



**Department of Pesticide Regulation
Environmental Monitoring Branch
1001 I Street, P.O. Box 4015
Sacramento, California 95812**

April 8, 2008

**STUDY GW08: PROTOCOL FOR CONDUCTING GROUND WATER
PROTECTION LIST MONITORING FOR 2007-2008**

I. INTRODUCTION

The Pesticide Contamination Prevention Act (PCPA) (Statutes of 1985, Chapter 1298, Section 1) added sections 13141–13152 to the Food and Agricultural Code to prevent pesticide pollution of California’s ground water aquifers. The PCPA outlines procedures for (1) gathering physical and chemical data on pesticides, (2) establishing specific numerical values (SNVs [threshold values]) for specified types of those data that the PCPA associates with the potential of a pesticide to leach through soil to ground water, (3) identifying pesticides that “exceed” those SNVs, and (4) placing pesticides that “exceed” SNVs and are applied in specified ways on the Groundwater Protection List (GWPL) (Title 3, California Code of Regulations [3 CCR] section 6800[b]). The PCPA then requires the Department of Pesticide Regulation (DPR) to monitor for GWPL pesticides to determine if they have migrated to ground water. Since 1990, DPR has sampled 1228 wells for 81 pesticides and pesticide breakdown products as part of GWPL monitoring.

II. OBJECTIVE

The purpose of this study is to determine whether tebuthiuron has migrated to ground water in areas of California with high reported use.

III. PERSONNEL

GWPL well sampling will be conducted by Environmental Monitoring Branch. Project personnel include:

- Project Leader: Joy Dias
- Field Coordinator: Craig Nordmark
- Project Supervisor: Lisa Quagliaroli
- Senior Scientist: John Troiano
- Lab Liaison: Carissa Ganapathy
- Chemists: California Department of Food and Agriculture (CDFA),
Center for Analytical Chemistry, Staff Chemists

All questions concerning this protocol should be directed to Mark Pepple at (916) 324-4086, e-mail: <mpepple@cdpr.ca.gov>.

IV. STUDY PLAN

a) Active Ingredient Selection

DPR selects pesticide active ingredients (AIs) for monitoring based on guidelines outlined in Troiano (1997).

For fiscal year 2007/2008, DPR chose to monitor for tebuthiuron (*N*-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-*N,N'*-dimethylurea) based on recent detections in California ground water and reported use history in potentially sensitive areas.

Tebuthiuron is a broad spectrum herbicide used to control weeds in noncropland areas, rangelands, rights-of-way and industrial sites. Data obtained from DPR's Pesticide Use Reports (PURs) indicate that tebuthiuron use throughout California has steadily increased from 1996 to 2005 (Figure 1) (CDPR, 2008). The U.S. Geological Survey (USGS) reported detections of tebuthiuron in 29 wells from 10 counties during a survey conducted for the State Water Resources Control Board's Priority Basin Assessment (Bennett et al., 2006; Dawson et al., 2008; Wright et al., 2005; M. Fram, personal communication, 2008).

In addition to monitoring for the parent compound, DPR will also monitor for four of the main degradates:

- N-[5-(1,1-Dimethylethyl)-1,3,4-thiadiazol-2-yl]-N-methylurea
- 2-Dimethylethyl-5-methylamino-1,3,4-thiadiazol
- N-[5-(1,1-Dimethylethyl)-1,3,4-thiadiazol-2-yl]-urea
- 2-Dimethylethyl-5-amino-1,3,4-thiadiazole

The wells will also be sampled for the presence of the known ground water contaminants (3 CCR section 6800(a)) and several important degradates of these parent AIs. We included the analysis of the 3 CCR section 6800(a) pesticides and degradates because known contaminants have been used in the proposed sampling areas and the areas appear to be sensitive to pesticide movement through soil as evidenced by USGS detections. By monitoring for these pesticides, we can determine if tebuthiuron is migrating to ground water by the same mechanism as the known contaminants. If the known contaminants are detected but tebuthiuron is not detected, we will be able to determine that there are additional factors, such as use patterns or application rates, that are mitigating the movement of tebuthiuron to ground water.

b) Study Area Selection

Potential study sites will be chosen based on pesticide use data collected by DPR and detections reported by state, federal, or local government agencies.

The State Water Resources Control Board is collaborating with the USGS to implement the Priority Basin Assessment portion of the Groundwater Ambient Monitoring and Assessment (GAMA) Program. The goal of this program is to monitor and assess the

quality of all priority water basins that account for over 90 percent of all ground water used in the state. The USGS is monitoring ground water for dozens of chemicals, including tebuthiuron. When possible, we will re-sample the wells that had positive detections for tebuthiuron when sampled by the USGS for the GAMA Program. Additional wells within approximately two miles of the original GAMA detections will also be located and sampled as available.

Tebuthiuron is primarily used for rights-of-way pest control so applicators only report the total number of pounds they use per county per month. Since tebuthiuron use reports do not include exact use locations, we will contact the pest control businesses with the highest reported use to help determine areas that have had multiple applications over several years. This information will be used to identify additional areas to sample.

Potential counties for sampling will be based on GAMA detections and on the highest use as reported in the PUR from 1996-2005 (Table 1). A study goal of 40 to 60 sampled wells was set. Each well will be sampled for tebuthiuron and triazines.

Table 1. Total pounds of tebuthiuron applied from 1996 to 2005 and number of GAMA detections by county.

County	Total Use 1996-2005	GAMA detections	GAMA detection range
Kern	12,709	0	N/A
Los Angeles	12,538	12	E* 0.01 – 0.14
San Bernardino	11,271	2	E 0.01
Riverside	8,271	2	E 0.01 – 0.02
San Diego	8,261	4	E 0.02 – E 0.23
Orange	6,675	4	E 0.01 – 0.02
Ventura	1,161	1	E 0.02
San Joaquin	676	1	0.03
Solano	493	1	0.12
Glenn	403	1	0.02
Yolo	238	1	0.03

*E = Estimated value

V. SAMPLING AND ANALYTICAL METHODS

Where domestic wells are available, they will be selected according to procedures in SOP FSWA006.00 (Marade, 1998). Where domestic wells are unavailable, municipal wells will be sampled. Samples will be collected using the methods described in SOP FSWA001.00 (Marade, 1996). CDFAs' Center for Analytical Chemistry will analyze primary samples for tebuthiuron and triazines. Samples containing known amounts of tebuthiuron and disguised as actual samples (blind spikes) will be prepared and analyzed in accordance with SOP QAQC001.00 (Segawa, 1995). Samples containing deionized water (field blanks) will be collected at the same time as field samples and analyzed to confirm the validity of positive results. The reporting limit for all analytes is 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.

VI. DATA ANALYSIS

Data obtained from the CDFA laboratory will be used to determine if pesticides are migrating to ground water. If we find evidence that tebuthiuron has migrated to ground water, we will conduct additional surveys to determine the extent of the migration to ground water. These data will also be used to generate a study memorandum detailing the analysis findings. Analytical results will be provided to participating property owners for their respective wells within 12 to 16 weeks of sampling.

VII. TIMETABLE

- April-June 2008: Conduct well sampling for tebuthiuron
- August 2008: Obtain analysis results from CDFA laboratory, mail results to property owners
- September-November 2008: Conduct additional well sampling if tebuthiuron is detected during the first sampling
- November 2008: Write study memorandum if additional well sampling is not required
- January 2009: If additional well sampling is required, obtain analysis results from CDFA laboratory, mail results to property owners
- April 2009: Write study memorandum if additional well sampling is required

VIII. BUDGET

Budget Component	Units	Expense per Unit	Total Component Expense
Pesticide sample analysis	≤ 200	\$720	\$144,000
Travel	1	\$15,000	\$15,000
PY	0.3	\$100,000	\$30,000
Total			\$189,000

IX. REFERENCES

- Bennett, G.L., V. K. Belitz and, B.J. Milby Dawson. 2006. California GAMA Program—Ground-water quality data in the northern San Joaquin basin study unit, 2005. Available online at http://www.waterboards.ca.gov/gama/docs/nsjv_dsr.pdf (verified 6 June 2008). U.S. Geological Survey Data Series 196, 122 p.
- CDPR. 2008. Pesticide Use Reports. Available online at <http://www.cdpr.ca.gov/docs/pur/purmain.htm> (verified 14 March 2008). California Department of Pesticide Regulation, Sacramento, CA.
- Dawson, B.J., G.L. Bennett, V, and K. Belitz. 2008. Ground-Water Quality Data in the Southern Sacramento Valley, California, 2005—Results from the California GAMA Program. Available online at <http://pubs.usgs.gov/ds/285/ds285.pdf> (verified 6 June 2008). U.S. Geological Survey Data Series 285, 93 p.
- Marade, J. 1996. SOP FSWA001.00. Well Sampling: Obtaining Permission to Sample, Purging, Collection, Preservation, Storage, and Documentation. Available online at <http://www.cdpr.ca.gov/docs/empm/pubs/sops/fswa001.pdf> (verified 14 March 2008). California Department of Pesticide Regulation, Sacramento, CA.
- Marade, J. 1998. SOP FSWA006.00. Selection of a Suitable Well Site. Available online at <http://www.cdpr.ca.gov/docs/empm/pubs/sops/fswa006.pdf> (verified 14 March 2008). California Department of Pesticide Regulation, Sacramento, CA.
- Segawa, R. 1995. SOP QAQC001.00. Chemistry Laboratory Quality Control. Available online at <http://www.cdpr.ca.gov/docs/emon/pubs/sops/qaqc001.pdf> (verified 14 March 2008). California Department of Pesticide Regulation, Sacramento, CA.
- 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 14 March 14, 2008). California Department of Pesticide Regulation, Sacramento, CA.
- Wright, M.T., K. Belitz, and C.A. Burton. 2005. California GAMA Program—Ground-water quality in the San Diego Drainages hydrogeologic province, California, 2004. Available online at http://www.waterboards.ca.gov/gama/docs/sandiego_data_summary.pdf (verified 6 June 2008). U.S. Geological Survey Data Series 129, 91 p.

TABLES AND FIGURES

Figure 1. Total tebuthiuron use in California for reporting years 1996-2005 (CDPR, 2008).

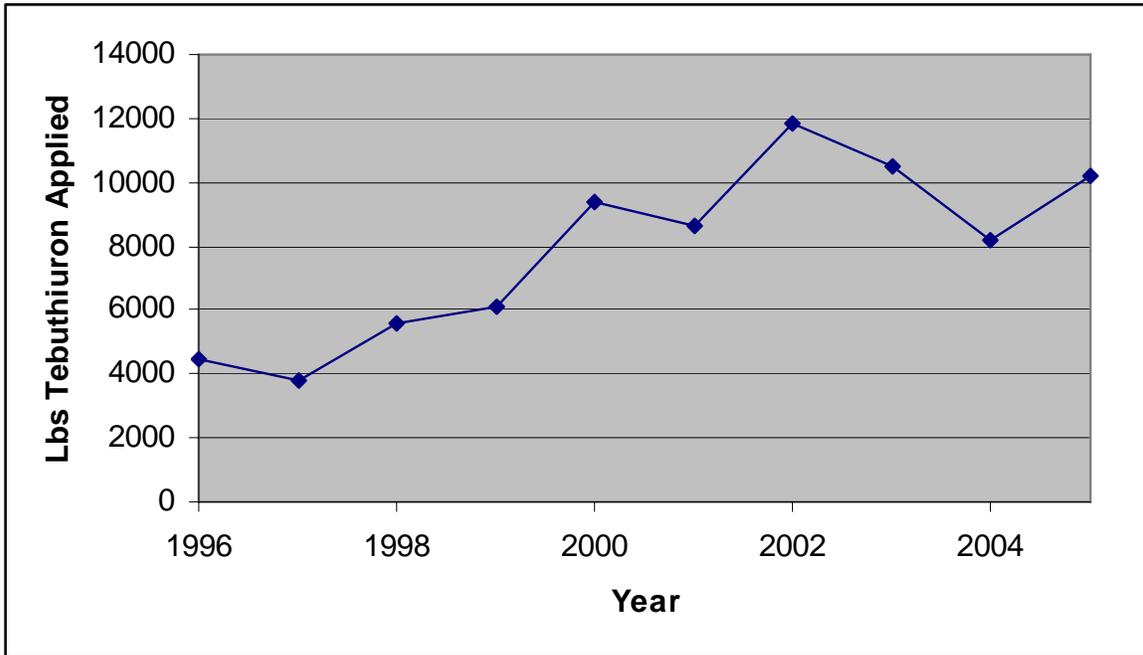


Figure 2. Tebuthiuron use in six counties for reporting years 1999-2006 (CDPR, 2008).

