



# Department of Pesticide Regulation



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## MEMORANDUM

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SUBJECT: STUDY GW05-SUMMARY OR RESULTS FOR FISCAL YEAR 2005/06  
GROUND WATER PROTECTIONS LIST MONITORING FOR S-ETHYL  
DIPROPYLTHIOCARBAMATE

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### SUMMARY

S-ethyl dipropylthiocarbamate (EPTC) was chosen for monitoring from the active ingredients (AIs) on the Ground Water Protection List (GWPL). Forty-four wells were sampled in eight counties during October through December 2005. No residues of EPTC were detected in any of the wells. No analyses for other pesticides were done on the samples taken.

### BACKGROUND

The Department of Pesticide Regulation's (DPR's) GWPL is a list of pesticides having the potential to pollute ground water. Pursuant to California Food and Agricultural Code (FAC) section 13143, companies seeking to register an agricultural use pesticide containing a new AI must send DPR certain chemical and environmental fate data. If these data exceed certain key values and the pesticide label specifies certain application methods, FAC section 13144 requires DPR to add the pesticide to GWPL. GWPL is contained in the Title 3, California Code of Regulations section 6800. FAC section 13148 requires DPR to monitor pesticides on GWPL to more accurately determine the mobility and persistence of the pesticides and determine if these pesticides have migrated to ground waters of the state. Between 1990 and 2005, DPR sampled approximately 1060 wells for 81 pesticides and pesticide breakdown products as part of GWPL monitoring (CDPR, 2007a). The herbicide EPTC was selected for monitoring during fiscal year 2005–2006, based on procedures described in Troiano (1997). This herbicide was selected based on the availability of a combined laboratory analysis method and trends in reported use.



## **METHODS**

DPR chose study sections based on soil vulnerability and the pounds of AI applied as reported in the pesticide use reports (CDPR, 2007b). These sections were further prioritized based on the presence of wells in the area according to our well inventory database (CDPR, 2007a). Areas with clusters of high use sections, based on use for reporting years 1999–2004, were considered first (Table 1). DPR has classified many sections within the state as ground water protection areas (GWPAs) because they are more vulnerable to pesticide contamination of the ground water based on either (1) soil conditions and the depth to ground water less than 70 feet or (2) the presence of verified pesticide residues in the ground water of the section (Troiano et al., 2000). For this study, the majority of the sections with a high use of EPTC were located outside of these GWPAs. As a result, areas of high EPTC use and with ground water depths that were less than 150 feet and a record of available wells were given highest priority. Most targeted sections had a depth to ground water of 100 feet or less. The sampled sections were located in Butte, Fresno, Glenn, Merced, Sacramento, San Joaquin, Siskiyou, and Stanislaus counties (Table 2). Although there were counties with much higher use of EPTC, DPR did not sample these areas due to a lack of available wells and excessive depth to ground water (greater than 150 feet).

Table 1. Counties with the highest use of EPTC for the reporting years of 1999–2004 (CDPR, 2007b). Counties sampled are indicated with an asterisk.

County	Pounds Applied
Imperial	427,277
Kings	206,122
Kern	194,387
Tulare	125,436
Merced*	94,139
San Joaquin*	94,065
Fresno*	83,931
Riverside	68,357
Sacramento*	49,213
Stanislaus*	46,317
Yolo	28,021
Madera	24,358
Monterey	24,249
Santa Barbara	22,284
Sutter	20,146
Contra Costa	17,357
Solano	16,517
Glenn*	16,500
Los Angeles	13,193
Siskiyou*	12,908
Butte*	12,274
San Luis Obispo	10,199
Colusa	6,797
Ventura	4,224
Santa Clara	2,941

Table 2. Sections containing wells sampled during 2005 GWPL monitoring. Pounds of EPTC applied in each section and in the total for the 9-section area (sampled section and the surrounding 8 sections) are given for reporting years 1999–2004 (DPR, 2007b). Depth to ground water values are from Troiano et al. (2000).

County	Section	Depth to ground water (ft)	Pounds of EPTC applied	
			In section	In 9-section
Butte	04M21N01E28	Not avail.	428	1044
	04M21N01E34	Not avail.	271	2907
Fresno	10M14S16E29	30	0	1688
	10M14S17E24	113	936	936
	10M17S20E08	105	501	3870
	10M17S20E19**	77	876	4292
	10M17S20E28**	53	94	2828
	10M17S21E10*	48	2328	2328
Glenn	11M20N03W21**	20	415	751
	11M20N04W35**	21	33	606
	11M21N02W23	21	1185	2346
	11M21N03W10	29	900	900
Merced	24M05S11E32*	32	1817	5160
	24M06S10E20*	8	1507	5696
	24M06S10E21*	9	1496	6193
	24M06S10E25*	15	1130	1879
	24M06S12E08**	81	1520	2632
	24M07S13E21**	41	936	1077
Sacramento	34M05N04E15	4	995	1265
	34M05N06E02	88	8481	8727
	34M05N07E28	109	1737	3210
	34M06N05E11	109	1068	1754
	34M06N06E03	85	2911	7422
	34M06N06E08**	91	300	5484
	34M07N07E29	102	1727	3129
San Joaquin	39M01S05E18	0	2559	3737
	39M01S08E14	96	0	2353
	39M02S05E02	38	953	3823
	39M02S07E07*	8	2706	5460
	39M03N07E24	104	1178	1345
	39M04N05E36*	13	297	3779
	39M04N07E03	112	2156	5782
	39M04N07E05	99	2131	4142
	39M04N07E08	97	1041	4943
	39M05N07E02	122	514	4937

County	Section	Depth to ground water (ft)	Pounds of EPTC applied	
			In section	In 9-section
Siskiyou	47M43N06W22	13	696	1045
	47M46N01W10	160	471	3063
	47M46N01W21	Not avail.	2550	4281
Stanislaus	50M04S07E29*	72	504	2477
	50M04S08E23**	16	1497	2176
	50M05S09E12*	16	632	1905
	50M05S09E19**	10	113	2473
	50M05S11E19*	24	420	5387

\* Section is a GWPA. \*\* Section adjacent to a GWPA.

DPR selected domestic wells for sampling according to procedures in SOP FSWA006.00 (Marade, 1998), with the goal of sampling at least one well in each selected section. If the sampling crew could find no suitable wells available in the target section, a well within approximately 0.2 miles of the section could be sampled. Samples were collected using the methods described in SOP FSWA001.00 (Marade, 1996). DPR obtained information regarding the well construction and depth from the well owner. When possible, the sampling crew measured the depth to water using a Slope Water Level Indicator model WLI#51690030 meter.

The California Department of Food and Agriculture's Center for Analytical Chemistry analyzed one primary sample from each well for EPTC. Samples containing known amounts of EPTC and disguised as actual samples (blind spikes) were prepared and analyzed in accordance with SOP QAQC001.00 (Segawa, 1995). Samples containing deionized water (field blanks) were collected at the same time as the field samples and would have been analyzed to confirm the validity of positive results. The reporting limit for EPTC was 0.05 parts per billion. The reporting limit is the smallest amount that can be reliably detected and is set by the testing laboratory for each compound.

## RESULTS

A total of 44 wells were sampled in 43 sections in 8 counties with no reported detections of EPTC. Two counties, Yolo and Solano, were surveyed for wells to sample however no suitable wells could be found in the target areas. The original plan was to sample up to 60 wells. Results from the samples received during the course of the study were all negative for EPTC. After sampling 44 wells located in most of the targeted counties and finding no residues of EPTC, DPR decided to suspend further sampling. EPTC use for the years 1999–2004 and the locations of wells sampled for this study are shown in figure 1.

## **DISCUSSION**

EPTC is a selective pre-emergent thiocarbamate herbicide that is applied to soil to control a variety of broadleaf weeds and grasses. In California, during the period 1999–2004, EPTC use was reported on 50 different crops. The ten crops with the highest reported use were: alfalfa, corn, potatoes, sugarbeets, beans, tomato, safflower, almonds, carrots, and clover.

None of the 44 sampled wells tested positive for EPTC despite being located in high use areas, some with very shallow depths to ground water. Ten of the sections sampled were GWPA's and nine others were adjacent to a GWPA. Similar results were obtained in a GWPL monitoring study conducted in 1992, in which 28 wells were sampled for EPTC (Weaver and Marade, 1992). The combined results of the 1991–1992 and 2005–2006 monitoring studies indicate that the AI EPTC has a low potential for contaminating California ground water due to legal agricultural use in vulnerable areas. If EPTC use increases or application methods change, DPR may conduct further investigations.

Figure 1. Total California EPTC use 1999-2004, GWPsAs and sampled well locations.



## REFERENCES

CDPR. 2007a. Well Inventory Database. California Department of Pesticide Regulation, Sacramento, California.

CDPR. 2007b. Pesticide use Reports. Available at:  
<http://www.cdpr.ca.gov/docs/pur/purmain.htm>. (verified December 20, 2007). California Department of Pesticide Regulation, Sacramento, California.

Marade, J. 1996. SOP FSWA001.00. Well Sampling: Obtaining Permission to Sample, Purging, Collection, Preservation, Storage and Documentation. Available at:  
<http://www.cdpr.ca.gov/docs/emon/pubs/sops/fswa001.pdf>. (verified December 20, 2007). Department of Pesticide Regulation, Sacramento, California

Marade, J. 1998. SOP FSWA006.00. Selection of a Suitable Well Site. Available at:  
<http://www.cdpr.ca.gov/docs/emon/pubs/sops/fswa006.pdf>. (verified December 20, 2007). California Department of Pesticide Regulation, Sacramento, California.

Segawa, R. 1995. SOP QAQC001.00. Chemistry Laboratory Quality Control. Available at:  
<http://www.cdpr.ca.gov/docs/emon/pubs/sops/qaqc001.pdf>. (verified December 5, 2007). California Department of Pesticide Regulation, Sacramento, California.

Troiano, J. 1997. Revised Protocol for Selecting Ground Water Protection List Pesticide Active Ingredients To Be Monitored Under Certain Agricultural Conditions. Available at:  
<http://www.cdpr.ca.gov/docs/emon/grndwtr/polprocd/gwplai.pdf>. (verified January 11, 2008). California Department of Pesticide Regulation, Sacramento, California.

Troiano, J., F. Spurlock and J. Marade. 2000. EH 00-05. Update of the California vulnerability soil analysis for movement of pesticides to ground water: October 14, 1999. Available at:  
<http://www.cdpr.ca.gov/docs/emon/pubs/ehapreps/eh0005.pdf>. (verified December 11, 2007). California Department of Pesticide Regulation, Sacramento, California.

Weaver, D. and J. Marade. 1992. Memorandum to Kean S. Goh, Ph.D. Summary of Results for FY 1991-92 Ground Water Protection List Monitoring. Available at:  
[http://www.cdpr.ca.gov/docs/emon/grndwtr/rpts/gwpl\\_9192.pdf](http://www.cdpr.ca.gov/docs/emon/grndwtr/rpts/gwpl_9192.pdf). (verified January 11, 2008). California Department of Pesticide Regulation, Sacramento, California.