



# 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<br>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

Contact [GWPP@cdpr.ca.gov](mailto:GWPP@cdpr.ca.gov) for references not currently available on the web.

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 previously at: [cdpr.ca.gov/docs/emon/pubs/sops/fswa001.pdf](http://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 previously at: [cdpr.ca.gov/docs/emon/pubs/sops/fswa006.pdf](http://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 previously at: [cdpr.ca.gov/docs/emon/pubs/sops/qaqc001.pdf](http://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 previously at: [cdpr.ca.gov/docs/emon/grndwtr/polprocd/gwplai.pdf](http://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 previously at: [cdpr.ca.gov/docs/emon/pubs/ehapreps/eh0005.pdf](http://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 previously at: [cdpr.ca.gov/docs/emon/grndwtr/rpts/gwpl\\_9192.pdf](http://cdpr.ca.gov/docs/emon/grndwtr/rpts/gwpl_9192.pdf). (verified January 11, 2008). California Department of Pesticide Regulation, Sacramento, California.