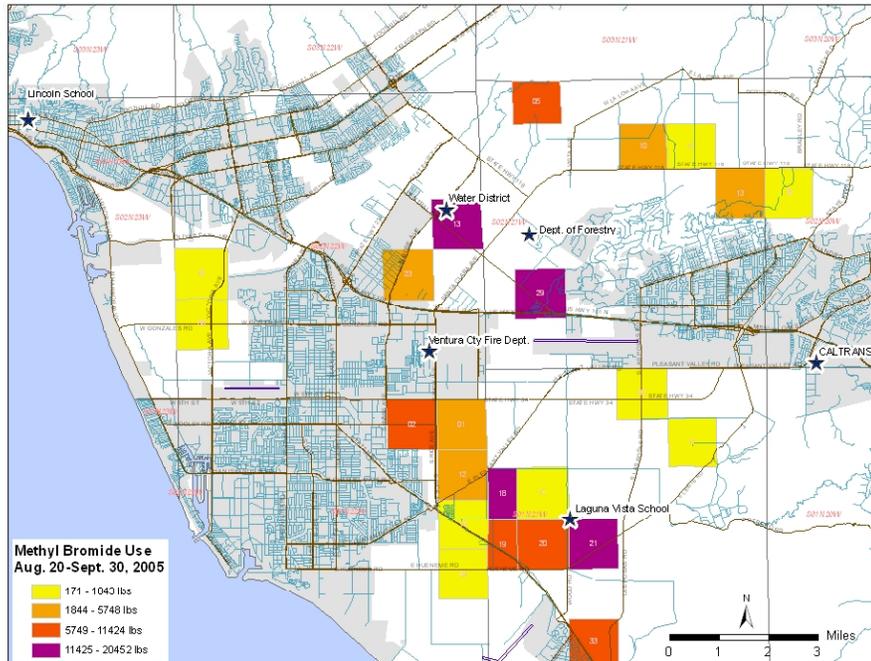


Figure 4. Monitoring sites and MeBr use in 2006

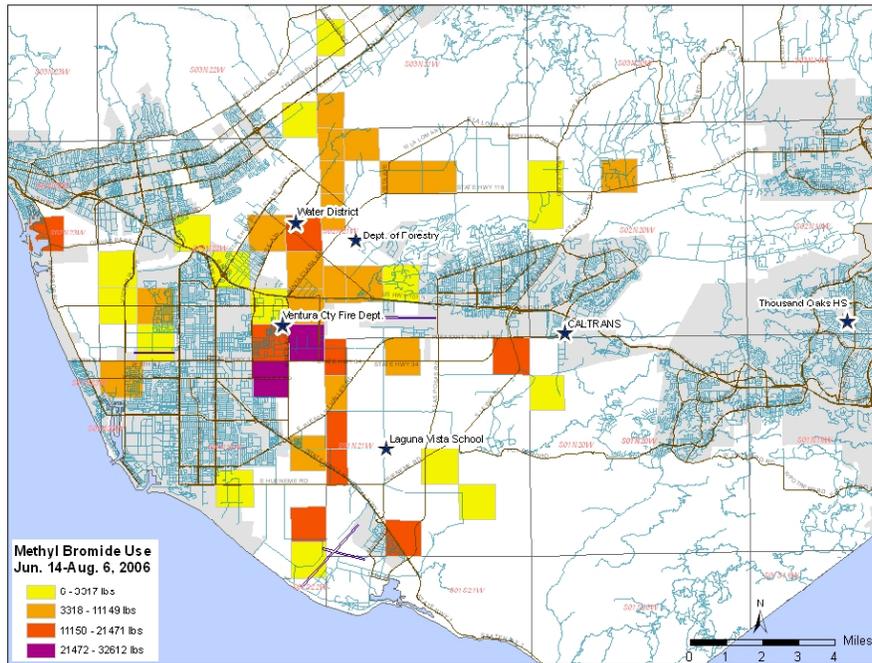


Figure 5. Monitoring sites and 1,3-D use in 2005

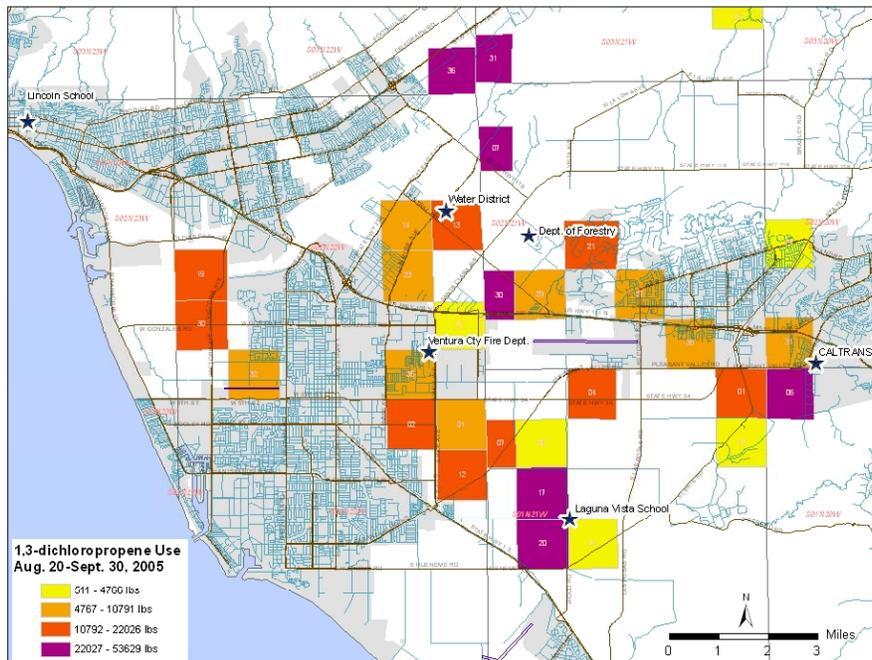


Figure 6. Monitoring sites and 1,3-D use in 2006

