

**SAMPLING FOR PESTICIDE RESIDUES
IN CALIFORNIA WELL WATER**

**1999 Update of the
Well Inventory Database**

**For Sampling Results Reported From
July 1, 1998 through June 30, 1999**

Fourteenth Annual Report to
the Legislature,
Department of Health Services,
Office of Environmental Health Hazard Assessment,
and the State Water Resources Control Board

Pursuant to the
Pesticide Contamination Prevention Act



California Environmental Protection Agency
DEPARTMENT OF PESTICIDE REGULATION

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California Department of Pesticide Regulation

Gray Davis, Governor

Winston H. Hickox, Secretary
California Environmental Protection Agency

Paul E. Helliker, Director
Department of Pesticide Regulation

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by

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Department of Pesticide Regulation
Environmental Monitoring and Pest Management Branch
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EH00-04

EXECUTIVE SUMMARY

The Pesticide Contamination Prevention Act

The Pesticide Contamination Prevention Act (PCPA) was enacted in 1985 to prevent further pesticide pollution of the state's ground water. The PCPA requires:

The Department of Pesticide Regulation (DPR) to maintain a statewide database of wells sampled for active ingredients of pesticide products.

Agencies to report to DPR the results of any well sampling for the active ingredients of pesticides.

DPR to review findings of pesticide contamination and undertake necessary mitigation.

DPR, in consultation with the California Department of Health Services (CDHS) and the State Water Resources Control Board (SWRCB), to annually make this report to the Legislature, CDHS, the State Office of Environmental Health Hazard Assessment, and SWRCB.

The Well Inventory Database

The well inventory database was developed by DPR (then a division of the California Department of Food and Agriculture) in 1983 before the passage of the PCPA.

The purposes of the database were to centralize information on the occurrence of nonpoint source contamination of ground water by the agricultural use of pesticides and to facilitate graphical, numerical, and spatial analyses of the data.

To meet the requirements of the PCPA, sampling results from both point source and nonpoint source contamination are included in the database.

What Happens When Detections are Reported to DPR

When a pesticide is found in ground water, a well-defined process established by the PCPA is triggered. This process allows for comprehensive review of the detection.

DPR refers detections to SWRCB if the pesticide is: not currently registered for use; registered for other than agricultural, outdoor industrial, or outdoor institutional uses; or found in ground water and determined not to be due to legal agricultural use. (See Appendix D for definitions of terms used in this report.)

DPR attempts to verify the detection of pesticides that are currently registered for agricultural use by conducting a well sampling study. There are specific criteria for verification of a detection. If a detection is verified, a determination is made as to whether the contamination occurred because of legal agricultural use of the chemical. Detections may not be verified for one of several reasons, including:

Follow-up sampling has not yet been completed by DPR, or sampling was not conducted by DPR. The detection may have been referred to SWRCB; there may be no wells available for sampling; or permission to sample could not be obtained from the well owner.

Analyses of all other samples taken by DPR in response to the positive sample were negative for the compound under investigation.

General Information about Sampling Results in the Well Inventory Database

A summary of the data in the database by report year is given in Table 1.

The data can be used to:

Display the geographic distribution of well sampling.

Display the geographic distribution of pesticide residues in sampled wells.

Identify areas potentially sensitive to contamination by the legal agricultural use of pesticides.

There are limitations on interpreting the data, including:

The data indicate which pesticides are present in well water among those pesticides for which analyses were performed. They do not represent a complete survey of ground water quality throughout the State nor do they represent sampling for all pesticides.

Sampling by agencies other than DPR is not necessarily related to suspected agricultural sources of contamination.

The Data in this Report

This is the fourteenth annual report.

Data were submitted to DPR from July 1, 1998, to June 30, 1999.

Data are the results of 15 investigations conducted by two agencies.

Data are from studies that were conducted from 1998 through 1999.

Table I. Summary of well sampling results included in DPR's well inventory database, by report year.

CATEGORY	Total						TOTAL ^(d) 1984-1999
	1984-1994	1995	1996	1997	1998	1999	
Total wells sampled	19,725	3,322	3,564	2,508	1,898	2,389	20,714
no detections	15,547	2,769	3,128	2,071	1,668	2,093	16,249
detections ^(a)	4,178	552	436	437	230	296	4,465
verified detections ^(b)	789	213	6	96	3	39	895
Total counties sampled	58	47	48	48	41	49	58
no detections	14	19	20	24	21	29	48
detections ^(a)	44	28	28	24	20	20	10
verified detections ^(b)	31	17	5	7	3	10	32
Total pesticides and related compounds	291	166	121	165	83	111	308
no detections	202	139	99	143	67	94	212
detections ^(a)	89	27	22	22	16	17	96
verified detections ^(b)	22	9	3	11	5	8	24
Pesticides and related compounds detected in ground water as the result of legal, agricultural use ^(c)	15	9	8	9	9	9 ^(e)	16 ^(f)

(a) Includes verified and unverified detections.

(b) Detections are designated as verified if residues are detected in one sample as a result of an analytical method approved by DPR and verified, within 30 days in a second discrete sample taken from the well, by a second analytical method or laboratory approved by DPR; or if an unequivocal detection is made.

(c) Legal, agricultural use is the application of a pesticide, according to its labeled directions and in accordance with all laws and regulations. Agricultural use is defined in Food and Agricultural Code section 11408.

(d) The total includes data since the inception of the database in 1984, and is not additive. A single well that had sampling data reported in more than one year is counted one time only.

(e) The 9 compounds are 1,2-D, ACET, bromacil, DBCP, deethyl-atrazine, diuron, EDB, norflurazon, and simazine.

(f) The 16 compounds are 1,2-D, ACET, aldicarb, aldicarb sulfone, aldicarb sulfoxide, atrazine, bentazon, bromacil, DBCP, deethyl-atrazine, diuron, EDB, norflurazon, prometon, simazine, and 2,3,5,6-tetrachloroterephthalic acid. Aldicarb, atrazine, bentazon, bromacil, diuron, norflurazon, prometon, and simazine have been reviewed through the Pesticide Detection Response Process. The uses of 1,2-D, DBCP, and EDB were canceled prior to the passage of the PCPA; therefore, DPR did not review these chemicals but considers them to have reached ground water as a result of legal, agricultural use.

Summary of Data in This Report

61,931 records (chemical analyses) were added to the database for this report.

2,389 wells were sampled in 49 counties.

111 pesticide active ingredients and breakdown products were analyzed.

17 compounds were reported with detections.

Of the 2,389 wells sampled, 2,265 (95%) were public drinking water wells, 111 (4.6%) were private drinking water wells, 9 were non-drinking water wells, and 4 wells were either unused or the use was unknown.

Detections Referred to SWRCB

Detections of seven chemicals, including three chemicals where historical agricultural applications are considered by DPR to be the source of residues in ground water, were reported to SWRCB.

The three chemicals and the number of wells with detections are:

1,2-dibromo-3-chloropropane (DBCP): 236 wells.

1,2-dichloropropane (1,2-D): 6 wells.

ethylene dibromide (EDB): 11 wells.

Chemical names

Deethyl-atrazine (2-amino-4-chloro-6-isopropylamino-s-triazine, DEA) is a degradate of atrazine. 2-amino-4-chloro-6-ethylamino-s-triazine (ACET) and 2,4-diamino-6-chloro-s-triazine (DACT) are breakdown products of either atrazine or simazine.

Summary of Verified Detections

Verified detections were made of eight compounds: bromacil, diuron, hexazinone, norflurazon, simazine, atrazine and its breakdown product DEA, and the breakdown product ACET, which is common to both atrazine and simazine. Verified detections were made in a total of 39 wells in 10 counties (Table 2). One large water system well had a verified detection of atrazine (0.084 ppb) and its breakdown product DEA (0.097 ppb). The remaining verified detections were in private water wells. The concentration of all verified detections was below established health action levels for these compounds.

Table 2. Summary of wells with verified detections of pesticide residues, by county and chemical. Results are for data reported from July 1, 1998, through June 30, 1999.

County	atrazine	bromacil	diuron	hexazinone	norflurazon	simazine	ACET	DEA	Total Wells ^(b)
Colusa				1 ^(a)		1	1 ^(a)	1 ^(a)	3
Fresno	1	3	3			4	6	1	10
Kern							1 ^(a)		1
Madera							1 ^(a)		1
Merced	1	1 ^(a)	1			1	2 ^(a)		4
Monterey						1 ^(a)			1
San Joaquin			1			1	4		4
Solano								1	1
Stanislaus							2		2
Tulare	1	3	10		3	9	11	1	12
Total Wells	3	7	15	1	3	17	28	4	39

(a) First time verified detection of this chemical in this county.

(b) The total may not be additive due to detections of multiple residues in the same well.

Legal Agricultural Use Determinations and Recommendations for Pesticide Management Zones

After well sampling and land use surveys are completed, a determination is made as to whether the detection of the pesticide residues in ground water could have been due to legal agricultural use. Specific criteria must be met for this determination to be made.

A pest management zone (PMZ) is a land area where a pesticide has been detected in ground water and where it has been determined that the contamination was due to legal agricultural use. PMZs are established in regulation to prevent further contamination of ground water. The use of certain chemicals is prohibited or restricted in these areas. PMZs have been established in various areas of the State for atrazine, bromacil, diuron, prometon, and simazine.

Legal agricultural use was determined to be the source of residues of atrazine, bromacil, diuron, simazine, ACET, and deethyl-atrazine in wells in Fresno, Merced, San Joaquin, Solano, and Tulare counties. DPR recommended 17 sections in five counties as new PMZs (Section II, Table II-1).

Norflurazon continues in the Pesticide Detection Response Process.

The Pesticide Registration Evaluation Committee's subcommittee held a hearing and made findings and recommendations to the DPR Director regarding the continued use of norflurazon. After reviewing these findings and recommendations, the Director issued a final decision in April 1999. The Director concurred with the subcommittee that the use of norflurazon can be modified in such a way that there would be a high probability that no norflurazon residues other than those already present in ground water would migrate to ground water. Regulations will be adopted to make norflurazon a restricted material, add norflurazon use requirements, and establish norflurazon PMZs.

Groundwater Protection List Monitoring

Groundwater Protection List monitoring was conducted in 13 counties for napropamide and oryzalin. There were no detections of either chemical in the 29 wells sampled for napropamide and the 34 wells sampled for oryzalin.

Bentazon Monitoring

During this year's well monitoring survey for bentazon, no residues of bentazon or other herbicides were detected in any of the samples.

Changes in the Ground Water Program

DPR is planning to change the ground water protection program to make it more preventive. Based on information collected since the early 1980s, DPR will expand the number of sensitive areas and the number of pesticides regulated to protect ground water. Mitigation measures will be tailored to fit the mechanism of movement to ground water, will become mandatory, and will include measures to prevent wells themselves from serving as pathways for pesticide movement to ground water.

Factors That Contribute to Ground Water Contamination

DPR environmental scientists continue their work to understand the factors that contribute to ground water contamination by pesticides used in agriculture. They conduct field studies on pesticide movement, investigate contaminated wells, compile extensive databases, and review the work of other scientists. The knowledge gained from these activities is used to develop pesticide use practices designed to prevent further ground water contamination. For the past several years, DPR scientists have been developing an approach that integrates climatic, soil, and geographic data in analyses of their combined influence on the movement of pesticides to ground water. This

method may provide a basis for development of regional agricultural management practices to reduce ground water contamination by pesticides.

The State and Regional Water Boards

SWRCB and nine regional water quality control boards are responsible for protecting the beneficial uses of water in California and for controlling all discharges of waste into waters of the state. Actions taken by SWRCB to prevent pesticides from migrating to ground water are detailed in section III of this report.

PREFACE

This report fulfills the requirements contained in section 13152, subdivision (e) of the Food and Agricultural Code, directing DPR to report specified information on sampling for pesticide residues in California ground water to the Legislature, CDHS, the Office of Environmental Health Hazard Assessment, and SWRCB annually by December 1.

This report presents data reported to DPR from July 1, 1998, through June 30, 1999. This is the fourteenth annual report.

The PCPA requires that the annual report give the location of wells for which sampling results were reported. Although well locations are specified by township, range, and section in the database, listing results in this manner in the report is not possible due to the large number of wells sampled. Instead, sampling locations are summarized by county.

The information in this report is presented in three parts: Sections I and II were written by DPR staff. Section III was written by SWRCB staff.

ACKNOWLEDGMENTS

The authors wish to thank the reviewers whose unique perspectives helped ensure this report's accuracy and readability. In addition, we acknowledge the staff of cooperating federal, state, local, and private agencies for contributing their data, time, and efforts.

DISCLAIMER

The mention of commercial products, their source, or their use in this report is not to be construed as either an actual or implied endorsement of such product.

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LIST OF ACRONYMS AND ABBREVIATIONS

AB 1803	Assembly Bill No. 1803 (Connelly, 1983), Health and Safety Code, sections 4026.2 and 4026.3
AB 2021	Assembly Bill No. 2021 (Connelly, 1985), Food and Agricultural Code, sections 13141 through 13152. Also known as the Pesticide Contamination Prevention Act.
ACET	2-amino-4-chloro-6-ethylamino-s-triazine
Cal/EPA	California Environmental Protection Agency
3CCR	Title 3, California Code of Regulations
CDHS	California Department of Health Services
1,2-D	1,2-dichloropropane; propylene dichloride
2,4-D	2,4-dichlorophenoxyacetic acid
DACT	2,4-diamino-6-chloro-s-triazine
DBCP	1,2-dibromo-3-chloropropane
DPR	Department of Pesticide Regulation
DWR	California Department of Water Resources
EDB	ethylene dibromide
EHAP	Environmental Hazards Assessment Program (Part of DPR)
EMPM	Environmental Monitoring and Pest Management Branch (DPR)
FAC	Food and Agricultural Code
GWPL	Groundwater Protection List
HAL	health advisory level
MCL	maximum contaminant level
MDL	minimum detection limit
PCA	pest control adviser
PCPA	Pesticide Contamination Prevention Act of 1985 (AB 2021)
PDRP	Pesticide Detection Response Process
PMZ	pesticide management zone
ppb	parts per billion
PREC	Pesticide Registration and Evaluation Committee
RWQCB	Regional Water Quality Control Board
SB 950	Senate Bill 950: The Birth Defect Prevention Act
SWRCB	State Water Resources Control Board
U.S. EPA	U. S. Environmental Protection Agency

I. WELL INVENTORY DATABASE

INTRODUCTION

This report presents results from California water wells sampled for pesticide residues. The Department of Pesticide Regulation (DPR) compiled the sampling results from July 1, 1998 through June 30, 1999. The report discusses actions taken to prevent pesticides from entering ground water by DPR and the State Water Resources Control Board (SWRCB), including the nine Regional Boards. Factors contributing to the movement of pesticides to ground water as a result of legal agricultural use are also presented.

BACKGROUND

In 1979, the soil fumigant 1,2-dibromo-3-chloropropane (DBCP) was detected in ground water in Lathrop, California. These detections prompted widespread testing and many areas of DBCP contamination were found. Since then studies have been conducted throughout California to determine whether other pesticides have migrated to ground water.

On January 1, 1986, the Pesticide Contamination Prevention Act (PCPA) added sections 13141 through 13152 to Division 7 of the Food and Agricultural Code (FAC). The PCPA requires DPR to maintain a statewide database of wells sampled for pesticide active ingredients and to submit a report annually to the Legislature, the SWRCB, the California Department of Health Services (CDHS), and Cal/EPA's Office of Environmental Health Hazard Assessment. The report contains specific information from the database, as well as actions taken by the Director of DPR and the SWRCB to prevent pesticides from migrating to ground water.

In 1983, the Environmental Hazards Assessment Program (EHAP) of DPR developed the well inventory database to archive information on the occurrence of wells containing pesticide residues due to the agricultural use of pesticides. The well inventory is a unique archive of ground water sampling data for a single state. Although databases have been compiled in other states, only California centralizes monitoring results from various agencies.

The 1992 cumulative report (Maes, *et al.*, 1992) was the first to discuss the number of wells with detections resulting from the legal agricultural use of pesticides. Before 1992, well inventory reports emphasized the number of wells with confirmed, positive samples. In 1989, criteria were established for verifying detections of pesticide residues in ground water (Biermann, 1989). Reports after 1992 emphasize verified detections.

This is the fourteenth annual report. Section I summarizes the database by total wells sampled, verified detections, unverified detections, and the status of pesticides with verified detections. Section II describes the actions taken by DPR to prevent pesticides from entering ground water. Section III summarizes the actions taken by the SWRCB and the RWQCBs to prevent pesticides from migrating to ground water. Also included are a summary of the number of wells sampled by county and chemical (Appendix A), a summary of studies (Appendix B), the methods of data collection and format of records (Appendix C), and a glossary (Appendix D). A summary of data added to the database, by report year, is given in Table I-1.

CRITERIA FOR CLASSIFYING RECORDS IN THE WELL INVENTORY

Each record in the well inventory database represents a well water sample analyzed for a pesticide residue. Each record was classified as follows:

(1) Well water samples were designated as *negative* if pesticide residues were not detected at or above the minimum detection limit (MDL) of the method used for analysis.

(2) If pesticide residues were detected at or above the MDL, samples were classified into one of three categories:

(a) *unconfirmed*: Pesticide residues were detected in only one sample during a single monitoring survey. Confirmation of the initial detection by a second positive sample was not possible because either only a single sample was taken from the well or analyses of all other samples taken from the well during the survey were negative.

(b) *confirmed, unverified*: Pesticide residues were detected in two discrete samples taken from a well during a monitoring survey. A confirmed detection is unverified unless it meets the criteria of a verified detection.

(c) *verified*: Confirmed detections are verified if they meet the criteria specified in FAC section 13149(d) of the PCPA. Section 13149(d) requires that the detection of a pesticide in ground water results either from an analytical method approved by the department that provides unequivocal identification of a chemical, or from verification within 30 days by a second analytical method or a second analytical laboratory approved by DPR. DPR has set criteria to determine whether the detection of a pesticide or its breakdown product(s) in ground water meets the standards of section 13149(d) (Biermann, 1989, 1996).

Table I-1. Summary of well sampling results included in the Department of Pesticide Regulation's (DPR) well inventory database, by report year.

CATEGORY	Total						TOTAL ^(d) 1984-1999
	1984-1994	1995	1996	1997	1998	1999	
Total wells sampled	19,725	3,322	3,564	2,508	1,898	2,389	20,714
no detections	15,547	2,769	3,128	2,071	1,668	2,093	16,249
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Total counties sampled	58	47	48	48	41	49	58
no detections	14	19	20	24	21	29	48
detections ^(a)	44	28	28	24	20	20	10
verified detections ^(b)	31	17	5	7	3	10	32
Total pesticides and related compounds	291	166	121	165	83	111	308
no detections	202	139	99	143	67	94	212
detections ^(a)	89	27	22	22	16	17	96
verified detections ^(b)	22	9	3	11	5	8	24
Pesticides and related compounds detected in ground water as the result of legal, agricultural use ^(c)	15	9	8	9	9	9 ^(e)	16 ^(f)

(a) Includes verified and unverified detections.

(b) Detections are designated as verified if residues are detected in one sample as a result of an analytical method approved by DPR and verified, within 30 days in a second discrete sample taken from the well, by a second analytical method or laboratory approved by DPR; or if an unequivocal detection is made.

(c) Legal, agricultural use is the application of a pesticide, according to its labeled directions and in accordance with all laws and regulations. Agricultural use is defined in Food and Agricultural Code section 11408.

(d) The total includes data since the inception of the database in 1984, and is not additive. A single well that had sampling data reported in the more than one year is counted one time only.

(e) The 9 compounds are 1,2-D, ACET, bromacil, DBCP, deethyl-atrazine, diuron, EDB, norflurazon, and simazine.

(f) The 16 compounds are 1,2-D, ACET, aldicarb, aldicarb sulfone, aldicarb sulfoxide, atrazine, bentazon, bromacil, DBCP, deethyl-atrazine, diuron, EDB, norflurazon, prometon, simazine, and 2,3,5,6-tetrachloroterephthalic acid. Aldicarb, atrazine, bentazon, bromacil, diuron, norflurazon, prometon, and simazine have been reviewed through the Pesticide Detection Response Process. The uses of 1,2-D, DBCP, and EDB were canceled prior to the passage of the PCPA, therefore DPR did not review these chemicals but considers them to have reached ground water as a result of legal, agricultural use.

INTERPRETING THE DATA

This report discusses data submitted to DPR from July 1, 1998 to June 30, 1999. The data are the results of 15 investigations, designed and conducted by two agencies for varying purposes.

The information contained in the well inventory database can be used to:

- Design studies for future sampling.
- Display the geographic distribution of well sampling.
- Display the geographic distribution of pesticide residues in sampled wells.
- Identify areas potentially sensitive to contamination by the legal, agricultural use of pesticides.

Interpretation of sampling results in the well inventory database is subject to the following limitations:

The data indicate which pesticides are present in well water among those pesticides for which analyses were performed. They do not represent a complete survey of ground water quality throughout the State nor do they represent sampling for all pesticides used.

Sampling by agencies other than DPR is not necessarily related to the suspected presence of residues in ground water due to the agricultural use of pesticides. It should not be assumed that results submitted by those agencies are an indication of which pesticides are more or less likely to reach ground water as a result of agricultural use.

SUMMARY OF DATA

RESULTS BY REPORTING AGENCY

The results of 15 well sampling surveys were added to the well inventory database from July 1, 1998 through June 30, 1999. The surveys were conducted from 1998 through 1999. The data represent a total of 2,389 wells in 49 counties that were sampled for 111 pesticide active ingredients and breakdown products. A summary of the data included in the database, by sampling agency, is shown in Table I-2. Some wells were sampled by more than one agency. A summary of each study is presented in Appendix B.

Of the 2,389 wells sampled, 2,265 (95%) were public drinking water wells, 111 (4.6%) were private drinking water wells, 9 were non-drinking water wells, and 4 wells were either unused or the use was unknown.

Table I-2. Summary of records added to the Department of Pesticide Regulation’s well inventory database, by agency, for the reporting period July 1, 1998 through June 30, 1999.

Sampling agency	Wells	Counties	Chemicals analyzed	Samples with Detections	Wells with detections	Records added to database
CDHS	2,271	49	106	1,148	258	60,363
DPR	125	17	16	79	39	1,568

RESULTS BY PESTICIDE AND COUNTY

Sampling Distribution

Sampling results for 111 pesticide active ingredients and breakdown products were reported. The chemicals, number of counties and wells sampled, and number of wells with unverified and verified detections is given in Table I-3. Variation in the sampling frequency is due to the differences in study design and programs of the agencies contributing data to the database.

Sampling results were reported for 49 of California’s 58 counties (Table I-4). Of the counties sampled, 20 had detections and 29 did not have detections. A summary, by county, of pesticides analyzed and number of wells sampled versus number of wells with unverified, verified, and negative detections is given in Table I-5. The number of pesticides analyzed in each county ranged from one (San Benito) to 72 (Orange, Santa Cruz). The number of wells sampled in each county ranged from one (Calaveras, Del Norte, Mariposa, Plumas, Tehama) to 487 (Los Angeles). A summary of the number of wells sampled and the number of wells with positive detections, by county and chemical, is given in Appendix A.

Table I-3. Pesticide active ingredients and breakdown products added to the well inventory database for the 1999 report year, by total number of counties and wells sampled and number of wells with verified and unverified detections. Most wells were sampled for more than one compound. Results are for data reported from July 1, 1998 through June 30, 1999.

CHEMICAL	Number of Counties Sampled	Number of Wells Sampled	Wells with Unverified Detections	Wells with Verified Detections
1,3-DICHLOROPROPENE	2	196		
1,1,2,2-TETRACHLOROETHANE	44	1,374	1	
1,2,4-TRICHLOROBENZENE	44	1,373		
1,2-D + 1,3-D + C-3 COMPOUNDS	44	1,351		
1,2-DICHLOROPROPANE	44	1,376	6	
2,3,7,8-TCDD (DIOXIN)	10	122		
2,4,5-T	11	52		
2,4,5-TP (SILVEX)	26	555		
2,4-D	27	726	1	
3-HYDROXYCARBOFURAN	25	343		
4(2,4-DB), DIMETHYLAMINE SALT	1	3		
ACENAPTHENE	2	15		
ACET (DEETHYL-SIMAZINE OR DEISOPROPYL-ATRAZINE)	14	106		28
ACROLEIN	1	10		
ALACHLOR	26	695		
ALDICARB	26	344		
ALDICARB SULFONE	26	344		
ALDICARB SULFOXIDE	26	343		
ALDRIN	23	427		
AMETRYNE	1	1		
ATRAZINE	37	1,095		3
BARBAN	1	4		
BENTAZON, SODIUM SALT	26	558		
BENZENE (BENZOL)	45	1,384	4	
BHC (OTHER THAN GAMMA ISOMER)	1	11		
BROMACIL	33	860		7
BUTACHLOR	28	699		
BUTYLATE	1	1		
CARBARYL	26	343		
CARBOFURAN	27	357		
CHLORAMBEN	2	2		
CHLORDANE	23	577		
CHLOROMETHANE (METHYL CHLORIDE)	44	1,352	6	
CHLOROTHALONIL	23	373		
CHLORPROPHAM	1	4		
CHLORTHAL-DIMETHYL (DACTHAL)	1	1		
CYANAZINE	17	124		
CYCLOATE	1	1		
DALAPON	26	564		
DBCP	24	1,094	236	
DDD	1	11		
DDE	1	11		
DDT	1	11		
DDVP (DICHLORVOS)	1	1		
DEETHYL-ATRAZINE	14	106		4
DEMETON	11	222		
DIAZINON	29	719		
DICAMBA	27	550		
DIELDRIN	23	425		
DIMETHOATE	28	701		
DINOSEB	26	553		
DIPHENAMID	1	1		
DIQUAT DIBROMIDE	27	455		
DISULFOTON	11	222		

Table I-3 (cont.)

CHEMICAL	Number of	Number of	Wells with	Wells with
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	Counties Sampled	Wells Sampled	Unverified Detections	Verified Detections
DIURON	30	359	1	15
ENDOSULFAN	1	11		
ENDOSULFAN SULFATE	1	11		
ENDOTHALL	23	259		
ENDRIN	23	439		
ENDRIN ALDEHYDE	1	11		
EPTC	1	1		
ETHYLENE DIBROMIDE	26	1,101	11	
FENURON	1	4		
FLUOMETURON	1	4		
GLYPHOSATE, ISOPROPYLAMINE SALT	20	433		
HEPTACHLOR	24	433		
HEPTACHLOR EPOXIDE	24	438		
HEXACHLOROBENZENE	24	409		
HEXAZINONE	18	125		1
LINDANE (GAMMA-BHC)	25	446		
LINURON	1	4		
MALATHION	1	13		
MCPA, DIMETHYLAMINE SALT	1	1		
METHIOCARB	6	18		
METHOMYL	27	342		
METHOXYCHLOR	25	448		
METHYL BROMIDE (BROMOMETHANE)	44	1,353		
METHYL PARATHION	1	13		
METOLACHLOR	29	701		
METRIBUZIN	34	824		
MOLINATE	29	735		
MONURON	1	4		
NAPHTHALENE	44	1,417		
NAPROPAMIDE	14	55		
NEBURON	1	4		
NORFLURAZON	14	106		3
ORTHO-DICHLOROBENZENE	44	1,374	1	
ORYZALIN	13	54		
OXAMYL	26	377		
PARAQUAT DICHLORIDE	5	21		
PARATHION OR ETHYL PARATHION	1	13		
PICLORAM	27	577		
PROMETON	18	125		
PROMETRYN	33	843		
PROPACHLOR	29	659		
PROPAZINE	1	1		
PROPHAM	1	4		
PROPOXUR	6	18		
SIDURON	1	4		
SIMAZINE	35	1,083		17
SIMETRYN	1	1		
SWEP (3,4-DICHLOROCARBANILATE)	1	4		
TEBUTHIURON	1	1		
TERBUTRYN	1	1		
TETRACHLORVINPHOS (STIROFOS)	1	1		
THIOBENCARB	28	719		
TOXAPHENE	24	434		
TRIADIMEFON	1	1		
TRICHLOROBENZENES	44	1,352		
VERNOLATE	1	1		
XYLENE	45	1,395	3	
TOTAL	49	2,389	258	39

Table I-4. Counties with and without detections of pesticides or related compounds for data reported during the period July 1, 1998 through June 30, 1999.

<u>Counties</u> <u>without detections</u>	<u>Counties</u> <u>with detections</u>	<u>Counties</u> <u>Not Sampled</u>
Alameda	Colusa *	Alpine
Amador	Fresno *	Humboldt
Butte	Kern *	Imperial
Calaveras	Los Angeles	Inyo
Contra Costa	Madera *	Lassen
Del Norte	Merced *	Marin
El Dorado	Monterey *	Mono
Glenn	Riverside	San Francisco
Kings	Sacramento	Trinity
Lake	San Bernardino	
Mariposa	San Diego	
Mendocino	San Joaquin *	
Modoc	San Mateo	
Napa	Santa Clara	
Nevada	Santa Cruz	
Orange	Solano *	
Placer	Sonoma	
Plumas	Stanislaus *	
San Benito	Tulare *	
San Luis Obispo	Ventura	
Santa Barbara		
Shasta		
Sierra		
Siskiyou		
Sutter		
Tehama		
Tuolumne		
Yolo		
Yuba		

* Counties with verified detections.

Table I-5. Summary, by county, of total number of pesticides and wells sampled, wells with unverified, verified, and negative detections. Wells may have both unverified and verified detections. Results are for data reported from July 1, 1998 through June 30, 1999.

County	Pesticides Sampled	Wells Sampled	Wells with Unverified Detections	Wells with Verified Detections	Wells with No Detections
ALAMEDA	21	9			
AMADOR	11	2			
BUTTE	23	25			
CALAVERAS	3	1			
COLUSA	11	10		3	7
CONTRA COSTA	56	5			
DEL NORTE	11	1			
EL DORADO	11	24			
FRESNO	59	250	105	10	136
GLENN	11	3			
KERN	59	41	8	1	32
KINGS	59	19			
LAKE	48	9			
LOS ANGELES	61	487	11		476
MADERA	13	8	1	1	6
MARIPOSA	11	1			
MENDOCINO	41	13			
MERCED	58	44	5	4	35
MODOC	22	2			
MONTEREY	56	44		1	43
NAPA	20	3			
NEVADA	11	7			
ORANGE	72	204			
PLACER	20	5			
PLUMAS	11	1			
RIVERSIDE	57	115	7		108
SACRAMENTO	44	54	1		53
SAN BENITO	1	4			
SAN BERNARDINO	61	329	63		266
SAN DIEGO	63	24	1		23
SAN JOAQUIN	61	96	6	4	86
SAN LUIS OBISPO	54	50			
SAN MATEO	55	18	1		17
SANTA BARBARA	57	32			
SANTA CLARA	60	89	1		88
SANTA CRUZ	72	28	3		25
SHASTA	11	3			
SIERRA	11	2			
SISKIYOU	8	2			
SOLANO	11	10		1	9
SONOMA	55	68	1		67
STANISLAUS	59	94	24	2	68
SUTTER	28	8			

Table I-5 (cont.)

County	Pesticides Sampled	Wells Sampled	Wells with Unverified Detections	Wells with Verified Detections	Wells with No Detections
TEHAMA	9	1			
TULARE	47	91	19	12	60
TUOLUMNE	26	8			
VENTURA	57	16	1		15
YOLO	19	14			
YUBA	63	15			
TOTAL	111	2389	258	39	2093

WELLS AND COUNTIES WITH VERIFIED DETECTIONS

Verified detections were made in a total of 39 wells in 10 counties. One large water system well had a verified detection of atrazine (0.084 pbb) and its breakdown product DEA (0.097 ppb). The remaining verified detections were in private water wells. A summary of wells with verified detections, by county and pesticide, is given in Table I-6. Also, the counties with a first-time verified detection of a pesticide are noted.

Table I-6. Summary of wells with verified detections of pesticide residues, by county and chemical. Results are for data reported from July 1, 1998 through June 30, 1999.

County	atrazine	bromacil	diuron	hexazinone	norflurazon	simazine	ACET	DEA	Total Wells ^(b)
Colusa				1 ^(a)		1	1 ^(a)	1 ^(a)	3
Fresno	1	3	3			4	6	1	10
Kern							1 ^(a)		1
Madera							1 ^(a)		1
Merced	1	1 ^(a)	1			1	2 ^(a)		4
Monterey						1 ^(a)			1
San Joaquin			1			1	4		4
Solano								1	1
Stanislaus							2		2
Tulare	1	3	10		3	9	11	1	12
Total Wells	3	7	15	1	3	17	28	4	39

(a) First time verified detection of this chemical in this county

(b) The total may not be additive due to detections of multiple residues in the same well.

STATUS OF PESTICIDES WITH VERIFIED DETECTIONS

Atrazine

Atrazine, an herbicide, was reviewed through the Pesticide Detection Response Process (PDRP), including review by a subcommittee of the Pesticide Registration and Evaluation Committee (PREC), pursuant to FAC sections 13149 through 13151. DPR adopted regulations that prohibit the use of pesticides containing atrazine within an atrazine Pesticide Management Zone (PMZ). A PMZ is a geographic surveying unit of approximately one square mile (a section) that is designated in regulation as sensitive to ground water pollution.

The following sites represent the major uses of atrazine reported in 1998 (DPR, 1998).

<u>SITE</u>	<u>POUNDS APPLIED</u>
FOREST TREES, FOREST LANDS (ALL OR UNSPEC)	15,038
CORN (FORAGE - FODDER)	13,779
SUDANGRASS (FORAGE - FODDER) (SORGHUM SUDANESE)	9,434
CORN, HUMAN CONSUMPTION	6,797
BERMUDAGRASS (FORAGE - FODDER)	6,108
ALL OTHER	1,698
TOTAL	52,854

Detections of atrazine residues were verified in three wells in three counties out of 1,095 wells sampled in 37 counties. The range of concentrations of verified detections was 0.058 to 0.084 ppb. The CDHS and U.S. EPA maximum contaminant level (MCL, see glossary) for atrazine is 3 ppb.

Bromacil

Bromacil, an herbicide, was reviewed through the PDRP, including review by a subcommittee of the PREC. DPR adopted regulations that prohibit the agricultural, outdoor institutional, or outdoor industrial uses of bromacil in non-crop areas and on rights-of-way within bromacil PMZs. Bromacil was also made a restricted material for which a permit is required for crop uses in bromacil PMZs. The permit can only be issued if growers submit a ground water protection advisory written by a licensed pest control adviser (PCA) who has completed an approved ground water protection course within the previous two years.

The following sites represent the major uses of bromacil reported in 1998 (DPR, 1998).

SITE	POUNDS APPLIED
ORANGE (ALL OR UNSPEC)	41,141
RIGHTS OF WAY	16,328
LEMON	11,751
LANDSCAPE MAINTENANCE	4,579
GRAPEFRUIT	4,328
ALL OTHER	6,450
TOTAL	84,577

Detections of bromacil residues were verified in seven wells in three counties out of 860 wells sampled in 33 counties. The range of concentrations of verified detections was 0.051 to 1.2 ppb. The U. S. EPA USEPA IRIS RfD (see glossary) for bromacil is 91 mg/kg/day.

Diuron

Diuron, an herbicide, was reviewed through the PDRP, including review by a subcommittee of the PREC. DPR adopted regulations that prohibit the agricultural, outdoor institutional, or outdoor industrial uses of diuron in non-crop areas and on rights-of-way within diuron PMZs. Diuron was also made a restricted material for which a permit is required for crop uses in diuron PMZs. The permit can only be issued if growers submit a ground water protection advisory written by a licensed PCA who has completed an approved ground water protection course within the previous two years.

The following sites represent the major uses of diuron reported in 1998 (DPR, 1998).

SITE	POUNDS APPLIED
RIGHTS OF WAY	779,304
ORANGE (ALL OR UNSPEC)	223,946
ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	221,613
GRAPES	39,752
LANDSCAPE MAINTENANCE	38,951
WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	36,565
ALL OTHER	165,082
TOTAL	1,505,212

Diuron residues were verified in 15 wells in four counties out of 359 wells sampled in 30 counties. The range of concentrations of verified detections was 0.068 to 1.6 ppb. No MCL has been established for diuron. The U. S. EPA IRIS RfD for diuron is 10 mg/kg/day.

Hexazinone

Hexazinone is an herbicide. The following sites represent the major uses of hexazinone reported in 1998 (DPR, 1998).

SITE	POUNDS APPLIED
ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	82,893
FOREST TREES, FOREST LANDS (ALL OR UNSPEC)	26,720
LANDSCAPE MAINTENANCE	1,809
N-OUTDR CONTAINER/FLD GRWN PLANTS	1,182
RIGHTS OF WAY	1,113
ALL OTHER	861
TOTAL	114,578

Hexazinone residues were verified in one well in Colusa County out of 125 wells sampled in 18 counties. The concentration of the verified detection was 0.056 ppb. No MCL has been established for hexazinone. The U. S. EPA IRIS RfD for hexazinone is 230 mg/kg/day.

Norflurazon

Norflurazon, an herbicide, was reviewed through the PDRP, including review by a subcommittee of the PREC, pursuant to FAC sections 13149 through 13151. The findings and Director's final decision are discussed in Section II. Norflurazon residues were verified in three wells in Tulare County out of 106 wells sampled in 14 counties. Concentrations of verified detections ranged from 0.078 to 0.23 ppb. There are no drinking water quality criteria for norflurazon.

The following sites represent the major uses of norflurazon reported in 1998(DPR, 1998).

SITE	POUNDS APPLIED
ALFALFA (FORAGE - FODDER) (ALFALFA HAY)	90,375
ALMOND	43,424
GRAPES	26,889
GRAPES, WINE	20,452
ORANGE (ALL OR UNSPEC)	20,199
RIGHTS OF WAY	14,829
ALL OTHER	49,680
TOTAL	265,848

Simazine

Simazine, an herbicide, was reviewed through the PDRP, including review by a subcommittee of the PREC. DPR adopted regulations that prohibit the agricultural, outdoor industrial, or outdoor institutional use of pesticides containing simazine in non-crop areas or on rights-of-way within simazine PMZs. Simazine was also made a restricted material for which a permit is required for crop uses in simazine PMZs. The permit can only be issued if growers submit a ground water protection advisory written by a licensed pest control adviser (PCA) who has completed an approved ground water protection course within the previous two years.

The following sites represent the major uses of simazine reported in 1998 (DPR, 1998).

SITE	POUNDS APPLIED
ORANGE (ALL OR UNSPEC)	227,974
GRAPES	164,192
GRAPES, WINE	133,357
ALMOND	48,170
WALNUT (ENGLISH WALNUT, PERSIAN WALNUT)	46,247
RIGHTS OF WAY	45,867
ALL OTHER	132,675
TOTAL	798,482

Simazine residues were verified in 17 wells in 6 counties out of 1,083 wells sampled in 35 counties. Concentrations of verified detections ranged from 0.05 to 0.3 ppb.

Both the CDHS and U. S. EPA MCL for simazine is 4 ppb.

Triazine breakdown products: ACET, DEA.

Deethyl-atrazine (2-amino-4-chloro-6-isopropylamino-s-triazine, DEA) is a degradate of atrazine. 2-amino-4-chloro-6-ethylamino-s-triazine (ACET) is a breakdown product of either atrazine or simazine. Verified detections of DEA were made in four wells in four counties, and ACET was detected in 28 wells in 8 counties. Concentrations of verified detections ranged from 0.057 to 0.097 ppb for DEA and 0.051 to 0.79 ppb for ACET. Both DEA and ACET were sampled in 106 wells in 14 counties. There are no drinking water quality criteria for ACET or DEA.

SUMMARY OF UNVERIFIED DETECTIONS

Samples with unverified detections are reviewed or investigated in one of two ways. Detections of the following are referred to the SWRCB: pesticides that are not currently registered for use, pesticides registered for other than agricultural, outdoor industrial, or outdoor institutional uses, and pesticides in ground water which are determined not to be the result of legal agricultural use. The SWRCB and nine RWQCBs are responsible for protecting the beneficial uses of water in California and for controlling all discharges of waste into waters of the State. Compounds registered for agricultural use in California are investigated by DPR. The investigation of the initial detection may lead to other verified detections, or all subsequent samples may be negative for pesticide residues. Negative follow-up samples may result from delays (sometimes years) in reporting the initial detection to DPR.

A summary of the status of all positive samples (verified and unverified) added to the database for this report is given in Table I-7. Of the 61,931 records added to the well inventory for this report, there were 1,149 (1.8%) unverified detections from 258 wells in 17 counties for a total of 10 pesticide active ingredients or breakdown products.

Of the 1,149 unverified samples, 1,147 (99.8%) were for chemicals currently not registered or not registered for agricultural use. The chemicals were 1,1,2,2-tetrachloroethane, 1,2-dichloropropane, benzene, chloromethane, DBCP, ethylene dibromide, ortho-dichlorobenzene, and xylene. These detections have been reported to the SWRCB.

Reported unverified detections of 2,4-D and diuron, which are contained in pesticides registered for agricultural use, were investigated by DPR. The results of these investigations are described in Table I-7.

Table I-7. Status, as of June 30, 1999 of all reported detections of pesticide active ingredients and breakdown products in ground water that were added to the Department of Pesticide Regulation (DPR) well inventory database from July 1, 1998 through June 30, 1999

Compound Detected	Number of Counties and Wells Sampled	Counties and Number of Wells with Detections	Range of Concentrations Detected (ppb)	Water Quality Criteria ^(a)	Registration Status Type of Compound Comments
1,1,2,2-tetrachloroethane	44 counties 1,374 wells	Santa Clara, 1	0.83		Not registered (NR). Non-agricultural uses of industrial chemicals may contribute to these findings. Referred to SWRCB.
1,2-dichloropropane (1,2-D; propylene dichloride)	44 counties 1,376 wells	Fresno, 1 Kern, 1 Los Angeles, 1 San Bernardino, 1 San Joaquin, 1 San Mateo, 1	0.5 - 26.2	DHS & USEPA MCL 5	Fumigant. NR. Source of residues was determined by DPR to be due to historical non-point source, legal agricultural use. Regulations were adopted in 1985 that prohibit the use or sale of pesticides in California in which 1,2-D exceeds 0.5% of the total formulation. Referred to SWRCB.
2,4-D	27 counties 726 wells	Sonoma, 1	6.3		Herbicide. Active registration (AR). 2,4-D was not detected during a follow-up study conducted by DPR; removed from PDRP.
ACET (2-amino-4-chloro-6-ethylamino-s-triazine)	14 counties 106 wells	Colusa, 1 Fresno, 6 Kern, 1 Madera, 1 Merced, 2 San Joaquin, 4 Stanislaus, 2 Tulare, 11	0.051 - 0.79		Breakdown product of atrazine or simazine. Detections in 1 well in Colusa, Kern, Madera; 2 wells in Merced, Stanislaus, Tulare; 3 wells in Fresno, San Joaquin are currently under investigation (CUI) by DPR. Detections in 3 wells in Fresno, and 9 wells in Tulare were determined due to legal agricultural use (LAU).

(a) Marshack, J.B. A Compilation of Water Quality Goals. and personal communication. Definitions of the various Water Quality Criteria are given below.

DHS MCL: Maximum Contaminant Level (MCL) adopted by DHS under the Safe Drinking Water Act. MCLs are formally established in regulation and are enforceable by DHS on water suppliers. Values are expressed in ppb.

USEPA IRIS RfD: USEPA Integrated Risk Information System (IRIS) Reference Dose (RfD): published by USEPA's Office of Water. See glossary for complete description. Values are expressed in mg/kg/day.

USEPA MCL: MCL adopted by the U.S. Environmental Protection Agency (USEPA) under the Safe Drinking Water Act. MCLs are enforceable by the California Department of Health Services (DHS) on water suppliers. Values are expressed in ppb.

Table I-7 continued

Compound Detected	Number of Counties and Wells Sampled	Counties and Number of Wells with Detections	Range of Concentrations Detected (ppb)	Water Quality Criteria ^(a)	Registration Status Type of Compound Comments
atrazine	37 counties 1,095 wells	Fresno, 1 Merced, 1 Tulare, 1	0.058 - 0.084	DHS & USEPA MCL 3	Herbicide. AR. Detection in 1 well in Fresno was determined not due to LAU; detections in Merced and Tulare are CUI.
benzene	45 counties 1,384 wells	Kern, 1 Los Angeles, 1 Santa Cruz, 2	0.51 - 2.39	DHS MCL 1 USEPA MCL 5	Benzene was an ingredient in some early grain fumigants. NR for agricultural use. Non-agricultural uses of industrial chemicals may contribute to these findings. Referred to SWRCB.
bromacil	33 counties 860 wells	Fresno, 3 Merced, 1 Tulare, 3	0.051 - 1.2	USEPA IRIS RfD 91	Herbicide. AR. Detections in all wells were determined to be due to LAU.
chloromethane	44 counties 1,352 wells	Fresno, 2 Los Angeles, 2 Sacramento, 1 San Diego, 1	0.5 - 2.3	USEPA IRIS RfD 2.8	Fumigant. NR. Referred to SWRCB.
DBCP (1,2-dibromo-3-chloropropane)	24 counties 1,094 wells	Fresno, 102 Kern, 5 Los Angeles, 5 Madera, 1 Merced, 5 Riverside, 7 San Bernardino, 62 San Joaquin, 6 Santa Cruz, 1 Stanislaus, 22 Tulare, 19 Ventura, 1	0.01 - 2.24	DHS & USEPA MCL 0.2	Soil fumigant. NR. Use suspended in 1979. Source of residues considered by DPR to be from historical non-point source, legal agricultural use. Referred to SWRCB.
deethyl-atrazine	14 counties 106 wells	Colusa, 1 Fresno, 1 Solano, 1 Tulare, 1	0.57 - 0.097		Breakdown product of atrazine. Detection in Colusa is CUI; detection in Fresno was determined not LAU; detections in Solano and Tulare were determined to be due to LAU.

Table I-7 continued

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Compound Detected	Number of Counties and Wells Sampled	Counties and Number of Wells with Detections	Range of Concentrations Detected (ppb)	Quality Criteria ^(a)	Registration Status Type of Compound Comments
diuron	30 counties 359 wells	Fresno, 4 Merced, 1 San Joaquin, 1 Tulare, 10	0.068 - 1.6	USEPA IRIS RfD 14	Herbicide. AR. Detection in 1 well in Fresno was determined not due to LAU; detections in 3 wells in Fresno, 2 wells in Tulare, and 1 well in San Joaquin are CUI; detection in 1 well in Merced and 8 wells in Tulare were determined due to LAU.
ethylene dibromide (EDB)	26 counties 1,101 wells	Fresno, 7 Kern, 1 Los Angeles, 1 Stanislaus, 1 Tulare, 1	0.02 - 0.1	DHS & USEPA MCL 0.05	Fumigant, insecticide, nematicide. NR since 1/87. Source of residues considered by DPR to be from historical non-point source, legal agricultural use. Referred to SWRCB.
hexazinone	18 counties 125 wells	Colusa, 1	0.056	USEPA IRIS RfD 230	Herbicide. AR Hexazinone was not detected in follow-up sampling conducted by DPR. This detection was removed for Pesticide Detection Response Process (PDRP).
norflurazon	14 counties 106 wells	Tulare, 3	0.078 - 0.23		Herbicide. AR Detection in 2 wells were determined due to LAU and continued in the PDRP for a Director's Determination. Detection in 1 well was determined not due to LAU and was removed from the PDRP.
ortho-dichlorobenzene	44 counties 1,374 wells	Stanislaus, 1	1.0		NR. Referred to SWRCB.
simazine	35 counties 1,083 wells	Colusa, 1 Fresno, 4 Merced, 1 Monterey, 1 San Joaquin, 1 Tulare, 9	0.05 - 0.3	USEPA MCL 4.0	Herbicide. AR Detections in 1 well in Colusa, Fresno, Monterey, San Joaquin, Tulare are CUI. Detections in 3 wells in Fresno, 1 well in Merced, and 8 wells in Tulare were determined due to LAU.
xylene	45 counties 1,395 wells	Fresno, 1 Los Angeles, 1 Stanislaus, 1	0.8 - 5.3	DHS MCL 1750 USEPA MCL 10000	Solvent. NR. There are no products currently registered for agricultural use in California that contain xylene as an active ingredient. Non-agricultural uses of industrial chemicals may contribute to these findings. Referred to SWRCB.

SECTION I SUMMARY

From July 1, 1998 through June 30, 1999, results were reported for 2,389 wells, located in 49 counties, that were sampled for an overall total of 111 pesticide active ingredients or breakdown products. The data represent 15 groundwater sampling studies conducted by two agencies from 1998 through 1999.

Of the 111 compounds, 17 pesticide active ingredients or breakdown products were reported detected in 296 wells in 20 counties. Verified detections were made of eight compounds in 39 wells in 10 counties

Detections of the following chemicals were verified for the first time in the following counties: bromacil in Merced; hexazinone in Colusa; simazine in Monterey; ACET in Colusa, Kern, Madera, Merced, and DEA in Colusa.

II. ACTIONS TAKEN BY THE DEPARTMENT OF PESTICIDE REGULATION TO PREVENT PESTICIDES FROM ENTERING GROUND WATER AS A RESULT OF AGRICULTURAL USE

ENVIRONMENTAL HAZARDS ASSESSMENT PROGRAM

The Environmental Monitoring and Pest Management Branch's Environmental Hazards Assessment Program (EHAP) performs the lead role for implementing DPR's environmental protection programs. EHAP personnel design and conduct field studies of air, soil, and surface and ground water to determine the environmental fate of pesticides, and conduct monitoring surveys to determine the presence of pesticide residues in ground water. All sampling results reported to DPR with positive pesticide detections are reviewed and either referred to the SWRCB or further investigated by DPR. DPR uses results of these investigations to take actions to prevent pesticide contamination of ground water.

GROUND WATER PROTECTION TRAINING

Ground water protection training is part of a comprehensive program designed to protect ground water from contamination due to the legal agricultural use of pesticides. The training is required for licensed PCAs who write ground water protection advisories (GWPA) for growers. Growers must submit these GWPA to the county agricultural commissioner (CAC) before the CAC can issue permits that are required for crop uses of simazine, bromacil, and diuron in their respective Pesticide Management Zones (PMZs). A PMZ is an approximately one-square-mile area that has been determined to be sensitive to ground water pollution by pesticides. To be authorized to write a GWPA, a licensed PCA must have attended DPR-approved ground water protection training within the previous two years and submitted written proof of the training to the CAC. The GWPA contains specific information for applying a regulated pesticide in a PMZ to reduce the potential for movement of the chemical into ground water.

DPR has conducted ground water protection training annually since 1989. Speakers review the extent of pesticide residues in ground water, potential sources of pesticide residues, contamination pathways, factors that influence pesticide movement to ground water, and management practices that decrease such movement. Recommended management practices begin before the pesticide is applied with proper storage, mixing, loading, rinsing and disposal procedures, and wellhead protection. During and after application, management practices depend on the mechanism of pesticide movement to ground water. For leaching areas (coarse

soils), the training focuses on proper irrigation management which keeps excess irrigation water from leaching pesticides down to ground water through soil. For runoff areas (fine-textured and hardpan soils), the training recommends incorporation of soil-applied pesticides, which helps shield residues from surface water runoff that can subsequently carry residues to ground water via drainage (dry) wells or improperly sealed wells. The training also reviews changes in ground water laws, regulations, and programs. This year, DPR conducted 15 ground water protection training sessions in 12 counties to qualify pest control advisers to write ground water protection advisories.

THE PESTICIDE DETECTION RESPONSE PROCESS (conducted pursuant to sections 13149 through 13151 [FAC] of the PCPA)

Under the provisions of the Pesticide Detection Response Process (PDRP, see glossary), EHAP investigates all reports of detections of pesticides in ground water from its own sampling program and from sampling conducted by other public agencies or private entities.

A pesticide is considered to be “found” in ground water if it is detected using an unequivocal detection method, or if the original detection is subsequently verified. DPR has established precise criteria for analytical methods which provide for an unequivocal detection and for determining if a detection is verified (Biermann 1989, 1996).

EHAP determines if the detected pesticide could have resulted from the use of a currently registered pesticide and if the pesticide’s presence in ground water is due to agricultural use, i.e., the pesticide was properly applied according to the label directions of a pesticide registered for agricultural use and in accordance with federal and State laws and regulations.

In the past, unless the pesticide was detected in or immediately adjacent to its PMZ, DPR routinely conducted a “four-section survey” to help determine whether the detection was due to agricultural use. Sampling was conducted in the section of land of the original detection and in three adjacent sections of land. Often, these studies were located in areas that have been thoroughly investigated and would provide little additional useful information. In an effort to use resources in the most effective and efficient manner, DPR reviewed and modified its protocols for determining when field sampling is required (DPR, January 1996).

EHAP conducts a four-section survey under the following conditions.

1. For reported detections of new active ingredients, that is, pesticide active ingredients for which a Director’s finding has not been made pursuant to FAC section 13150.

2. For pesticide active ingredients for which a Director's finding has been made pursuant for FAC section 13150 [6800(a) list chemicals] and:
 - a. There has not been a previous detection of a pesticide in ground water in the section due to agricultural use, and,
 - b. The sections included in the four-section study area do not include a section which is an adopted or recommended PMZ, and,
 - c. The detection is not in an area identified by modeling as an area sensitive to ground water pollution, or,
 - d. Conducting a well survey will provide new information that may be useful for vulnerability assessment.

In addition, DPR uses land use maps, pesticide use information, and surveys of potential "point" sources of pesticide residues to help make the agricultural use determination. Verified detections are determined to be due to legal agricultural use if all the following criteria are met (DPR, March 1996):

1. The residue detected (active ingredient, breakdown product, or any other specified ingredient) is from a pesticide that is registered for agricultural use in California.
2. The application of a pesticide in the vicinity of the detection was reasonably likely.
3. A point source was not a likely cause.
4. A non-agricultural use of the pesticide was not a likely source.
5. A non-pesticide source was not a likely cause.
6. The pesticide should be present in another adjacent section or verified within a second site within a ½ mile radius of original determination.

Verified detections of pesticide residues that are determined to be due to agricultural use and that have been previously formally reviewed by the Director are subject to the current applicable ground water regulations. Verified detections of pesticide residues that are determined to be due to agricultural use and that have not been previously formally reviewed by the Director are subject to special review specified in FAC section 13150. The purpose of the review is to determine whether continued registration, sale, and use of the compound will be allowed. A subcommittee of the PREC holds a hearing, evaluates information, and makes recommendations to the Director of DPR who then makes a determination regarding continued use of the compound in California.

The pesticide detection is removed from the PDRP and referred to the SWRCB if the pesticide is not currently registered for use; is registered for other than agricultural, outdoor

industrial, or outdoor institutional use; or is detected in ground water not as a result of agricultural use.

ACTIONS TAKEN BY DPR ON PESTICIDE DETECTIONS

A total of 17 pesticide active ingredients and breakdown products were detected and reported from July 1, 1998 through June 30, 1999.

EHAP did not conduct investigations for eight of the 17 detected chemicals because they are not currently registered for agricultural use in California (1,1,2,2-tetrachloroethane, 1,2-D, benzene, chloromethane, DBCP, ethylene dibromide, ortho-dichlorobenzene, and xylene). Those detections were referred to the SWRCB.

EHAP conducted monitoring studies or investigations for chemicals reported detected in ground water that are currently registered for agricultural use in California. These investigations are described below in two groups. First are chemicals that may have previously been reported and monitored for, but were removed from the PDRP and have not been reviewed by the PREC subcommittee. Second are chemicals that have previously been reviewed through the PDRP and by the PREC. For each monitoring study, reported detections may not have been verified because (1) residues were not detected in follow-up sampling or (2) the original positive well could not be resampled. A description of each study is given in Appendix B.

Monitoring for pesticides not previously reviewed by the PREC subcommittee

A study was conducted in Sonoma County in response to a reported detection of 2,4-D. No residues were detected and 2,4-D was removed from the PDRP.

Monitoring for pesticides previously reviewed through the PDRP and by the PREC subcommittee where additional well monitoring was conducted

Nine studies were conducted in five counties for eight chemicals that were reported detected. The studies are described in Appendix B. In some cases, the detections were determined to be due to legal agricultural use and Pesticide Management Zones were recommended (see below) and in others, there was no evidence to support a legal agricultural use determination and the detections were removed from the PDRP.

Norflurazon continues in the PDRP - Director's Decision

Norflurazon was previously found in ground water and determined to be due to legal agricultural use. The registrant was subsequently notified and requested a hearing of the Pesticide Registration and Evaluation Committee (PREC) subcommittee, as prescribed by law. The PREC subcommittee held a hearing and made findings and recommendations to the DPR director regarding the continued use of norflurazon. After reviewing these findings and recommendations, the director issued a final decision on in April 1999. The director concurred with the PREC subcommittee that the use of norflurazon can be modified in such a way that there would be a high probability that no norflurazon residues other than those already present in ground water would migrate to ground water. The director also determined the DPR will do the following:

- 1) Eliminate the use of norflurazon in all areas managed to recharge ground water and in inward slopes of drainage canals, and will further regulate other uses to manage off-site movement.
- 2) List norflurazon in regulation as a restricted material.
- 3) Include norflurazon in the existing Ground Water Protection Training program for pest control advisers and applicators.
- 4) Require the submission of data demonstrating the means to minimize pesticide movement through soils and will review information submitted by researchers, norflurazon users, registrants, and other agencies which document agricultural practices and norflurazon uses which decrease movement of norflurazon to ground water.
- 5) Monitor in areas of norflurazon use to evaluate the effectiveness of modifications of agricultural use of norflurazon.
- 6) Investigate options under existing legal authorities for protecting well heads from the potential effects of agricultural practices.
- 7) Work with the registrant on possible label changes and propose adoption of regulations to implement these findings for norflurazon.

AGRICULTURAL USE DETERMINATIONS AND RECOMMENDATIONS FOR PESTICIDE MANAGEMENT ZONES

As a result of investigations concluded between July 1, 1998 and June 30, 1999, pesticide residues in a total of 17 sections were determined, pursuant to Food and Agricultural Code section 13149, to be present in ground water as the result of non-point source, legal agricultural use. DPR recommended 17 sections as new PMZs (Table II-4) . Recommended PMZs must be adopted in regulation before they are subject to regulatory controls. A more

detailed description of the section number and chemical is given in the study summary in Appendix B.

Table II-1. Number of sections recommended as Pesticide Management Zones by the Department of Pesticide Regulation from July 1, 1998 through June 30, 1999.

County	Chemical(s)	Sections
Fresno	bromacil	2
	atrazine, simazine	1
	bromacil, simazine	1
	diuron, simazine	1
	atrazine, bromacil, diuron, simazine	1
San Joaquin	atrazine	1
	atrazine, simazine	1
Merced	bromacil, diuron, simazine	1
Solano	atrazine	1
Tulare	diuron	1
	diuron, simazine	3
	atrazine, diuron, simazine	1
	bromacil, diuron, simazine	2
Total	atrazine 6, bromacil 7, diuron 9, simazine 13	17

GROUNDWATER PROTECTION LIST MONITORING

The Groundwater Protection List (GWPL) is a list of pesticides having the potential to pollute ground water. It is required pursuant to FAC section 13145(d) and placed in 3CCR section 6800. The GWPL is divided into sublists (a) and (b). Sublist (a) is comprised of chemicals detected in the soil or ground water as a result of legal agricultural use. Sublist (b) is comprised of chemicals that meet the conditions specified in FAC section 13145(d).

These are pesticide active ingredients whose physicochemical properties exceed or are less than certain values (called specific numerical values or SNVs) and (1) are intended to be applied to or injected into the soil by ground-based application equipment or by chemigation or (2) the labels of which recommend that the application be followed, within 72 hours, by flood or furrow irrigation. DPR is required to conduct monitoring to determine whether these sublist (b) chemicals have migrated to ground water.

Before monitoring begins, chemicals on the GWPL are ranked for various factors used to determine in which order and to what extent the compounds should be monitored in California. First priority is given to pesticide active ingredients that have been detected in

ground water due to non-point sources in other states or which are given a high priority for risk assessment on the list of pesticide active ingredients created for implementing the Birth Defect Prevention Act (SB950). For chemicals given first priority, between 25 and 40 wells are sampled. Second priority pesticides are selected based on pounds of active ingredient sold per year and on a combination of physicochemical factors; 15 to 25 wells are sampled for this group. Remaining compounds on the list are given third priority for monitoring, and 10 to 15 wells are sampled.

In 1992, 45 pesticide active ingredients were placed on the GWPL and prioritized. Since that time, monitoring has been completed for 18 active ingredients. A regulation package that became effective on May 13, 1999 added 15 new active ingredients to the GWPL.

For future monitoring, active ingredients on the GWPL will no longer be ranked according to priority for monitoring. Instead, all active ingredients on the list will be evaluated for their potential to contaminate ground water based on the factors previously used to rank them along with any current information on recent detections, cultural practices or any other pertinent information. Each year, one or more active ingredients on the GWPL will be selected for monitoring.

Monitoring during 1998-99 was conducted for napropamide and oryzalin. Areas surveyed for potential well sampling locations were selected based on Pesticide Use Reports for 1991-95. The minimum detection limit (MDL) was 0.05 parts per billion for napropamide and oryzalin. Water samples from each well were also analyzed for atrazine, bromacil, cyanazine, diuron, hexazinone, metribuzin, norflurazon, prometon, prometryn, simazine, 2-amino-4-chloro-6-isopropylamino-s-triazine (DEA), and 2-amino-4-chloro-6-ethylamino-s-triazine (ACET) each with an MDL of 0.05 ppb. DEA is degradation product of atrazine and ACET is a degradation product of atrazine and simazine.

A total of 64 wells in 13 counties were sampled for these pesticides during July 1998. Due to an analytical problem, the first set of samples could not be used to analyze napropamide or oryzalin and the wells were re-sampled during November 1998. However, only 54 of the original 64 wells could be re-sampled. Sampling results, by county and pesticide, are presented in Table II-2. No residues of napropamide or oryzalin were detected in any of the wells. However, verified detections were made of pesticides on sublist (a) and the two degradation products DEA and ACET: atrazine in 1 well each in Merced and Tulare counties; simazine in 1 well each in Colusa, Monterey and San Joaquin counties, 3 wells in Fresno

County and 4 wells in Tulare County; ACET in 1 well each in Colusa, Kern, Madera, and Merced counties, 4 wells in Fresno County, 3 wells in San Joaquin County, 2 wells in Stanislaus County and 5 wells in Tulare County; DEA in 1 well in Colusa County; hexazinone in 1 well in Colusa County; norflurazon in 2 wells in Tulare County; bromacil in 1 well in Tulare County; diuron in 3 wells in Fresno County, 1 well in San Joaquin County and 4 wells in Tulare County.

Table II-2. Summary of sampling for napropamide and oryzalin, pesticide active ingredients placed on the Ground Water Protection List (Title 3, California Code of Regulation, section 6800(b)). Sampling was conducted by the Department of Pesticide Regulation between July 1, 1998 and June 30, 1999. There were no detections of napropamide or oryzalin.

County	Wells Sampled For Napropamide	Wells Sampled For Oryzalin
Butte	1	4
Colusa	5	1
Fresno	2	7
Kern	0	1
Madera	0	2
Merced	6	3
Monterey	3	1
San Benito	2	0
San Joaquin	3	4
Santa Clara	3	0
Stanislaus	1	4
Tulare	0	7
Yolo	3	0
Total	29	34

BENTAZON MONITORING

Historically, approximately 98% of all bentazon used in California was for postemergence weed control in rice fields. In 1989, confirmed detections of bentazon were made in 64 wells in 10 counties where rice was a major crop. As a result of those detections, DPR suspended the registration of bentazon until a full review could be conducted through the PDRP. The review resulted in DPR adopting regulations in January 1992 which added bentazon to section 6800(a) of the Ground Water Protection List (GWPL), and established use modifications that prohibited the use of bentazon (1) in Del Norte and Humboldt counties, (2) in the production of rice, (3) before April 1 or after July 31, and (4) in fields where irrigation applied through December of the application year would not be by sprinklers (Title 3 CCR 6486.6). In the PDRP findings, DPR's Director stated that the Department would continue to monitor for the presence of bentazon in ground water in areas where it was applied after the establishment of the use modifications.

Well monitoring for bentazon has been conducted annually from 1993 to 1996. During those surveys only 7-12 wells were sampled because of the small quantities of bentazon applied in any one county or area within a county. In all, 21 different wells were sampled during the four surveys but no bentazon residues were detected. As a result of the low number of wells available for sampling in treated areas, bentazon monitoring was changed from an annual survey to a biennial survey as of September 1996.

The most recent survey was conducted in August 1998. Bentazon use information was obtained from the annual Pesticide Use Report for 1991-96. Monterey, San Mateo and Santa Barbara counties were selected for monitoring. Areas of greatest use in those counties were plotted by township/range-section on county maps. Sampling crews attempted to sample one or two wells in sections where the greatest quantities of bentazon had been applied. A total of eight wells located in seven sections were sampled. The samples taken from these wells were also analyzed for atrazine, simazine, prometon, diuron, bromacil, prometryn, hexazinone, cyanazine, and metribuzin. No residues of bentazon or other herbicides were detected in any of the samples.

SPECIAL STUDIES

Simazine and Bromide Movement Under Drip Irrigation In Sandy Soils

Preemergent herbicide residues associated with citrus and grape production have been detected in several hundred domestic wells in Fresno and Tulare counties. Many of the detections are located in coarse soil areas. Previous EHAP studies in coarse soil have shown

that evapotranspiration-based irrigation scheduling can effectively mitigate downward movement of herbicides under furrow, basin, or sprinkler irrigation regimes. However, much less is known about the downward movement of herbicides and tracers under drip emitters; potential problems with drip irrigation include very high water throughput directly beneath drip emitters leading to leaching. Rapid downward water movement under drip emitters is greatest in coarse soils such as sands, so that coarse soils are the most vulnerable to rapid leaching under drip irrigation. Consequently, the effectiveness of water management for mitigating downward herbicide movement under drip irrigation in coarse soils is unknown. The objective of this study is to evaluate the potential for downward and lateral simazine movement under drip irrigation emitters in coarse soil with three different water application amounts. The field work on this study has been completed.

Evaluation of Current Simulation Models to Predict Pesticide Movement to Ground and Surface Water Under California Conditions

The objective of this study is to evaluate the usefulness of various simulation models for predicting pesticide transport to ground and surface waters under California irrigation conditions. This evaluation will include quantitative comparisons between model output and measured environmental data, qualitative comparisons of model operations and quality of supporting documentation, data input requirements for the models, and sources and availability of input data required. The input data has been compiled and model simulations have been started.

CHANGES IN THE GROUND WATER PROGRAM

Currently, DPR identifies areas sensitive to ground water pollution and pesticides with a high potential to contaminate ground water based solely on well monitoring results. This process is very time consuming and expensive, and identifies sensitive areas and appropriate use restrictions only after contamination has occurred. Based on the large body of data collected since the early 1980's, DPR has developed a more efficient, comprehensive, and preventive method to identify these areas and to relate these areas to the mechanism of movement to ground water. In addition, DPR has developed mitigation measures to address various mechanisms of pesticide movement to ground water. DPR currently advises, but does not require, users of pesticides found in ground water to adopt these mitigation measures to protect ground water. And finally, there are no restrictions to prevent movement of pesticides residues in irrigation or rainfall runoff water into poorly sealed wells or drainage wells.

Based on this new information and methodology, DPR plans to change the regulations to make the ground water protection program more preventive. Sensitive areas will be based on soil types and depth to ground water that are characteristic of areas where contamination has occurred. Pesticides with a high potential to contaminate ground water will be identified based on detections anywhere in the United States and certain label statements and environmental fate characteristics, rather than only on detections in California ground water. Pesticide users will be required to adopt the mitigation measures that correspond to the mechanism of movement in all sensitive areas, even if contamination has not yet occurred. And DPR will require pesticide users to adopt wellhead protection measures so that wells themselves will not serve as a pathway for pesticide movement to ground water.

FACTORS CONTRIBUTING TO PESTICIDE MOVEMENT TO GROUND WATER AS A RESULT OF AGRICULTURAL USE

The PCPA requires DPR to include in the annual report an analysis of the factors that contribute to the movement of pesticides to ground water. Factors that determine the probability of an agricultural use pesticide reaching ground water include the chemical's physiochemical properties, pesticide formulation, site of application, soil type, climate, and irrigation practices. Many of these factors have been investigated by DPR.

Pesticides may reach ground water by leaching or direct streaming. Leaching is the process by which pesticide residues are dissolved or suspended in water and are carried through the soil matrix as it recharges a ground water aquifer. Direct streaming is the movement of a pesticide to ground water through conduits. A natural conduit includes structures such as sink holes, macropores, insect and animal burrows, root channels, and deep cracks in clay soils. Man-made conduits include poorly constructed or damaged well seals or casings, agricultural drainage wells (dry wells), and improperly abandoned water, oil, or natural gas wells.

Ground water contamination may arise from point or non-point sources. Point source contamination occurs when the pesticide comes from a defined area such as from spills (improper handling, storage, disposal), or direct injection into ground water during mixing or chemigation. Non-point source contamination occurs when pesticides reach ground water from a large area, typically as a result of movement of pesticide after an agricultural application.

SECTION II SUMMARY

From July 1, 1998 through June 30, 1999, EHAP sampled 125 wells in 17 counties. The samples were analyzed for a total of 16 pesticide active ingredients and breakdown products. Verified detections were made in 39 wells in 10 counties of eight compounds: atrazine, bromacil, diuron, hexazinone, norflurazon, simazine, deethyl-atrazine, and ACET.

During this year's well monitoring survey for bentazon, no residues of bentazon or other herbicides were detected in any of the samples.

Groundwater Protection List Monitoring was conducted in 13 counties for napropamide and oryzalin. There were no detections of either chemical in the 29 wells sampled for napropamide and the 34 wells sampled for oryzalin.

DPR determined that residues of atrazine, ACET, deethyl-atrazine, bromacil, diuron, simazine, and norflurazon reached ground water as the result of legal, agricultural use. A total of 17 sections in five counties were recommended as PMZs.

The PREC subcommittee held a hearing and made findings and recommendations to the DPR director regarding the continued use of norflurazon. After reviewing these findings and recommendations, the director issued a final decision on in April 1999. The director concurred with the PREC subcommittee that the use of norflurazon can be modified in such a way that there would be a high probability that no norflurazon residues other than those already present in ground water would migrate to ground water. Regulations will be adopted to make norflurazon a restricted material, add norflurazon use requirements, and establish norflurazon PMZs.

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Appendix A

Number of wells sampled and positive detections, by county and chemical

This appendix is presented in two sections. The first contains summaries for counties without pesticide detections. The second contains summaries for counties with detections. In each section, the counties are given alphabetically. Sampling results are reported for the period July 1, 1997 through June 30, 1998. The counties without and with detections are as follows:

Counties without detections

Alameda
Amador
Butte
Calaveras
Contra Costa
El Dorado
Humboldt
Lake
Mariposa
Mendocino
Modoc
Monterey
Napa
Orange
Plumas
San Benito
San Diego
San Luis Obispo
Santa Barbara
Santa Clara
Tuolumne

Counties with detections

Fresno
Glenn
Kern
Los Angeles
Madera
Merced
Riverside
Sacramento
San Bernardino
San Joaquin
San Mateo
Santa Cruz
Solano
Sonoma
Stanislaus
Sutter
Tulare
Ventura
Yolo
Yuba

Appendix A part 1. Counties without detections. The chemicals and number of wells sampled for each chemical is given.

ALAMEDA

1,1,2,2-TETRACHLOROETHANE	9	LINDANE (GAMMA-BHC)	5
1,2,4-TRICHLOROBENZENE	9	METHOXYCHLOR	5
1,2-D + 1,3-D + C-3 COMPOUNDS	9	METHYL BROMIDE	9
1,2-DICHLOROPROPANE	9	MOLINATE	5
ALACHLOR	5	NAPHTHALENE	9
ATRAZINE	5	ORTHO-DICHLOROBENZENE	9
BENZENE (BENZOL)	9	SIMAZINE	5
CHLOROMETHANE	9	THIOBENCARB	5
DBCP	5	TRICHLOROBENZENES	9
ETHYLENE DIBROMIDE	5	XYLENE	9
HEXACHLOROBENZENE	5		

AMADOR

1,1,2,2-TETRACHLOROETHANE	2	METHYL BROMIDE	2
1,2,4-TRICHLOROBENZENE	2	NAPHTHALENE	2
1,2-D + 1,3-D + C-3 COMPOUNDS	2	ORTHO-DICHLOROBENZENE	2
1,2-DICHLOROPROPANE	2	TRICHLOROBENZENES	2
BENZENE (BENZOL)	2	XYLENE	2
CHLOROMETHANE	2		

BUTTE

1,1,2,2-TETRACHLOROETHANE	15	METHYL BROMIDE	15
1,2,4-TRICHLOROBENZENE	15	METOLACHLOR	1
1,2-D + 1,3-D + C-3 COMPOUNDS	15	METRIBUZIN	5
1,2-DICHLOROPROPANE	15	MOLINATE	1
ACET	4	NAPHTHALENE	20
ATRAZINE	5	NAPROPAMIDE	4
BENZENE (BENZOL)	15	NORFLURAZON	4
BROMACIL	5	ORTHO-DICHLOROBENZENE	15
BUTACHLOR	1	ORYZALIN	4
CHLOROMETHANE	15	PROMETON	4
CYANAZINE	4	PROMETRYN	5
DEETHYL-ATRAZINE	4	PROPACHLOR	1
DIAZINON	1	SIMAZINE	5
DIMETHOATE	1	THIOBENCARB	1
DIURON	4	TRICHLOROBENZENES	15
HEXAZINONE	4	XYLENE	15

CALAVERAS

ATRAZINE	1		
DIURON	1		
SIMAZINE	1		

CONTRA COSTA

1,1,2,2-TETRACHLOROETHANE	4	DINOSEB	3
1,2,4-TRICHLOROBENZENE	4	DIQUAT DIBROMIDE	3
1,2-D + 1,3-D + C-3 COMPOUNDS	4	DIURON	3
1,2-DICHLOROPROPANE	4	ENDOTHALL	3
2,4,5-TP (SILVEX)	3	ENDRIN	3
2,4-D	3	ETHYLENE DIBROMIDE	4
3-HYDROXYCARBOFURAN	4	GLYPHOSATE, ISOPROPYLAMINE SALT	3
ALACHLOR	3	HEPTACHLOR	3
ALDICARB	4	HEPTACHLOR EPOXIDE	3
ALDICARB SULFONE	4	HEXACHLOROBENZENE	3
ALDICARB SULFOXIDE	4	LINDANE (GAMMA-BHC)	3
ALDRIN	3	METHOMYL	4
ATRAZINE	4	METHOXYCHLOR	3
BENTAZON, SODIUM SALT	3	METHYL BROMIDE	4
BENZENE (BENZOL)	4	METOLACHLOR	4
BROMACIL	4	METRIBUZIN	4
BUTACHLOR	4	MOLINATE	4
CARBARYL	4	NAPHTHALENE	4
CARBOFURAN	4	ORTHO-DICHLOROBENZENE	4
CHLORDANE	3	OXAMYL	4
CHLOROMETHANE	4	PICLORAM	3
CHLOROTHALONIL	3	PROMETRYN	4
DALAPON	3	PROPACHLOR	4
DBCP	4	SIMAZINE	4
DIAZINON	3	THIOBENCARB	4
DICAMBA	3	TOXAPHENE	3
DIELDRIN	3	TRICHLOROBENZENES	4
DIMETHOATE	4	XYLENE	4

DEL NORTE

1,1,2,2-TETRACHLOROETHANE	1	METHYL BROMIDE	1
1,2,4-TRICHLOROBENZENE	1	NAPHTHALENE	1
1,2-D + 1,3-D + C-3 COMPOUNDS	1	ORTHO-DICHLOROBENZENE	1
1,2-DICHLOROPROPANE	1	TRICHLOROBENZENES	1
BENZENE (BENZOL)	1	XYLENE	1
CHLOROMETHANE	1		

EL DORADO

1,1,2,2-TETRACHLOROETHANE	24	METHYL BROMIDE	5
1,2,4-TRICHLOROBENZENE	24	NAPHTHALENE	5
1,2-D + 1,3-D + C-3 COMPOUNDS	5	ORTHO-DICHLOROBENZENE	24
1,2-DICHLOROPROPANE	24	TRICHLOROBENZENES	5
BENZENE (BENZOL)	24	XYLENE	24
CHLOROMETHANE	5		

GLENN

1,1,2,2-TETRACHLOROETHANE	3	METHYL BROMIDE	3
1,2,4-TRICHLOROBENZENE	3	NAPHTHALENE	3
1,2-D + 1,3-D + C-3 COMPOUNDS	3	ORTHO-DICHLOROBENZENE	3
1,2-DICHLOROPROPANE	3	TRICHLOROBENZENES	3
BENZENE (BENZOL)	3	XYLENE	3
CHLOROMETHANE	3		

KINGS

1,1,2,2-TETRACHLOROETHANE	19	DINOSEB	1
1,2,4-TRICHLOROBENZENE	19	DIQUAT DIBROMIDE	1
1,2-D + 1,3-D + C-3 COMPOUNDS	19	DISULFOTON	1
1,2-DICHLOROPROPANE	19	DIURON	1
2,4,5-T	1	ENDOTHALL	1
2,4,5-TP (SILVEX)	1	ENDRIN	1
2,4-D	1	ETHYLENE DIBROMIDE	3
3-HYDROXYCARBOFURAN	1	GLYPHOSATE, ISOPROPYLAMINE SALT	1
ALACHLOR	3	HEPTACHLOR	1
ALDICARB	1	HEPTACHLOR EPOXIDE	1
ALDICARB SULFONE	1	HEXACHLOROBENZENE	1
ALDICARB SULFOXIDE	1	LINDANE (GAMMA-BHC)	1
ALDRIN	1	METHOMYL	1
ATRAZINE	3	METHOXYCHLOR	1
BENTAZON, SODIUM SALT	1	METHYL BROMIDE	19
BENZENE (BENZOL)	19	METOLACHLOR	3
BROMACIL	3	METRIBUZIN	3
BUTACHLOR	3	MOLINATE	3
CARBARYL	1	NAPHTHALENE	19
CARBOFURAN	1	ORTHO-DICHLOROBENZENE	19
CHLORDANE	1	OXAMYL	1
CHLOROMETHANE	19	PICLORAM	1
CHLOROTHALONIL	1	PROMETRYN	3
DALAPON	1	PROPACHLOR	1
DBCP	3	SIMAZINE	3
DEMETON	1	THIOBENCARB	3
DIAZINON	3	TOXAPHENE	1
DICAMBA	1	TRICHLOROBENZENES	19
DIELDRIN	1	XYLENE	19
DIMETHOATE	1		

LAKE

1,1,2,2-TETRACHLOROETHANE	2	DIQUAT DIBROMIDE	5
1,2,4-TRICHLOROBENZENE	2	DIURON	1
1,2-D + 1,3-D + C-3 COMPOUNDS	2	ENDOTHALL	5
1,2-DICHLOROPROPANE	2	ETHYLENE DIBROMIDE	2
2,4,5-TP (SILVEX)	5	HEPTACHLOR	1
2,4-D	5	HEPTACHLOR EPOXIDE	1
3-HYDROXYCARBOFURAN	1	LINDANE (GAMMA-BHC)	1
ALDICARB	1	METHOMYL	1
ALDICARB SULFONE	1	METHOXYCHLOR	1
ALDICARB SULFOXIDE	1	METHYL BROMIDE	2
ATRAZINE	7	METOLACHLOR	1
BENTAZON, SODIUM SALT	4	METRIBUZIN	1
BENZENE (BENZOL)	2	MOLINATE	1
BROMACIL	1	NAPHTHALENE	2
BUTACHLOR	1	ORTHO-DICHLOROBENZENE	2
CARBARYL	1	OXAMYL	5
CARBOFURAN	4	PICLORAM	5
CHLOROMETHANE	2	PROMETRYN	1
CHLOROTHALONIL	1	PROPACHLOR	1
DALAPON	5	SIMAZINE	7
DIAZINON	1	THIOBENCARB	1
DICAMBA	4	TOXAPHENE	1
DIMETHOATE	1	TRICHLOROBENZENES	2
DINOSEB	5	XYLENE	2

MARIPOSA

1,1,2,2-TETRACHLOROETHANE	1	METHYL BROMIDE	1
1,2,4-TRICHLOROBENZENE	1	NAPHTHALENE	1
1,2-D + 1,3-D + C-3 COMPOUNDS	1	ORTHO-DICHLOROBENZENE	1
1,2-DICHLOROPROPANE	1	TRICHLOROBENZENES	1
BENZENE (BENZOL)	1	XYLENE	1
CHLOROMETHANE	1		

MENDOCINO

1,1,2,2-TETRACHLOROETHANE	6	DINOSEB	10
1,2,4-TRICHLOROBENZENE	6	DIQUAT DIBROMIDE	6
1,2-D + 1,3-D + C-3 COMPOUNDS	6	ENDOTHALL	6
1,2-DICHLOROPROPANE	6	ENDRIN	1
2,4,5-TP (SILVEX)	10	ETHYLENE DIBROMIDE	1
2,4-D	10	HEPTACHLOR	2
3-HYDROXYCARBOFURAN	4	HEPTACHLOR EPOXIDE	2
ALDICARB	4	HEXACHLOROBENZENE	1
ALDICARB SULFONE	4	LINDANE (GAMMA-BHC)	2
ALDICARB SULFOXIDE	4	METHOMYL	4
ALDRIN	1	METHOXYCHLOR	2
ATRAZINE	10	METHYL BROMIDE	6
BENTAZON, SODIUM SALT	10	NAPHTHALENE	6
BENZENE (BENZOL)	6	ORTHO-DICHLOROBENZENE	6
CARBOFURAN	5	OXAMYL	6
CHLORDANE	1	PICLORAM	10
CHLOROMETHANE	6	SIMAZINE	10
CHLOROTHALONIL	1	TOXAPHENE	1
DALAPON	10	TRICHLOROBENZENES	6
DICAMBA	10	XYLENE	6
DIELDRIN	1		

MODOC

1,1,2,2-TETRACHLOROETHANE	1	DIMETHOATE	1
1,2,4-TRICHLOROBENZENE	1	DIQUAT DIBROMIDE	1
1,2-D + 1,3-D + C-3 COMPOUNDS	1	GLYPHOSATE, ISOPROPYLAMINE SALT	1
1,2-DICHLOROPROPANE	1	METHOMYL	1
2,4-D	1	METHYL BROMIDE	1
BENZENE (BENZOL)	1	METRIBUZIN	2
CARBARYL	1	NAPHTHALENE	1
CARBOFURAN	2	ORTHO-DICHLOROBENZENE	1
CHLOROMETHANE	1	PICLORAM	1
CHLOROTHALONIL	1	TRICHLOROBENZENES	1
DICAMBA	1	XYLENE	1

NAPA

1,1,2,2-TETRACHLOROETHANE	2	DALAPON	1
1,2,4-TRICHLOROBENZENE	2	DICAMBA	1
1,2-D + 1,3-D + C-3 COMPOUNDS	2	DINOSEB	1
1,2-DICHLOROPROPANE	2	METHYL BROMIDE	2
2,4,5-TP (SILVEX)	1	NAPHTHALENE	2
2,4-D	1	ORTHO-DICHLOROBENZENE	2
ATRAZINE	2	PICLORAM	1
BENTAZON, SODIUM SALT	1	SIMAZINE	2
BENZENE (BENZOL)	2	TRICHLOROBENZENES	2
CHLOROMETHANE	2	XYLENE	2

NEVADA

1,1,2,2-TETRACHLOROETHANE	7	METHYL BROMIDE	7
1,2,4-TRICHLOROBENZENE	7	NAPHTHALENE	7
1,2-D + 1,3-D + C-3 COMPOUNDS	7	ORTHO-DICHLOROBENZENE	7
1,2-DICHLOROPROPANE	7	TRICHLOROBENZENES	7
BENZENE (BENZOL)	7	XYLENE	7
CHLOROMETHANE	7		

ORANGE

1,3-DICHLOROPROPENE (1,3-D TELONE)	195	DIQUAT DIBROMIDE	12
1,1,2,2-TETRACHLOROETHANE	201	DIURON	10
1,2,4-TRICHLOROBENZENE	201	ENDOSULFAN	11
1,2-D + 1,3-D + C-3 COMPOUNDS	201	ENDOSULFAN SULFATE	11
1,2-DICHLOROPROPANE	201	ENDOTHALL	15
2,3,7,8-TCDD (DIOXIN)	2	ENDRIN	15
2,4,5-TP (SILVEX)	14	ENDRIN ALDEHYDE	11
2,4-D	14	ETHYLENE DIBROMIDE	199
3-HYDROXYCARBOFURAN	13	GLYPHOSATE, ISOPROPYLAMINE SALT	15
ACENAPHTHENE	9	HEPTACHLOR	15
ALACHLOR	19	HEPTACHLOR EPOXIDE	15
ALDICARB	13	HEXACHLOROBENZENE	15
ALDICARB SULFONE	13	LINDANE (GAMMA-BHC)	15
ALDICARB SULFOXIDE	13	MALATHION	13
ALDRIN	15	METHIOCARB	9
ATRAZINE	21	METHOMYL	13
BENTAZON, SODIUM SALT	14	METHOXYCHLOR	15
BENZENE (BENZOL)	201	METHYL BROMIDE	201
BHC (OTHER THAN GAMMA ISOMER)	11	METHYL PARATHION	13
BROMACIL	20	METOLACHLOR	18
BUTACHLOR	18	METRIBUZIN	18
CARBARYL	13	MOLINATE	21
CARBOFURAN	13	NAPHTHALENE	203
CHLORDANE	15	ORTHO-DICHLOROBENZENE	201
CHLOROMETHANE	201	OXAMYL	13
CHLOROTHALONIL	15	PARAQUAT DICHLORIDE	8
DALAPON	14	PARATHION OR ETHYL PARATHION	13
DBCP	199	PICLORAM	14
DDD	11	PROMETRYN	20
DDE	11	PROPACHLOR	19
DDT	11	PROPOXUR	9
DIAZINON	20	SIMAZINE	21
DICAMBA	14	THIOBENCARB	21
DIELDRIN	15	TOXAPHENE	15
DIMETHOATE	20	TRICHLOROBENZENES	201
DINOSEB	14	XYLENE	201

PLACER

1,1,2,2-TETRACHLOROETHANE	3	METHYL BROMIDE	3
1,2,4-TRICHLOROBENZENE	3	METOLACHLOR	2
1,2-D + 1,3-D + C-3 COMPOUNDS	3	METRIBUZIN	2
1,2-DICHLOROPROPANE	3	MOLINATE	2
ATRAZINE	2	NAPHTHALENE	3
BENZENE (BENZOL)	3	ORTHO-DICHLOROBENZENE	3
BROMACIL	2	PROMETRYN	2
BUTACHLOR	2	PROPACHLOR	2
CHLOROMETHANE	3	TRICHLOROBENZENES	3
DIAZINON	2	XYLENE	3

PLUMAS

1,1,2,2-TETRACHLOROETHANE	1	METHYL BROMIDE	1
1,2,4-TRICHLOROBENZENE	1	NAPHTHALENE	1
1,2-D + 1,3-D + C-3 COMPOUNDS	1	ORTHO-DICHLOROBENZENE	1
1,2-DICHLOROPROPANE	1	TRICHLOROBENZENES	1
BENZENE (BENZOL)	1	XYLENE	1
CHLOROMETHANE	1		

SAN BENITO

ACET	2	METRIBUZIN	2
ALACHLOR	2	NAPROPAMIDE	2
ATRAZINE	2	NORFLURAZON	2
BROMACIL	2	ORYZALIN	2
CYANAZINE	2	PROMETON	2
DEETHYL-ATRAZINE	2	PROMETRYN	2
DIURON	2	SIMAZINE	2
HEXAZINONE	2		

SAN LUIS OBISPO

1,1,2,2-TETRACHLOROETHANE	50	DIMETHOATE	22
1,2,4-TRICHLOROBENZENE	50	DINOSEB	10
1,2-D + 1,3-D + C-3 COMPOUNDS	50	DIQUAT DIBROMIDE	22
1,2-DICHLOROPROPANE	50	DIURON	4
2,4,5-TP (SILVEX)	10	ENDRIN	22
2,4-D	22	ETHYLENE DIBROMIDE	19
3-HYDROXYCARBOFURAN	22	HEPTACHLOR	22
ALACHLOR	22	HEPTACHLOR EPOXIDE	22
ALDICARB	22	HEXACHLOROBENZENE	22
ALDICARB SULFONE	22	LINDANE (GAMMA-BHC)	22
ALDICARB SULFOXIDE	22	METHOMYL	22
ALDRIN	22	METHOXYCHLOR	22
ATRAZINE	22	METHYL BROMIDE	50
BENTAZON, SODIUM SALT	10	METOLACHLOR	22
BENZENE (BENZOL)	50	METRIBUZIN	22
BROMACIL	22	MOLINATE	22
BUTACHLOR	22	NAPHTHALENE	50
CARBARYL	22	ORTHO-DICHLOROBENZENE	50
CARBOFURAN	22	OXAMYL	22
CHLORDANE	22	PICLORAM	22
CHLOROMETHANE	50	PROMETRYN	22
CHLOROTHALONIL	22	PROPACHLOR	22
DALAPON	10	SIMAZINE	28
DBCP	19	THIOBENCARB	22
DIAZINON	22	TOXAPHENE	22
DICAMBA	10	TRICHLOROBENZENES	50
DIELDRIN	22	XYLENE	50

SANTA BARBARA

1,1,2,2-TETRACHLOROETHANE	19	DINOSEB	8
1,2,4-TRICHLOROBENZENE	19	DIQUAT DIBROMIDE	8
1,2-D + 1,3-D + C-3 COMPOUNDS	19	DIURON	12
1,2-DICHLOROPROPANE	19	ENDOTHALL	1
2,3,7,8-TCDD (DIOXIN)	1	ENDRIN	10
2,4,5-TP (SILVEX)	8	ETHYLENE DIBROMIDE	11
2,4-D	9	GLYPHOSATE, ISOPROPYLAMINE SALT	2
3-HYDROXYCARBOFURAN	8	HEPTACHLOR	10
ALACHLOR	12	HEPTACHLOR EPOXIDE	10
ALDICARB	8	HEXACHLOROBENZENE	10
ALDICARB SULFONE	8	HEXAZINONE	5
ALDICARB SULFOXIDE	8	LINDANE (GAMMA-BHC)	10
ALDRIN	10	METHOMYL	8
ATRAZINE	17	METHOXYCHLOR	11
BENTAZON, SODIUM SALT	13	METHYL BROMIDE	19
BENZENE (BENZOL)	19	METOLACHLOR	12
BROMACIL	17	METRIBUZIN	17
BUTACHLOR	12	MOLINATE	12
CARBARYL	8	NAPHTHALENE	19
CARBOFURAN	8	ORTHO-DICHLOROBENZENE	19
CHLORDANE	10	OXAMYL	8
CHLOROMETHANE	19	PICLORAM	8
CHLOROTHALONIL	10	PROMETON	5
CYANAZINE	5	PROMETRYN	17
DALAPON	8	PROPACHLOR	10
DBCP	11	SIMAZINE	17
DIAZINON	12	THIOBENCARB	12
DICAMBA	8	TOXAPHENE	10
DIELDRIN	10	TRICHLOROBENZENES	19
DIMETHOATE	12	XYLENE	19

SHASTA

1,1,2,2-TETRACHLOROETHANE	3	METHYL BROMIDE	3
1,2,4-TRICHLOROBENZENE	3	NAPHTHALENE	3
1,2-D + 1,3-D + C-3 COMPOUNDS	3	ORTHO-DICHLOROBENZENE	3
1,2-DICHLOROPROPANE	3	TRICHLOROBENZENES	3
BENZENE (BENZOL)	3	XYLENE	3
CHLOROMETHANE	3		

SIERRA

1,1,2,2-TETRACHLOROETHANE	2	METHYL BROMIDE	2
1,2,4-TRICHLOROBENZENE	2	NAPHTHALENE	2
1,2-D + 1,3-D + C-3 COMPOUNDS	2	ORTHO-DICHLOROBENZENE	2
1,2-DICHLOROPROPANE	2	TRICHLOROBENZENES	2
BENZENE (BENZOL)	2	XYLENE	2
CHLOROMETHANE	2		

SISKIYOU

3-HYDROXYCARBOFURAN	2	CARBARYL	2
ALDICARB	2	CARBOFURAN	2
ALDICARB SULFONE	2	METHOMYL	2
ALDICARB SULFOXIDE	2	OXAMYL	2

SUTTER

1,1,2,2-TETRACHLOROETHANE	6	DIMETHOATE	1
1,2,4-TRICHLOROBENZENE	6	METHOMYL	1
1,2-D + 1,3-D + C-3 COMPOUNDS	6	METHYL BROMIDE	6
1,2-DICHLOROPROPANE	6	METOLACHLOR	1
ALDICARB	1	METRIBUZIN	1
ALDICARB SULFONE	1	NAPHTHALENE	2
ALDICARB SULFOXIDE	1	ORTHO-DICHLOROBENZENE	6
ATRAZINE	3	OXAMYL	1
BENZENE (BENZOL)	6	PROMETRYN	1
BROMACIL	1	PROPACHLOR	1
CARBARYL	1	SIMAZINE	3
CARBOFURAN	1	THIOBENCARB	1
CHLOROMETHANE	6	TRICHLOROBENZENES	6
DIAZINON	1	XYLENE	6

TEHAMA

ATRAZINE	1	METRIBUZIN	1
BROMACIL	1	MOLINATE	1
BUTACHLOR	1	PROMETRYN	1
DIAZINON	1	PROPACHLOR	1
METOLACHLOR	1		

TUOLUMNE

1,1,2,2-TETRACHLOROETHANE	4	DISULFOTON	7
1,2,4-TRICHLOROBENZENE	4	METHYL BROMIDE	4
1,2-D + 1,3-D + C-3 COMPOUNDS	4	METOLACHLOR	7
1,2-DICHLOROPROPANE	4	METRIBUZIN	7
ALACHLOR	7	MOLINATE	7
ATRAZINE	7	NAPHTHALENE	4
BENZENE (BENZOL)	4	ORTHO-DICHLOROBENZENE	4
BROMACIL	7	PROMETRYN	7
BUTACHLOR	7	PROPACHLOR	7
CHLOROMETHANE	4	SIMAZINE	7
DEMETON	7	THIOBENCARB	7
DIAZINON	7	TRICHLOROBENZENES	4
DIMETHOATE	7	XYLENE	4

YOLO

ACET	4	ETHYLENE DIBROMIDE	5
ALACHLOR	5	HEXAZINONE	4
ATRAZINE	9	METOLACHLOR	5
BENZENE (BENZOL)	7	METRIBUZIN	9
BROMACIL	9	MOLINATE	5
BUTACHLOR	5	NAPROPAMIDE	3
CYANAZINE	4	NORFLURAZON	4
DBCP	5	ORYZALIN	3
DEETHYL-ATRAZINE	4	PROMETON	4
DIAZINON	5	PROMETRYN	9
DIMETHOATE	5	PROPACHLOR	5
DIQUAT DIBROMIDE	3	SIMAZINE	9
DIURON	4	THIOBENCARB	5
ENDOTHALL	3	XYLENE	7

YUBA

1,1,2,2-TETRACHLOROETHANE	10	DIQUAT DIBROMIDE	1
1,2,4-TRICHLOROBENZENE	10	DIURON	1
1,2-D + 1,3-D + C-3 COMPOUNDS	10	EPTC	1
1,2-DICHLOROPROPANE	10	GLYPHOSATE, ISOPROPYLAMINE SALT	1
2,4,5-T	1	HEXAZINONE	1
2,4,5-TP (SILVEX)	1	METHIOCARB	1
2,4-D	1	METHOMYL	1
3-HYDROXYCARBOFURAN	1	METHYL BROMIDE	10
ALACHLOR	5	METOLACHLOR	4
ALDICARB	1	METRIBUZIN	4
ALDICARB SULFONE	1	MOLINATE	4
ALDICARB SULFOXIDE	1	NAPHTHALENE	10
AMETRYNE	1	NAPROPAMIDE	1
ATRAZINE	5	ORTHO-DICHLOROBENZENE	10
BENTAZON, SODIUM SALT	1	OXAMYL	1
BENZENE (BENZOL)	10	PARAQUAT DICHLORIDE	1
BROMACIL	5	PICLORAM	1
BUTACHLOR	5	PROMETRYN	5
BUTYLATE	1	PROPACHLOR	4
CARBARYL	1	PROPAZINE	1
CARBOFURAN	1	PROPOXUR	1
CHLORAMBEN	1	SIMAZINE	4
CHLOROMETHANE	10	SIMETRYN	1
CHLORTHAL-DIMETHYL	1	TEBUTHIURON	1
CYCLOATE	1	TERBUTRYN	1
DALAPON	1	TETRACHLORVINPHOS (STIROFOS)	1
DDVP (DICHLORVOS)	1	THIOBENCARB	4
DIAZINON	4	TRIADIMEFON	1
DICAMBA	1	TRICHLOROBENZENES	10
DIMETHOATE	4	VERNOLATE	1
DINOSEB	1	XYLENE	10
DIPHENAMID	1		

Appendix A part 2: Counties with positive detections. The chemical, number of wells sampled, and number of wells with positive detections is given.

COLUSA

<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>
1,1,2,2-TETRACHLOROETHANE	1		HEXAZINONE	9	1
1,2,4-TRICHLOROBENZENE	1		METHYL BROMIDE	1	
1,2-D + 1,3-D + C-3 COMPOUNDS	1		METRIBUZIN	9	
1,2-DICHLOROPROPANE	1		NAPHTHALENE	1	
ACET	5	1	NAPROPAMIDE	5	
ATRAZINE	9		NORFLURAZON	5	
BENZENE (BENZOL)	1		ORTHO-DICHLOROBENZENE	1	
BROMACIL	9		ORYZALIN	5	
CHLOROMETHANE	1		PROMETON	9	
CYANAZINE	9		PROMETRYN	9	
DEETHYL-ATRAZINE	5	1	SIMAZINE	9	1
DIURON	9		TRICHLOROBENZENES	1	
			XYLENE	1	

FRESNO

<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>
1,1,2,2-TETRACHLOROETHANE	57		DINOSEB	117	
1,2,4-TRICHLOROBENZENE	57		DIQUAT DIBROMIDE	6	
1,2-D + 1,3-D + C-3 COMPOUNDS	57		DISULFOTON	128	
1,2-DICHLOROPROPANE	57	1	DIURON	23	4
2,4,5-T	4		ENDOTHALL	6	
2,4,5-TP (SILVEX)	117		ENDRIN	13	
2,4-D	116		ETHYLENE DIBROMIDE	200	7
3-HYDROXYCARBOFURAN	6		GLYPHOSATE, ISOPROPYLAMINE SALT	2	
ACET	23	6	HEPTACHLOR	13	
ACROLEIN	10		HEPTACHLOR EPOXIDE	13	
ALACHLOR	129		HEXACHLOROBENZENE	13	
ALDICARB	6		HEXAZINONE	23	
ALDICARB SULFONE	6		LINDANE (GAMMA-BHC)	13	
ALDICARB SULFOXIDE	6		METHOMYL	6	
ALDRIN	13		METHOXYCHLOR	13	
ATRAZINE	164	1	METHYL BROMIDE	57	
BENTAZON, SODIUM SALT	117		METOLACHLOR	142	
BENZENE (BENZOL)	57		METRIBUZIN	164	
BROMACIL	164	3	MOLINATE	140	
BUTACHLOR	142		NAPHTHALENE	57	
CARBARYL	6		NAPROPAMIDE	7	
CARBOFURAN	6		NORFLURAZON	23	
CHLORDANE	13		ORTHO-DICHLOROBENZENE	57	
CHLOROMETHANE	56	2	ORYZALIN	7	
CHLOROTHALONIL	13		OXAMYL	6	
CYANAZINE	23		PICLORAM	117	
DALAPON	117		PROMETON	23	
DBCP	201	102	PROMETRYN	164	
DEETHYL-ATRAZINE	23	1	PROPACHLOR	139	
DEMETON	128		SIMAZINE	153	4
DIAZINON	142		THIOBENCARB	130	
DICAMBA	117		TOXAPHENE	13	
DIELDRIN	6		TRICHLOROBENZENES	57	
DIMETHOATE	132		XYLENE	57	1

KERN

<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS</u>	<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS</u>
1,1,2,2-TETRACHLOROETHANE	27		DINOSEB	12	
1,2,4-TRICHLOROBENZENE	27		DIQUAT DIBROMIDE	12	
1,2-D + 1,3-D + C-3 COMPOUNDS	27		DISULFOTON	1	
1,2-DICHLOROPROPANE	28	1	DIURON	14	
2,3,7,8-TCDD (DIOXIN)	13		ENDOTHALL	13	
2,4,5-TP (SILVEX)	12		ENDRIN	13	
2,4-D	12		ETHYLENE DIBROMIDE	22	1
3-HYDROXYCARBOFURAN	13		GLYPHOSATE, ISOPROPYLAMINE SALT	13	
ACET	2	1	HEPTACHLOR	13	
ALACHLOR	17		HEPTACHLOR EPOXIDE	13	
ALDICARB	13		HEXACHLOROBENZENE	14	
ALDICARB SULFONE	13		HEXAZINONE	2	
ALDICARB SULFOXIDE	13		LINDANE (GAMMA-BHC)	13	
ALDRIN	13		METHOMYL	13	
ATRAZINE	21		METHOXYCHLOR	14	
BENTAZON, SODIUM SALT	12		METHYL BROMIDE	27	
BENZENE (BENZOL)	28	1	METOLACHLOR	17	
BROMACIL	19		METRIBUZIN	19	
BUTACHLOR	16		MOLINATE	17	
CARBARYL	13		NAPHTHALENE	27	
CARBOFURAN	13		NAPROPAMIDE	1	
CHLORDANE	13		NORFLURAZON	2	
CHLOROMETHANE	27		ORTHO-DICHLOROBENZENE	27	
CHLOROTHALONIL	13		ORYZALIN	1	
CYANAZINE	2		OXAMYL	13	
DALAPON	12		PICLORAM	12	
DBCP	22	5	PROMETON	2	
DEETHYL-ATRAZINE	2		PROMETRYN	19	
DEMETON	1		PROPACHLOR	16	
DIAZINON	17		SIMAZINE	21	
DICAMBA	12		THIOBENCARB	17	
DIELDRIN	13		TOXAPHENE	13	
DIMETHOATE	17		TRICHLOROBENZENES	27	
			XYLENE	28	

LOS ANGELES

<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>
1,3-DICHLOROPROPENE	1		CHLORDANE	223	
1,1,2,2-TETRACHLOROETHANE	265		CHLOROMETHANE	263	2
1,2,4-TRICHLOROBENZENE	265		CHLOROTHALONIL	73	
1,2-D + 1,3-D + C-3 COMPOUNDS	263		DALAPON	80	
1,2-DICHLOROPROPANE	265	1	DBCP	82	5
2,3,7,8-TCDD (DIOXIN)	17		DEMETON	19	
2,4,5-T	1		DIAZINON	98	
2,4,5-TP (SILVEX)	80		DICAMBA	79	
2,4-D	235		DIELDRIN	76	
3-HYDROXYCARBOFURAN	35		DIMETHOATE	97	
ALACHLOR	87		DINOSEB	80	
ALDICARB	35		DIQUAT DIBROMIDE	219	
ALDICARB SULFONE	35		DISULFOTON	19	
ALDICARB SULFOXIDE	35		DIURON	23	
ALDRIN	76		ENDOTHALL	29	
ATRAZINE	260		ENDRIN	78	
BENTAZON, SODIUM SALT	80		ETHYLENE DIBROMIDE	78	1
BENZENE (BENZOL)	265	1	GLYPHOSATE, ISOPROPYLAMINE SALT	225	
BROMACIL	98		HEPTACHLOR	78	
BUTACHLOR	68		HEPTACHLOR EPOXIDE	78	
CARBARYL	39		HEXACHLOROBENZENE	47	
CARBOFURAN	35		LINDANE (GAMMA-BHC)	78	

LOS ANGELES (cont.)

<u>CHEMICAL</u>	<u>SAMPLED POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED POS.</u>
METHOMYL	35	PICLORAM	80
METHOXYCHLOR	78	PROMETRYN	98
METHYL BROMIDE	263	PROPACHLOR	74
METOLACHLOR	68	SIMAZINE	261
METRIBUZIN	68	THIOBENCARB	96
MOLINATE	98	TOXAPHENE	78
NAPHTHALENE	311	TRICHLOROBENZENES	263
ORTHO-DICHLOROBENZENE	265	XYLENE	277 1
OXAMYL	35		

MADERA

<u>CHEMICAL</u>	<u>SAMPLED POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED POS.</u>
1,1,2,2-TETRACHLOROETHANE	3	ETHYLENE DIBROMIDE	1
1,2,4-TRICHLOROBENZENE	3	HEXAZINONE	4
1,2-D + 1,3-D + C-3 COMPOUNDS	3	METHYL BROMIDE	3
1,2-DICHLOROPROPANE	3	METRIBUZIN	4
ACET	4 1	NAPHTHALENE	3
ATRAZINE	4	NAPROPAMIDE	2
BENZENE (BENZOL)	3	NORFLURAZON	4
BROMACIL	4	ORTHO-DICHLOROBENZENE	3
CHLOROMETHANE	3	ORYZALIN	2
CYANAZINE	4	PROMETON	4
DBCP	1 1	PROMETRYN	4
DEETHYL-ATRAZINE	4	SIMAZINE	4
DIURON	4	TRICHLOROBENZENES	3
		XYLENE	3

MERCED

<u>CHEMICAL</u>	<u>SAMPLED POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED POS.</u>
1,1,2,2-TETRACHLOROETHANE	17	DIELDRIN	10
1,2,4-TRICHLOROBENZENE	17	DIMETHOATE	10
1,2-D + 1,3-D + C-3 COMPOUNDS	17	DINOSEB	10
1,2-DICHLOROPROPANE	17	DIQUAT DIBROMIDE	10
2,4,5-TP (SILVEX)	10	DISULFOTON	10
2,4-D	10	DIURON	12 1
3-HYDROXYCARBOFURAN	10	ENDOTHALL	10
ACET	11 2	ENDRIN	10
ALACHLOR	10	ETHYLENE DIBROMIDE	16
ALDICARB	10	GLYPHOSATE, ISOPROPYLAMINE SALT	10
ALDICARB SULFONE	10	HEPTACHLOR	10
ALDICARB SULFOXIDE	10	HEPTACHLOR EPOXIDE	10
ALDRIN	10	HEXACHLOROBENZENE	10
ATRAZINE	21 1	HEXAZINONE	11
BENTAZON, SODIUM SALT	10	LINDANE (GAMMA-BHC)	10
BENZENE (BENZOL)	17	METHOMYL	10
BROMACIL	21 1	METHOXYCHLOR	10
BUTACHLOR	10	METHYL BROMIDE	17
CARBARYL	10	METOLACHLOR	10
CARBOFURAN	10	METRIBUZIN	21
CHLORDANE	10	MOLINATE	10
CHLOROMETHANE	17	NAPHTHALENE	17
CHLOROTHALONIL	10	NAPROPAMIDE	6
CYANAZINE	11	NORFLURAZON	11
DALAPON	10	ORTHO-DICHLOROBENZENE	17
DBCP	19 5	ORYZALIN	6
DEETHYL-ATRAZINE	11	OXAMYL	10
DEMETON	10	PICLORAM	10
DIAZINON	10	PROMETON	11
DICAMBA	10	PROMETRYN	21

MERCED (cont.)

<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>
PROPACHLOR	10		TOXAPHENE	10	
SIMAZINE	21	1	TRICHLOROBENZENES	17	
THIOBENCARB	10		XYLENE	17	

MONTEREY

<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>
1,1,2,2-TETRACHLOROETHANE	27		DIQUAT DIBROMIDE	17	
1,2,4-TRICHLOROBENZENE	27		DIURON	7	
1,2-D + 1,3-D + C-3 COMPOUNDS	27		ENDOTHALL	17	
1,2-DICHLOROPROPANE	27		ENDRIN	23	
2,4,5-TP (SILVEX)	20		ETHYLENE DIBROMIDE	17	
2,4-D	20		GLYPHOSATE, ISOPROPYLAMINE SALT	17	
3-HYDROXYCARBOFURAN	20		HEPTACHLOR	23	
ACET	4		HEPTACHLOR EPOXIDE	23	
ALACHLOR	23		HEXACHLOROBENZENE	23	
ALDICARB	20		HEXAZINONE	5	
ALDICARB SULFONE	20		LINDANE (GAMMA-BHC)	23	
ALDICARB SULFOXIDE	20		METHOMYL	20	
ALDRIN	23		METHOXYCHLOR	23	
ATRAZINE	28		METHYL BROMIDE	27	
BENTAZON, SODIUM SALT	21		METOLACHLOR	23	
BENZENE (BENZOL)	27		METRIBUZIN	28	
BROMACIL	28		MOLINATE	23	
BUTACHLOR	23		NAPHTHALENE	29	
CARBARYL	20		NAPROPAMIDE	3	
CARBOFURAN	20		NORFLURAZON	4	
CHLORDANE	20		ORTHO-DICHLOROBENZENE	27	
CHLOROMETHANE	27		ORYZALIN	3	
CHLOROTHALONIL	10		OXAMYL	20	
CYANAZINE	5		PICLORAM	20	
DALAPON	20		PROMETON	5	
DBCP	17		PROMETRYN	15	
DEETHYL-ATRAZINE	4		PROPACHLOR	23	
DIAZINON	10		SIMAZINE	28	1
DICAMBA	20		THIOBENCARB	23	
DIELDRIN	23		TOXAPHENE	20	
DIMETHOATE	10		TRICHLOROBENZENES	27	
DINOSEB	20		XYLENE	27	

RIVERSIDE

<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>
1,1,2,2-TETRACHLOROETHANE	28		CARBARYL	47	
1,2,4-TRICHLOROBENZENE	28		CARBOFURAN	47	
1,2-D + 1,3-D + C-3 COMPOUNDS	28		CHLORDANE	47	
1,2-DICHLOROPROPANE	29		CHLOROMETHANE	28	
2,3,7,8-TCDD (DIOXIN)	12		CHLOROTHALONIL	43	
2,4,5-TP (SILVEX)	43		DALAPON	43	
2,4-D	43		DBCP	81	7
3-HYDROXYCARBOFURAN	47		DIAZINON	50	
ALACHLOR	50		DICAMBA	43	
ALDICARB	47		DIELDRIN	47	
ALDICARB SULFONE	47		DIMETHOATE	50	
ALDICARB SULFOXIDE	47		DINOSEB	43	
ALDRIN	43		DIQUAT DIBROMIDE	5	
ATRAZINE	50		DIURON	50	
BENTAZON, SODIUM SALT	43		ENDOTHALL	8	
BENZENE (BENZOL)	28		ENDRIN	47	
BROMACIL	50		ETHYLENE DIBROMIDE	81	
BUTACHLOR	50		GLYPHOSATE, ISOPROPYLAMINE SALT	24	

RIVERSIDE (cont.)

<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>
HEPTACHLOR	47		NAPHTHALENE	30	
HEPTACHLOR EPOXIDE	47		ORTHO-DICHLOROBENZENE	28	
HEXACHLOROBENZENE	47		OXAMYL	47	
LINDANE (GAMMA-BHC)	47		PICLORAM	43	
METHOMYL	47		PROMETRYN	50	
METHOXYCHLOR	47		PROPACHLOR	47	
METHYL BROMIDE	28		SIMAZINE	50	
METOLACHLOR	50		THIOBENCARB	50	
METRIBUZIN	50		TOXAPHENE	47	
MOLINATE	50		TRICHLOROBENZENES	28	
			XYLENE	28	

SACRAMENTO

<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>
1,1,2,2-TETRACHLOROETHANE	54		DIELDRIN	1	
1,2,4-TRICHLOROBENZENE	54		DINOSEB	3	
1,2-D + 1,3-D + C-3 COMPOUNDS	54		DIQUAT DIBROMIDE	2	
1,2-DICHLOROPROPANE	54		DIURON	2	
2,4,5-T	2		ENDOTHALL	2	
2,4,5-TP (SILVEX)	3		ENDRIN	1	
2,4-D	3		ETHYLENE DIBROMIDE	1	
3-HYDROXYCARBOFURAN	2		GLYPHOSATE, ISOPROPYLAMINE SALT	2	
ALDICARB	2		HEPTACHLOR	1	
ALDICARB SULFONE	2		HEPTACHLOR EPOXIDE	1	
ALDICARB SULFOXIDE	2		HEXACHLOROBENZENE	1	
ALDRIN	1		LINDANE (GAMMA-BHC)	1	
BENTAZON, SODIUM SALT	3		METHOMYL	2	
BENZENE (BENZOL)	54		METHOXYCHLOR	1	
CARBARYL	2		METHYL BROMIDE	54	
CARBOFURAN	2		NAPHTHALENE	54	
CHLORDANE	1		ORTHO-DICHLOROBENZENE	54	
CHLOROMETHANE	54	1	OXAMYL	2	
CHLOROTHALONIL	1		PICLORAM	3	
DALAPON	3		TOXAPHENE	1	
DBCP	1		TRICHLOROBENZENES	54	
DICAMBA	3		XYLENE	54	

SAN BERNARDINO

<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>
1,1,2,2-TETRACHLOROETHANE	210		BUTACHLOR	100	
1,2,4-TRICHLOROBENZENE	210		CARBARYL	93	
1,2-D + 1,3-D + C-3 COMPOUNDS	210		CARBOFURAN	95	
1,2-DICHLOROPROPANE	210	1	CHLORDANE	102	
2,3,7,8-TCDD (DIOXIN)	59		CHLOROMETHANE	210	
2,4,5-T	11		CHLOROTHALONIL	101	
2,4,5-TP (SILVEX)	104		DALAPON	105	
2,4-D	105		DBCP	202	62
3-HYDROXYCARBOFURAN	94		DEMETON	11	
ACENAPHTHENE	6		DIAZINON	100	
ALACHLOR	100		DICAMBA	103	
ALDICARB	94		DIELDRIN	102	
ALDICARB SULFONE	94		DIMETHOATE	99	
ALDICARB SULFOXIDE	94		DINOSEB	105	
ALDRIN	102		DIQUAT DIBROMIDE	37	
ATRAZINE	100		DISULFOTON	11	
BENTAZON, SODIUM SALT	104		DIURON	71	
BENZENE (BENZOL)	210		ENDOTHALL	58	
BROMACIL	100		ENDRIN	102	

SAN BERNARDINO (cont.)

<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>
ETHYLENE DIBROMIDE	195		MOLINATE	100	
GLYPHOSATE, ISOPROPYLAMINE SALT	82		NAPHTHALENE	211	
HEPTACHLOR	102		ORTHO-DICHLOROBENZENE	210	
HEPTACHLOR EPOXIDE	102		OXAMYL	94	
HEXACHLOROBENZENE	101		PICLORAM	104	
LINDANE (GAMMA-BHC)	102		PROMETRYN	100	
METHOMYL	94		PROPACHLOR	102	
METHOXYCHLOR	102		SIMAZINE	100	
METHYL BROMIDE	210		THIOBENCARB	100	
METOLACHLOR	100		TOXAPHENE	102	
METRIBUZIN	100		TRICHLOROBENZENES	210	
			XYLENE	210	

SAN DIEGO

<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>
1,1,2,2-TETRACHLOROETHANE	20		DINOSEB	3	
1,2,4-TRICHLOROBENZENE	20		DIQUAT DIBROMIDE	1	
1,2-D + 1,3-D + C-3 COMPOUNDS	20		DIURON	3	
1,2-DICHLOROPROPANE	20		ENDOTHALL	1	
2,3,7,8-TCDD (DIOXIN)	3		ENDRIN	4	
2,4,5-T	1		ETHYLENE DIBROMIDE	3	
2,4,5-TP (SILVEX)	3		GLYPHOSATE, ISOPROPYLAMINE SALT	2	
2,4-D	2		HEPTACHLOR	4	
3-HYDROXYCARBOFURAN	4		HEPTACHLOR EPOXIDE	4	
ALACHLOR	2		HEXACHLOROBENZENE	4	
ALDICARB	4		LINDANE (GAMMA-BHC)	4	
ALDICARB SULFONE	4		MCPA, DIMETHYLAMINE SALT	1	
ALDICARB SULFOXIDE	4		METHIOCARB	1	
ALDRIN	4		METHOMYL	4	
ATRAZINE	4		METHOXYCHLOR	4	
BENTAZON, SODIUM SALT	2		METHYL BROMIDE	20	
BENZENE (BENZOL)	20		METOLACHLOR	4	
BROMACIL	4		METRIBUZIN	4	
BUTACHLOR	4		MOLINATE	3	
CARBARYL	4		NAPHTHALENE	20	
CARBOFURAN	4		ORTHO-DICHLOROBENZENE	20	
CHLORAMBEN	1		OXAMYL	4	
CHLORDANE	4		PICLORAM	3	
CHLOROMETHANE	20	1	PROMETON	1	
CHLOROTHALONIL	2		PROMETRYN	3	
DALAPON	2		PROPACHLOR	4	
DBCP	3		PROPOXUR	1	
DIAZINON	4		SIMAZINE	4	
DICAMBA	3		THIOBENCARB	2	
DIELDRIN	4		TOXAPHENE	4	
DIMETHOATE	3		TRICHLOROBENZENES	20	
			XYLENE	20	

SAN JOAQUIN

<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>
1,1,2,2-TETRACHLOROETHANE	49		ALACHLOR	49	
1,2,4-TRICHLOROBENZENE	49		ALDICARB	1	
1,2-D + 1,3-D + C-3 COMPOUNDS	48		ALDICARB SULFONE	1	
1,2-DICHLOROPROPANE	49	1	ALDICARB SULFOXIDE	1	
2,3,7,8-TCDD (DIOXIN)	1		ALDRIN	1	
2,4,5-TP (SILVEX)	4		ATRAZINE	66	
2,4-D	4		BENTAZON, SODIUM SALT	1	
3-HYDROXYCARBOFURAN	1		BENZENE (BENZOL)	49	
ACET	16	4	BROMACIL	68	

SAN JOAQUIN (cont.)

<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>
BUTACHLOR	49		HEXACHLOROBENZENE	1	
CARBARYL	1		HEXAZINONE	16	
CARBOFURAN	1		LINDANE (GAMMA-BHC)	4	
CHLORDANE	1		METHIOCARB	1	
CHLOROMETHANE	49		METHOMYL	1	
CHLOROTHALONIL	1		METHOXYCHLOR	4	
CYANAZINE	16		METHYL BROMIDE	49	
DALAPON	1		METOLACHLOR	49	
DBCP	44	6	METRIBUZIN	64	
DEETHYL-ATRAZINE	16		MOLINATE	49	
DEMETON	17		NAPHTHALENE	49	
DIAZINON	49		NAPROPAMIDE	6	
DICAMBA	1		NORFLURAZON	16	
DIELDRIN	1		ORTHO-DICHLOROBENZENE	49	
DIMETHOATE	49		ORYZALIN	6	
DINOSEB	1		OXAMYL	1	
DIQUAT DIBROMIDE	1		PICLORAM	1	
DISULFOTON	17		PROMETON	16	
DIURON	17	1	PROMETRYN	65	
ENDOTHALL	1		PROPACHLOR	45	
ENDRIN	4		PROPOXUR	1	
ETHYLENE DIBROMIDE	44		SIMAZINE	66	1
GLYPHOSATE, ISOPROPYLAMINE SALT	1		THIOBENCARB	49	
HEPTACHLOR	1		TOXAPHENE	4	
HEPTACHLOR EPOXIDE	1		TRICHLOROBENZENES	49	
			XYLENE	49	

SAN MATEO

<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>
1,1,2,2-TETRACHLOROETHANE	8		DIMETHOATE	8	
1,2,4-TRICHLOROBENZENE	8		DINOSEB	3	
1,2-D + 1,3-D + C-3 COMPOUNDS	8		DIQUAT DIBROMIDE	3	
1,2-DICHLOROPROPANE	8	1	DISULFOTON	3	
2,4,5-T	3		DIURON	5	
2,4,5-TP (SILVEX)	3		ENDRIN	3	
2,4-D	3		HEPTACHLOR	3	
3-HYDROXYCARBOFURAN	3		HEPTACHLOR EPOXIDE	3	
ALACHLOR	3		HEXACHLOROBENZENE	3	
ALDICARB	3		HEXAZINONE	2	
ALDICARB SULFONE	3		LINDANE (GAMMA-BHC)	3	
ALDICARB SULFOXIDE	3		METHOMYL	3	
ALDRIN	3		METHOXYCHLOR	3	
ATRAZINE	10		METHYL BROMIDE	8	
BENTAZON, SODIUM SALT	5		METOLACHLOR	8	
BENZENE (BENZOL)	8		METRIBUZIN	10	
BROMACIL	10		MOLINATE	8	
BUTACHLOR	8		NAPHTHALENE	8	
CARBARYL	3		ORTHO-DICHLOROBENZENE	8	
CARBOFURAN	3		OXAMYL	3	
CHLORDANE	3		PICLORAM	3	
CHLOROMETHANE	8		PROMETON	2	
CHLOROTHALONIL	3		PROMETRYN	10	
CYANAZINE	2		PROPACHLOR	3	
DALAPON	3		SIMAZINE	10	
DEMETON	3		THIOBENCARB	8	
DIAZINON	8		TOXAPHENE	3	
DICAMBA	3		TRICHLOROBENZENES	8	
DIELDRIN	3		XYLENE	8	

SANTA CLARA

<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>
1,1,2,2-TETRACHLOROETHANE	71	1	DINOSEB		15
1,2,4-TRICHLOROBENZENE	71		DIQUAT DIBROMIDE		13
1,2-D + 1,3-D + C-3 COMPOUNDS	71		DISULFOTON		12
1,2-DICHLOROPROPANE	71		DIURON		16
2,3,7,8-TCDD (DIOXIN)	13		ENDOTHALL		13
2,4,5-T	12		ENDRIN		15
2,4,5-TP (SILVEX)	15		ETHYLENE DIBROMIDE		14
2,4-D	15		GLYPHOSATE, ISOPROPYLAMINE SALT		14
3-HYDROXYCARBOFURAN	13		HEPTACHLOR		15
ACET	3		HEPTACHLOR EPOXIDE		15
ALACHLOR	15		HEXACHLOROBENZENE		14
ALDICARB	13		HEXAZINONE		3
ALDICARB SULFONE	13		LINDANE (GAMMA-BHC)		15
ALDICARB SULFOXIDE	13		METHOMYL		13
ALDRIN	15		METHOXYCHLOR		15
ATRAZINE	17		METHYL BROMIDE		71
BENTAZON, SODIUM SALT	15		METOLACHLOR		14
BENZENE (BENZOL)	71		METRIBUZIN		17
BROMACIL	17		MOLINATE		14
BUTACHLOR	14		NAPHTHALENE		72
CARBARYL	13		NAPROPAMIDE		3
CARBOFURAN	13		NORFLURAZON		3
CHLORDANE	15		ORTHO-DICHLOROBENZENE		71
CHLOROMETHANE	71		ORYZALIN		3
CHLOROTHALONIL	15		OXAMYL		13
CYANAZINE	3		PICLORAM		15
DALAPON	15		PROMETON		3
DBCP	14		PROMETRYN		17
DEETHYL-ATRAZINE	3		PROPACHLOR		14
DEMETON	12		SIMAZINE		17
DIAZINON	14		THIOBENCARB		14
DICAMBA	15		TOXAPHENE		15
DIELDRIN	15		TRICHLOROBENZENES		71
DIMETHOATE	14		XYLENE		71

SANTA CRUZ

<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>
1,1,2,2-TETRACHLOROETHANE	5		CHLORDANE		19
1,2,4-TRICHLOROBENZENE	5		CHLOROMETHANE		5
1,2-D + 1,3-D + C-3 COMPOUNDS	5		CHLOROTHALONIL		19
1,2-DICHLOROPROPANE	5		CHLORPROPHAM		4
2,4,5-T	13		DALAPON		20
2,4,5-TP (SILVEX)	20		DBCP		20
2,4-D	20		DEMETON		13
3-HYDROXYCARBOFURAN	11		DIAZINON		19
ALACHLOR	19		DICAMBA		20
ALDICARB	11		DIELDRIN		19
ALDICARB SULFONE	11		DIMETHOATE		19
ALDICARB SULFOXIDE	11		DINOSEB		20
ALDRIN	19		DIQUAT DIBROMIDE		11
ATRAZINE	19		DISULFOTON		13
BARBAN	4		DIURON		4
BENTAZON, SODIUM SALT	20		ENDOTHALL		19
BENZENE (BENZOL)	6	2	ENDRIN		19
BROMACIL	19		ETHYLENE DIBROMIDE		20
BUTACHLOR	19		FENURON		4
CARBARYL	11		FLUOMETURON		4
CARBOFURAN	11		GLYPHOSATE, ISOPROPYLAMINE SALT		11

SANTA CRUZ (cont.)

<u>CHEMICAL</u>	<u>SAMPLED POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED POS.</u>
HEPTACHLOR	19	ORTHO-DICHLOROBENZENE	5
HEPTACHLOR EPOXIDE	19	OXAMYL	11
HEXACHLOROBENZENE	19	PARAQUAT DICHLORIDE	4
LINDANE (GAMMA-BHC)	19	PICLORAM	20
LINURON	4	PROMETRYN	19
METHIOCARB	4	PROPACHLOR	19
METHOMYL	11	PROPHAM	4
METHOXYCHLOR	19	PROPOXUR	4
METHYL BROMIDE	5	SIDURON	4
METOLACHLOR	19	SIMAZINE	19
METRIBUZIN	19	SWEP (3,4-DICHLOROCARBANILATE)	4
MOLINATE	19	THIOBENCARB	19
MONURON	4	TOXAPHENE	19
NAPHTHALENE	13	TRICHLOROBENZENES	5
NEBURON	4	XYLENE	5

SOLANO

<u>CHEMICAL</u>	<u>SAMPLED POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED POS.</u>
1,1,2,2-TETRACHLOROETHANE	6	DIURON	4
1,2,4-TRICHLOROBENZENE	6	HEXAZINONE	4
1,2-D + 1,3-D + C-3 COMPOUNDS	6	METHYL BROMIDE	6
1,2-DICHLOROPROPANE	6	METRIBUZIN	4
ACET	4	NAPHTHALENE	6
ATRAZINE	4	NORFLURAZON	4
BENZENE (BENZOL)	6	ORTHO-DICHLOROBENZENE	6
BROMACIL	4	PROMETON	4
CHLOROMETHANE	6	PROMETRYN	4
CYANAZINE	4	SIMAZINE	4
DEETHYL-ATRAZINE	4 1	TRICHLOROBENZENES	6
		XYLENE	6

SONOMA

<u>CHEMICAL</u>	<u>SAMPLED POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED POS.</u>
1,1,2,2-TETRACHLOROETHANE	21	DIAZINON	11
1,2,4-TRICHLOROBENZENE	21	DICAMBA	43
1,2-D + 1,3-D + C-3 COMPOUNDS	21	DIELDRIN	27
1,2-DICHLOROPROPANE	21	DIMETHOATE	10
2,4,5-TP (SILVEX)	43	DINOSEB	43
2,4-D	46 1	DIQUAT DIBROMIDE	42
3-HYDROXYCARBOFURAN	15	DIURON	13
ALACHLOR	27	ENDOTHALL	43
ALDICARB	15	ENDRIN	30
ALDICARB SULFONE	15	ETHYLENE DIBROMIDE	30
ALDICARB SULFOXIDE	15	HEPTACHLOR	28
ALDRIN	27	HEPTACHLOR EPOXIDE	30
ATRAZINE	63	HEXACHLOROBENZENE	30
BENTAZON, SODIUM SALT	43	HEXAZINONE	6
BENZENE (BENZOL)	21	LINDANE (GAMMA-BHC)	30
BROMACIL	17	METHOMYL	12
BUTACHLOR	10	METHOXYCHLOR	30
CARBARYL	13	METHYL BROMIDE	21
CARBOFURAN	21	METOLACHLOR	11
CHLORDANE	29	METRIBUZIN	17
CHLOROMETHANE	21	MOLINATE	11
CHLOROTHALONIL	9	NAPHTHALENE	21
CYANAZINE	6	ORTHO-DICHLOROBENZENE	21
DALAPON	55	OXAMYL	43
DBCP	9	PICLORAM	55

SONOMA (cont.)

<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>
PROMETON	6		THIOBENCARB	10	
PROMETRYN	17		TOXAPHENE	27	
PROPACHLOR	11		TRICHLOROBENZENES	21	
SIMAZINE	59		XYLENE	21	

STANISLAUS

<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>
1,1,2,2-TETRACHLOROETHANE	58		DIQUAT DIBROMIDE	1	
1,2,4-TRICHLOROBENZENE	57		DIURON	7	
1,2-D + 1,3-D + C-3 COMPOUNDS	57		ENDOTHALL	1	
1,2-DICHLOROPROPANE	58		ENDRIN	5	
2,4,5-T	3		ETHYLENE DIBROMIDE	59	1
2,4,5-TP (SILVEX)	3		GLYPHOSATE, ISOPROPYLAMINE SALT	1	
2,4-D	3		HEPTACHLOR	5	
3-HYDROXYCARBOFURAN	2		HEPTACHLOR EPOXIDE	5	
4(2,4-DB), DIMETHYLAMINE SALT	3		HEXACHLOROBENZENE	5	
ACET	6	2	HEXAZINONE	6	
ALACHLOR	30		LINDANE (GAMMA-BHC)	5	
ALDICARB	2		METHIOCARB	2	
ALDICARB SULFONE	2		METHOMYL	2	
ALDICARB SULFOXIDE	2		METHOXYCHLOR	5	
ALDRIN	5		METHYL BROMIDE	58	
ATRAZINE	60		METOLACHLOR	54	
BENTAZON, SODIUM SALT	3		METRIBUZIN	59	
BENZENE (BENZOL)	58		MOLINATE	54	
BROMACIL	60		NAPHTHALENE	57	
BUTACHLOR	54		NAPROPAMIDE	5	
CARBARYL	2		NORFLURAZON	6	
CARBOFURAN	2		ORTHO-DICHLOROBENZENE	58	1
CHLORDANE	5		ORYZALIN	5	
CHLOROMETHANE	58		OXAMYL	1	
CYANAZINE	6		PICLORAM	3	
DALAPON	3		PROMETON	6	
DBCP	61	22	PROMETRYN	60	
DEETHYL-ATRAZINE	6		PROPACHLOR	54	
DIAZINON	54		PROPOXUR	2	
DICAMBA	3		SIMAZINE	60	
DIELDRIN	5		THIOBENCARB	54	
DIMETHOATE	54		TOXAPHENE	5	
DINOSEB	3		TRICHLOROBENZENES	57	
			XYLENE	58	1

TULARE

<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>
1,1,2,2-TETRACHLOROETHANE	42		CHLORDANE	7	
1,2,4-TRICHLOROBENZENE	42		CHLOROMETHANE	42	
1,2-D + 1,3-D + C-3 COMPOUNDS	42		CYANAZINE	18	
1,2-DICHLOROPROPANE	42		DALAPON	9	
2,4,5-TP (SILVEX)	9		DBCP	59	19
2,4-D	9		DEETHYL-ATRAZINE	18	1
ACET	18	11	DIAZINON	39	
ALACHLOR	38		DICAMBA	9	
ALDRIN	7		DIELDRIN	7	
ATRAZINE	57	1	DIMETHOATE	38	
BENTAZON, SODIUM SALT	9		DINOSEB	9	
BENZENE (BENZOL)	42		DIQUAT DIBROMIDE	1	
BROMACIL	57	3	DIURON	32	10
BUTACHLOR	39		ENDOTHALL	1	

TULARE (cont.)

<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>
ENDRIN	7		NAPROPAMIDE	7	
ETHYLENE DIBROMIDE	59	1	NORFLURAZON	18	3
HEPTACHLOR	4		ORTHO-DICHLOROBENZENE	42	
HEPTACHLOR EPOXIDE	7		ORYZALIN	7	
HEXACHLOROBENZENE	7		PARAQUAT DICHLORIDE	1	
HEXAZINONE	18		PICLORAM	9	
LINDANE (GAMMA-BHC)	7		PROMETON	18	
METHOXYCHLOR	7		PROMETRYN	57	
METHYL BROMIDE	42		PROPACHLOR	8	
METOLACHLOR	39		SIMAZINE	57	9
METRIBUZIN	57		THIOBENCARB	39	
MOLINATE	39		TOXAPHENE	7	
NAPHTHALENE	42		TRICHLOROBENZENES	42	
			XYLENE	42	

VENTURA

<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>	<u>CHEMICAL</u>	<u>SAMPLED</u>	<u>POS.</u>
1,1,2,2-TETRACHLOROETHANE	10		DIMETHOATE	12	
1,2,4-TRICHLOROBENZENE	10		DINOSEB	13	
1,2-D + 1,3-D + C-3 COMPOUNDS	10		DIQUAT DIBROMIDE	12	
1,2-DICHLOROPROPANE	10		ENDOTHALL	3	
2,3,7,8-TCDD (DIOXIN)	1		ENDRIN	13	
2,4,5-TP (SILVEX)	13		ETHYLENE DIBROMIDE	12	
2,4-D	13		GLYPHOSATE, ISOPROPYLAMINE SALT	6	
3-HYDROXYCARBOFURAN	11		HEPTACHLOR	13	
ALACHLOR	13		HEPTACHLOR EPOXIDE	13	
ALDICARB	11		HEXACHLOROBENZENE	13	
ALDICARB SULFONE	11		LINDANE (GAMMA-BHC)	13	
ALDICARB SULFOXIDE	10		METHOMYL	11	
ALDRIN	13		METHOXYCHLOR	13	
ATRAZINE	12		METHYL BROMIDE	10	
BENTAZON, SODIUM SALT	13		METOLACHLOR	12	
BENZENE (BENZOL)	11		METRIBUZIN	12	
BROMACIL	12		MOLINATE	12	
BUTACHLOR	12		NAPHTHALENE	10	
CARBARYL	12		ORTHO-DICHLOROBENZENE	10	
CARBOFURAN	11		OXAMYL	11	
CHLORDANE	13		PARAQUAT DICHLORIDE	7	
CHLOROMETHANE	10		PICLORAM	13	
CHLOROTHALONIL	6		PROMETRYN	12	
DALAPON	13		PROPACHLOR	12	
DBCP	12	1	SIMAZINE	12	
DIAZINON	12		THIOBENCARB	12	
DICAMBA	13		TOXAPHENE	13	
DIELDRIN	14		TRICHLOROBENZENES	10	
			XYLENE	11	

Appendix B

Studies Included in the 1999 Update Report

The well sampling surveys that were added to the well inventory database during the period July 1, 1998 through June 30, 1999 are summarized. The study number assigned by DPR is shown to the left.

CALIFORNIA DEPARTMENT OF HEALTH SERVICES (Sanitary Engineering Branch)
 0023 Sampled a total of 106 chemicals in 32 counties; January 1998 through December 1998; 2,271 wells sampled.

DEPARTMENT OF PESTICIDE REGULATION (Environmental Hazards Assessment Program)

STUDY	INITIATED FOR CHEMICAL COUNTY SECTION	WELLS SAMPLED	SAMPLING DATES	CHEMICALS SAMPLED (UNDERLINE INDICATES A VERIFIED DETECTION)
420	DIPA San Joaquin 03S/07E-07	4	10-Jun-98	atrazine, bromacil, simazine, diuron, prometon, prometryn, hexazinone, cyanazine, metribuzin, norflurazon, DEA, ACET
421	DEA San Joaquin 03N/06E-18	4	09-Jun-98	atrazine, bromacil, simazine, diuron, prometon, prometryn, hexazinone, cyanazine, metribuzin, norflurazon, DEA, ACET;
422	diuron, hexazinone Merced 09S/14E-23	5	02/03-Jun-98	atrazine, <u>bromacil</u> , <u>simazine</u> , <u>diuron</u> , prometon, prometryn, <u>hexazinone</u> , cyanazine, metribuzin, norflurazon, DEA, <u>ACET</u>
423	atrazine, DEA, ACET Solano 06N/01E-19	4	17-Jun-98	atrazine, bromacil, simazine, diuron, prometon, prometryn, hexazinone, cyanazine, metribuzin, norflurazon, <u>DEA</u> , ACET
424	DIPA Fresno 13S/22E-04	4	14/15-Jun-98	atrazine, <u>bromacil</u> , <u>simazine</u> , diuron, prometon, prometryn, hexazinone, cyanazine, metribuzin, norflurazon, DEA, ACET
425	atrazine Fresno 13S/21E-16	5	14-Jul-98	<u>atrazine</u> , bromacil, simazine, <u>diuron</u> , prometon, prometryn, hexazinone, cyanazine, metribuzin, norflurazon, <u>DEA</u> , ACET
426	bentazon survey Monterey, San Mateo, Santa Barbara	8	Aug 98	atrazine, bromacil, simazine, diuron, prometon, prometryn, hexazinone, cyanazine, metribuzin, bentazon

DEPARTMENT OF PESTICIDE REGULATION (Environmental Hazards Assessment Program)
continued.

STUDY	INITIATED FOR CHEMICAL COUNTY SECTION	WELLS SAMPLED	SAMPLING DATES	CHEMICALS SAMPLED (UNDERLINE INDICATES A VERIFIED DETECTION)
427	bromacil, diuron, DIPA Fresno 12S/20E-24	4	July 98	atrazine, <u>bromacil</u> , simazine, diuron, prometon, prometryn, hexazinone, cyanazine, metribuzin, norflurazon, DEA, ACET
428	diuron, simazine, DIPA Fresno 12S/21E-25	3	July 98	atrazine, bromacil, simazine, diuron, prometon, prometryn, hexazinone, cyanazine, metribuzin, norflurazon, DEA, <u>ACET</u>
429	norflurazon, bromacil, diuron, simazine, ACET Tulare 16S/24E-14	5	Aug 98	atrazine, <u>bromacil</u> , <u>simazine</u> , <u>diuron</u> , prometon, prometryn, hexazinone, cyanazine, metribuzin, <u>norflurazon</u> , <u>DEA</u> , <u>ACET</u>
430	norflurazon, simazine, ACET Tulare 19S/26E-16	5	Aug 98	atrazine, bromacil, <u>simazine</u> , <u>diuron</u> , prometon, prometryn, hexazinone, cyanazine, metribuzin, norflurazon, <u>DEA</u> , <u>ACET</u>
431	oryzalin, napropamide 03S/08E-09			atrazine, bromacil, simazine, diuron, prometon, prometryn, hexazinone, cyanazine, metribuzin, norflurazon, DEA, ACET, oryzalin, napropamide
432	hexazinone Colusa 15S/03W-36	4	Nov 98	atrazine, bromacil, simazine, diuron, prometon, prometryn, hexazinone, cyanazine, metribuzin
433	2,4-D 16S/24E-14 Sonoma	6	May 1999	atrazine, bromacil, simazine, diuron, prometon, prometryn, hexazinone, cyanazine, metribuzin, 2,4-D

Appendix C

Methods Used for Data Collection

Data Collection

Section 13152, subdivision (c) of the PCPA requires all government agencies that sample wells for pesticides to submit their sampling data to DPR for inclusion in the well inventory database. DPR has notified agencies of this law and requested them to submit required information. DPR has also contacted private companies that conduct well sampling for pesticides to request sampling results.

Data were reviewed to determine if they met the criteria for inclusion in the database:

- Results were for the analyses of pesticides or pesticide breakdown products;
- Samples were taken from a well;
- Samples were obtained from an untreated and unfiltered system;
- Location of each well was identified by at least township/range/section according to the U.S. Geological Survey's Public Lands Survey Coordinate system;
- Data had not previously been entered into the database.

The PCPA also requires DPR, the SWRCB, and CDHS to jointly establish minimum requirements for well sampling that will help insure data integrity. The agencies agreed upon the following minimum reporting requirements, effective December 1, 1986: State well number, county, date of sample, chemical analyzed for, chemical concentration, minimum detectable limit, sampling agency, analyzing laboratory, street address of well location, well type, sample type (initial or confirmation).

Information included in the data base when it is available includes: method of analysis and analysis date, well depth and depths of top and bottom perforations of the well casing, depth of standing water in the well at time of sampling, and year the well was drilled.

Data Verification

Each laboratory analysis of a well water sample for the presence of a pesticide active ingredient or breakdown product comprises one record in the database. This record of sampling information can be supplemented with any available well location and construction information. Before being added to the permanent well inventory database, each record undergoes verification by programs developed by DPR staff.

Appendix D

Glossary of Terms

AB 1803 – (1983) A law that required the California Department of Health Services (DHS) to evaluate each public water system to determine its potential for contamination. The systems were required to conduct specified water analyses and to report those results to the DHS. Monitoring required by AB 1803 was completed in June 1989. Based on sampling results, the DHS may require a system to conduct periodic water analyses and to report to the DHS the results of the analyses.

AB 2021 – See Pesticide Contamination Prevention Act.

active ingredient – The chemical or chemicals in a pesticide formulation that are in themselves, or are transformed to chemicals that are capable of preventing, destroying, repelling or mitigating pests.

Agricultural commissioner – For each county in California, the person in charge of the County Department of Agriculture. Under the supervision of DPR, the commissioner enforces the laws and regulations pertaining to agricultural and structural pest control and all other pesticide uses.

agricultural use – (See also legal agricultural use and legal agricultural use determination.) The use of any pesticide or method or device for the control of any pests, or the use of any pesticide for the regulation of plant growth or defoliation of plants. It excludes the sale or use of pesticides in properly labeled packages or containers which are intended only for any of the following: home use, use in structural pest control, industrial or institutional use, the control of an animal pest under the written prescription of a veterinarian, local districts, or other public agencies which have entered into and operate under a cooperative agreement with the Department of Health Services pursuant to section 2426 of the Health and Safety Code. (Food and Agricultural Code, section 11408.)

analysis – The determination of the composition of a substance by analytical methods. For example, the separation and measurement of a pesticide or its degradation product from the sample matrix.

aquifer – A geologic formation that is water bearing and which transmits water in sufficient quantity to supply springs and pumping wells.

Birth Defect Prevention Act (BDPA) – (SB 950, 1984) A law requiring DPR to acquire certain toxicological data for registered pesticides in order to make a scientific determination that their uses will not cause significant adverse health effects. The BDPA prohibits the registration of any new pesticide active ingredient if required mandatory health effects studies are missing, incomplete, or invalid. Pesticide active ingredients already registered that are identified as having the potential to cause significant adverse health effects following a thorough review by DPR scientific staff will be canceled.

breakdown product – See degradation product.

Cal/EPA - California Environmental Protection Agency. Comprised of the Department of Pesticide Regulation, the Department of Toxic Substances Control, the Integrated Waste Management Board,

the Water Resources Control Board, the Air Resources Board, and the Office of Environmental Health Hazard Assessment.

CCR (3CCR) - California Code of Regulations. Title 3, California Code of Regulations (3CCR). California Code of Regulations contains enforceable regulations that provide the specific means for implementation of laws. Title 3 CCR contains regulations pertaining to food and agriculture, including sale and use of pesticides.

chemigation – The application of pesticides through irrigation water, using irrigation equipment.

confirmed detection – For purposes of the well inventory database, the detection of a compound in two discrete samples taken from the same well during the time period of a single monitoring survey.

database record – The results of each chemical analysis of a well water sample for a pesticide residue and other corresponding sampling information constitutes one record in the database.

degradation product – A substance resulting from the transformation of a pesticide active ingredient by physical or chemical processes (e.g., oxidation, reduction, hydrolysis, photolysis).

direct streaming – A pathway by which agricultural chemicals may reach ground water; the movement of pesticide residue in runoff surface water to subsurface soil and, ultimately, ground water, through dry wells, soil cracks, or other direct pathways.

discrete sample – Samples taken separately from a well; not one sample split into smaller samples.

dry well – A small-diameter hole or pit dug into the ground and filled with gravel or other material for the disposal of surface water by infiltration into soil.

economic poison – see pesticide.

established PMZ – A Pesticide Management Zone (PMZ) listed in section 6802, Title 3 of the California Code of Regulations (3CCR).

FAC - Food and Agricultural Code. The laws pertaining to food and agriculture, including the registration, sale, and use of pesticides. Specific regulations for implementation of law are in the California Code of Regulations.

formulation – The way in which a pesticide product, containing the active ingredient, the carrier, and other additives, is prepared for use. Includes wettable powder, emulsifiable concentrate, etc.

fumigant – A chemical used in the form of a volatile liquid or a gas. Its vapors kill insects, nematodes, fungi, bacteria, seeds, roots, or entire plants; usually applied in an enclosure or in the soil.

ground water – Water beneath the surface that can be collected with wells, tunnels, or drainage galleries, or that flows naturally to the earth's surface via seeps or springs.

Ground water protection advisories (GWPA) – Written information given by a licensed pest control adviser, who has successfully completed the Ground Water Protection Training Program given by DPR, that must be submitted by permit applicants before the county agricultural commissioner can

issue a use permit for allowed uses of a regulated pesticide in a Pesticide Management Zone (PMZ). The GWPA contains specific information for applying the regulated pesticide in a sensitive area (PMZ) in order to prevent or minimize the movement of pesticide residues to ground water.

Groundwater Protection List (GWPL) – A list of pesticides having the potential to pollute ground water. It is required by the PCPA and established in section 6800 (3CCR). The GWPL is divided into two sublists. Sublist (a) is comprised of chemicals that have been detected in ground water as a result of legal, agricultural use. Sublist (b) contains pesticide active ingredients whose physico-chemical properties exceed or are less than the specific numerical values and that are labeled for soil application under certain conditions. Chemicals placed on the GWPL are subject to certain restrictions and reporting requirements.

herbicide – A pesticide used to control unwanted vegetation.

historical agricultural use – The documented use of a chemical, no longer registered for such use, that has been applied over time in a specific area for the production of an agricultural commodity.

hydrolysis – The chemical alteration of a pesticide by water.

initial detection sample – For a single study and a particular well, the initial detection sample for a chemical is the positive sample with the earliest sampling date and/or time. Subsequent samples are coded in relation to the initial detection sample.

insecticide – A pesticide used to kill insects.

institutional use – Use within the confines of, or on property necessary for the operation of, buildings such as hospitals, factories, schools, libraries, auditoriums and office complexes.

law – State laws and statutes are the result of action by the California legislature.

leaching – A pathway by which agricultural chemicals may reach ground water; the process by which pesticides carried by water, either in the dissolved or suspended state, through the soil matrix as it recharges a ground water aquifer.

legal agricultural use – The application of a pesticide, according to label directions and in accordance with federal and state laws and regulations, for agricultural use as defined in Food and Agricultural Code, section 11408. (See agricultural use.)

legal agricultural use determination – A determination required by Food and Agricultural Code (FAC) section 13149 and based upon the following criteria: (1) the detection of a pesticide ingredient or its degradation product that has been verified according to DPR criteria; (2) a detection of the same pesticide ingredient or its degradation product in ground water, verified at a second site in either an adjacent section or within one-half mile radius of the original, verified detection; (3) the detected pesticide ingredient must be formulated in a product which has listed on its label one or more agricultural uses; (4) the application of the agricultural use product(s) in the vicinity of the reported detections should either be documented historically, confirmed by local interviews, or presumed by the identification of a target pest or commodity; (5) the Director may consider a preponderance of evidence as meeting these criteria.

maximum contaminant level (MCL) – MCLs are part of the drinking water quality standards adopted by DHS and by U.S. EPA under the Safe Drinking Water Act. MCLs are formally established in regulation and are enforceable by the DHS on water suppliers. Primary MCLs take into consideration both health-based criteria and technologic and economic factors relating to the ability to achieve and monitor these concentrations in drinking water supply systems.

metabolite – In the case of a pesticide, a compound derived from the action upon the pesticide by a living organism (bacteria, plant, insect, higher animal, etc.). The chemical transformation varies (oxidation, reduction, conjugation) and the metabolite may be more toxic or less toxic than the parent compound. The same derivative may, in some cases, develop through exposure of the pesticide in the environment. (See also degradation product.)

minimum detection limit (MDL) – The lowest concentration of analyte that a method of analysis can reliably quantify. The MDL is established in protocol for a study either as a result of a method validation study or by using accepted proven analytical methods (e.g., U.S. EPA methods).

model – Mathematical equations that represent certain processes. These equations can be implemented in a computer program in order to facilitate calculations and test model predictions against measured data.

monitoring study – See survey.

monitoring well – Any artificial excavation by any method for the purpose of monitoring fluctuations in ground water levels, quality of underground waters, or the concentration of contaminants in underground waters.

non-crop areas – These areas include rights-of-way, golf courses, and cemeteries. There may be agricultural use of pesticides in non-crop areas, for example weed control around buildings on any of the areas described above.

non-point source – Contamination which cannot be traced to a small, definable location (compare with point source), e.g., applications of agricultural chemical to crops.

parts per billion (ppb) – A way to express the concentration of a chemical. One microgram of a chemical in one liter of water is equal to one ppb.

permit – Permits are issued by county agricultural commissioners for the use of chemicals that have been designated as restricted pesticides. Restricted pesticides, for various reasons, are potentially more hazardous than other pesticides.

pest – Any of the following that is, or is liable to become, dangerous or detrimental to the agricultural or nonagricultural environment of the State: any insect, predatory animal, rodent, nematode, or weed; any form of terrestrial, aquatic, or aerial plant or animal, virus, fungus, bacteria, or other microorganisms on or in living humans or other living animals; anything that the Director of the California Department of Food and Agriculture or Director of the Department of Pesticide Regulation declares, by regulation, to be a pest.

pest control adviser (PCA) – A person licensed by DPR and registered with the county agricultural commissioner who makes pest control recommendations. All agricultural use recommendations must

be in writing and contain certain information. A PCA must complete continuing education requirements before his/her license may be renewed.

pesticide – In California, any of the following: any spray adjuvant, any substance, or mixture of substances which is intended to be used for defoliating plants, regulating plant growth, or for preventing, destroying, repelling, or mitigating any pest which may infest or be detrimental to vegetation, man, animals, or households, or be present in any agricultural or nonagricultural environment. Includes fungicides, herbicides, insecticides, nematocides, rodenticides, desiccants, defoliant, plant growth regulators.

Pesticide Contamination Prevention Act (PCPA) – (AB 2021) A law, effective January 1, 1986, which added sections 13141 through 13152 to Division 7 of the FAC. The PCPA requires each registrant of an economic poison to submit specified information to the Director of DPR, provides for the establishment of the Groundwater Protection List, requires the Director to perform soil and water monitoring, provides for a specific response to the detection of pesticides in soil and ground water, and requires the Director to maintain a specified well sampling database and to report certain information annually to the Legislature, the DHS, and the State Water Resources Control Board.

Pesticide Detection Response Process (PDRP) – A process, established in sections 13149 through 13151 (FAC) by the PCPA, in which the detection of a pesticide residue in soil (at specific depths) or ground water, is investigated, evaluated, and, when necessary, mitigated. As part of the process, a determination must be made that the detection probably resulted from a legal agricultural use application of the pesticide. As a result of this process, the use of a pesticide in California may be modified or canceled.

Pesticide Management Zone (PMZ) – A geographic surveying unit of approximately one square mile (a section) that is designated in regulation as sensitive to ground water pollution. The use of a pesticide inside its PMZ is subject to certain ground water protection restrictions and requirements.

pesticide residue – The amount of a pesticide active ingredient remaining in a soil or ground water sample at the time of analysis.

physicochemical properties – The types of behavior that a substance exhibits in chemical reactions are called its chemical properties; other characteristics that are typical of a substance are called its physical properties. Taken together, the chemical and physical properties of a substance are called its physicochemical properties.

point source – A source of contamination, such as a spill or at a waste site, that is initially deposited and concentrated in a small, well-defined area. The contamination can be traced to its point of origin by locating a specifically shaped pattern in the ground water called a plume.

positive detection – A well water sample in which the presence of a pesticide chemical is detected at or above the minimum detection limit of the analytical method used for analysis of the compound under investigation. A positive analysis may be designated as confirmed or unconfirmed.

range – A single series or row of townships, each six miles square, extending parallel to, and numbered east and west from, a survey base meridian line. (See well numbering system.)

recommended PMZ – A section of land (one square mile) identified by DPR as sensitive to ground water pollution by specific pesticides, not yet adopted into regulation in section 6802 (3CCR).

registered pesticide – A pesticide product approved by the USEPA and DPR for use in California.

registrant – A person or corporation that has registered an economic poison for use in California and has obtained a certificate of registration from the Department.

regulation – These are adopted by state agencies to implement or clarify statutes enacted by the California Legislature. They can also be adopted in response to federal legislation, court decisions, changing technologies, and concerns for the health and well-being of the residents of California.

related compounds – See degradation product and metabolite.

restricted material – Compounds designated as “restricted materials” in section 6400 (3CCR) that, for various reasons, are potentially more hazardous to people, animals, or the environment than other pesticides. As a result, the use of these materials is regulated more closely and use is permitted only by trained personnel when additional precautionary measures are taken.

right-of-way – The strip of land over which facilities such as highways or railroads are built.

section – A land unit of 640 acres (one square mile) equal to 1/36 of a township. (See well numbering system.)

soil adsorption coefficient (Koc) – A measure of the tendency of compounds such as pesticide active ingredients to adhere to the surfaces of soil particles.

specific numerical values (SNVs) – Certain numeric threshold values set for the following physical and chemical properties of pesticide active ingredients: water solubility, soil adsorption coefficient, hydrolysis, aerobic and anaerobic soil metabolism, and field dissipation. The PCPA associates these properties with the longevity and mobility of a chemical in the soil and requires the establishment of SNVs in regulation as a means of identifying pesticides with the potential to pollute ground water.

State Well Number – See well numbering system.

survey – In the context of this report, well monitoring conducted by an agency or private firm for a specified length of time in a designated area. A survey typically involves well water sampling and chemical analysis.

township – A public land surveying unit which is a square parcel of land, six miles on each side. The location of a township is established as being so many six-mile units east or west of a north-south line running through an initial point (called the “principal meridian”) and so many six-mile units north or south of an east-west line running through another point (called the “baseline”; see also, well numbering system).

triazines – A class of chemical compounds derived from any of three isomeric compounds, each having three carbon and three nitrogen atoms in a six-membered ring. Triazines are strong inhibitors of photosynthesis. Atrazine, prometon, and simazine are triazines.

unconfirmed detection – For a particular well, the detection of a pesticide in a single sample during the time period of an individual monitoring study. Confirmation of the initial detection by a second positive sample was not possible because either (1) only a single sample was taken from the well or (2) analyses of all other samples taken from the well during the study were negative.

U.S. EPA IRIS RfD – An oral reference dose that is an estimate of a daily oral exposure to the human population (including sensitive subgroups) that is believed likely to be without an appreciable risk of certain deleterious effects during a lifetime. Expressed in mg/kg/day.

use requirement – Restrictions established in regulation for the use of certain pesticides. For example, section 6484.1 (3CCR) states that agricultural, outdoor institutional, and outdoor industrial uses of pesticides containing atrazine are prohibited in the Pesticide Management Zones listed in 6802(c) (3CCR).

vapor pressure – A physical property that indicates the rate of evaporation of a compound. The higher the vapor pressure, the more volatile the compound.

verified detection (DPR study) – The unequivocal detection of a pesticide or a pesticide breakdown product, or the detection of a chemical in two discrete samples taken from a single well during a 30-day time period, and analyzed either by the same laboratory using different analytical methods or by two laboratories using the same method. The analytical methods used must be approved by DPR. Verification of the presence of a compound in ground water by this criteria fulfills section 13149(d) (FAC) of the PCPA and may be used for regulatory purposes.

water solubility – The property of a substance to dissolve in water.

water well - any artificial excavation constructed by any method for the purpose of extracting water from, or injecting water into, the underground.

well head – The immediate area surrounding the top of a well.

well numbering system – The California well numbering system is based on a grid system commonly referred to as the Public Lands Survey. Under this system, all tracts of lands are tied to an initial point and identified as being in a township. A township is a square parcel of land six miles on each side. Its location is established as being so many six-mile units east or west of a north-south line running through the initial point (called the “principal meridian”) and so many six-mile units north or south of an east-west line running through the point (called the “baseline”). The meridian lines parallel to, and east or west of, the principal meridian are called range lines. Every township is further divided into 36 parts called sections. A section is a square parcel of land one mile on a side, each containing 640 acres. Each section of land is divided into sixteen 40-acre tracts. Once the township, range, section, and tract are known, each well is assigned a unique sequence number (in chronological order) by Department of Water Resources (DWR) personnel. This number is known as the State well number.

**III. PESTICIDE CONTAMINATION PREVENTION ACT
ANNUAL REPORT TO THE LEGISLATURE
STATE WATER RESOURCES CONTROL BOARD
OCTOBER 1999**

Actions taken by the State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Boards (RWQCBs) to prevent economic poisons from migrating to ground waters of the State are as follows:

A. SWRCB

SWRCB staff participated in the following activities:

- Reviewed DPR's findings on agricultural use determination for norflurazon residues in ground water pursuant to AB 2021 (Pesticide Contamination Prevention Act). Prepared a report (along with AB 2021 Committee members from DPR and OEHHA) on the findings and recommendations for action by DPR Director.
- Involved in ongoing consultations with DPR staff, UC scientists, and pesticide manufacturers to design monitoring studies and BMPs.
- Regularly attended meetings sponsored by the DPR, including the interagency Pesticide Advisory Committee (PAC), Pesticide Registration and Evaluation Committee (PREC), Pest Management Advisory Committee (PMAC), and the Rice Pesticide Workgroup.
- Participated in discussions with U.S. Geological Survey scientists on studies dealing with pesticides and water quality.
- Participated in the California Department of Health Services' Interagency Workgroup to develop Source Water Assessment Program (SWAP) mandated by the 1996 amendments of the Federal Safe Drinking Water Act.
- Participated in outreach with Yolo County growers regarding alternatives to pesticide use through best management practices (BMPs).
- Reviewed, on an ongoing basis, DPR Notices of "Materials Entering Evaluation" and advised DPR on potential water quality impacts of pesticide registration and use decisions.
- Developed a draft policy to implement the California Toxics Rule, which includes pesticide water quality criteria.

- Compiled and released the 1998 California 305(b) report on water quality as mandated by the federal Clean Water Act Section 305(b).
- Reviewed and commented on DPR's proposed studies on pesticide and water quality pursuant to the Management Agency Agreement (MAA) with DPR.
- Developed a Statewide consolidated Toxic Hot Spot Cleanup Plan for the Bay Protection and Toxic Cleanup Program.
- Made several presentations on toxicity testing and its ecological relevance at various professional organizations' annual meetings and conferences.
- Managed contracts with University of California Cooperative Extension to:
 - Develop alternative agricultural and irrigation practices to prevent or reduce off-site movement of pesticides;
 - Educate growers and others regarding the pesticide-caused problems and outreach the alternative practices to the agricultural community; and
 - Design and initiate monitoring projects to assess the success of the alternative practices.
- Managed contract with University of California, Davis' Aquatic Toxicity Laboratory for water quality monitoring (including toxicity testing, toxicity identification evaluations, and chemical analysis) to identify the spatial and temporal extent of the toxicity, as well as the chemical causes and sources of toxicity for the following five projects:
 - Central Valley Codling Moth Pesticide Runoff Project,
 - Sacramento River Watershed Project,
 - Yolo County Resource Conservation District Project,
 - Revlon Slough Project in Ventura County, and
 - Salton Sea Project in Imperial County.
- Contracted with University of California, Santa Cruz, to study toxicity of Salinas River water samples to aquatic organisms.

B. RWQCB

Information on actions to prevent economic poisons from migrating to the ground waters of the State by each of the nine RWQCBs is listed in Tables 1 through 10.

Table III-1. Actions taken by the Regional Water Quality Control Board, North Coast (Region 1), In FY 1998-99.

COUNTY	SITE	PESTICIDE	PREVENTION ACTION
Del Norte	Smith River Plains	Aldicarb, 1,2-D	Ongoing monitoring program.
Humboldt	U.S. Forest Service Nursery McKinleyville	Dithiocarbamate	USFS monitoring with RWQCB support.
	Blue Lake Forest Products	Pentachlorophenol, Tetrachlorophenol, Copper 8-Quinolinolate	State Superfund Site with ongoing assessment.
	Carlotta Lumber Company	Pentachlorophenol, Tetrachlorophenol	Ongoing contamination assessment and cleanup.
	Beaver Lumber Company, Arcata	Pentachlorophenol, Tetrachlorophenol	Contamination cleanup.
	Sun Valley Bulb Farms	Chlorothalonil, Dithiocarbamate, Oxamyl	Ongoing monitoring and assessment to prevent discharges to surface water and ground water under RWQCB direction.
	Pacific Lumber Co. Carlotta	Pentachlorophenol Tetrachlorophenol	Ongoing contamination assessment
Mendocino	Marcel Peterson	Chlordane	Remediation underway; new well.
Siskiyou	Mount Heron	Strychnine	Source removal.
	Hi-Ridge Lumber Company	Pentachlorophenol, Tetrachlorophenol	Ongoing contamination assessment and cleanup.
	Pine Mountain Lumber Company	Pentachlorophenol, Tetrachlorophenol	Ongoing contamination assessment and cleanup.
Trinity	Stone Forest Industries, Burnt Ranch	Pentachlorophenol, Tetrachlorophenol	Ongoing contamination assessment.

Table III-2. Actions Taken by the Regional Water Quality Control Board, San Francisco Bay (Region 2),
In FY 1996-97.

COUNTY	SITE	PESTICIDE	PREVENTION ACTION
Alameda	Parker & Amchem	2,4-D	No monitoring for 2,4-D is required after many years of non-detect levels of 2,4-D.
	Jones-Hamilton	Pentachlorophenol	RWQCB Order No. 89-110 specified time schedule for investigation/cleanup. Ground water cleanup underway. No sampling of ground water for pesticides.
	Port of Oakland (Embarcadero Cove)	Chlordane, Pentachlorophenol, DDT, Endosulfan, 2,3,7,8-TCDD, DDD	Department of Toxic Substances Control (DTSC) has lead and has approved a Remedial Action Plan including continuous ground water monitoring.
	Lincoln Properties (Orsetti Site)	DDE, 2,4-D	DDE and 2,4-D were non-detect in monitoring wells and are no longer monitored.
	Peerless Southern Pacific Railroad	Pentachlorophenol	City of Berkeley Health Department has lead. Additional soil and ground water investigations required.
	FMC, Newark	EDB	RWQCB Order No. 89-055 specified time schedule for investigation and cleanup. Ground water cleanup underway.
	3830 Old Santa Rita Road, Pleasanton	Dicamba, Dichloroprop, 2,4-D, 2,4,5-T	Pesticide found in grab water samples. One monitoring well installed on-site. Alameda County Department of Environmental Health lead on this site. Site closed October 1990.
Contra Costa	Chevron	Endrin, Lindane, Dieldrin, DDT, Arsenic	Submitted closure plan for Class I impoundment. A cut-off wall with a ground water extraction trench around the impoundment has been constructed.
	Levin Metals	Aldrin, 4,4'-DDD, 4,4'-DDE, o,p,-DDT, Dieldrin, BHC	U.S. Environmental Protection Agency (U.S. EPA) lead on-site cleanup. Awaiting report of completion for remedial dredging project.
	FMC, Richmond	DDT, DDD, DDE, Dieldrin, Chlordane, Tedion, Endosulfan, Ethion, Carbophenothion, Heptachlor	California Department of Health Services (DHS) lead on-site cleanup. Cleanup completed. Monitor to assure remaining pollutants do not migrate.
Marin	Former Sonoma Mosquito Abatement District, San Rafael	DDD, DDE, DDT, Dieldrin	DTSC is lead agency. Some soil removal has already taken place (approximately 3000 yd ³ in 1992). Old monitoring wells destroyed. Seven new wells were installed in 1996. DTSC has mailed out draft deed restriction and draft O&M Agreement for site.

Table III-3. Actions Taken By the Regional Water Quality Control Board, Central Coast (Region 3), In FY 1998-99.

COUNTY	SITE	PESTICIDE	PREVENTION ACTION
Monterey	Monterey Soil Service, King City	EDB, 1,2-D, DDT, DBCP, Toxaphene	Site is being actively remediated.
	WFS-Salinas	Dinoseb	Remediation completed.
	Castlerock Estates	Toxaphene, beta-BHC, delta- BHC, 4,4'-DDE, 4,4'-DDT, 4,4-DDE, 4,4-DDT, 4,4-DDD	Site is being actively remediated.
Santa Clara	Castle-Veg-Tech, Morgan Hill	Toxaphene, Endrin, Lindane, Endosulfan	Site is being actively remediated.
Santa Cruz	WFS-Greengro, Watsonville	1,2-DCP, Endosulfan	Site is being actively remediated.
	WFS, Watsonville	DDT, DDD, Toxaphene	Site is being actively remediated.

Table III-4. Actions Taken by the Regional Water Quality Control Board, Los Angeles (Region 4), In FY 1998-99.

COUNTY	SITE	PESTICIDE	PREVENTION ACTION
Los Angeles	Dominquez Park Landfill, Redondo Beach	Bis (2-ethylhexyl) phthalate	Phthalates are thought to be from PVC well casing.
	Bixby Village Sanitary Landfill (City Dump Salvage No. 1), Long Beach	Aldrin, Beta-BHC, Alpha-BHC, Bis (2-ethylhexyl) phthalate, Delta-BHC, 4,4'-DDE, 4,4'-DDT, 1,4-Dichlorobenzene, Dieldrin, 2,4-Dinitrophenol, Endosulfan I, Endrin, Endrin aldehyde, Lindane, Heptachlor	Additional analyses did not detect any pesticides.
	Market Place Sanitary Landfill (City Dump Salvage No. 2), Long Beach	Alpha-BHC, Bis (2-ethylhexyl) phthalate, Delta-BHC, 4,4'-DDE, 4,4'-DDT, Endosulfan I, Lindane, Heptachlor	Additional analyses did not detect any pesticides.
	Studebaker-Loynes Sanitary Landfill (City Dump Salvage No. 3), Long Beach	Alpha-BHC, Bis (2-ethylhexyl) phthalate, 4,4'-DDD, 4,4'-DDE, Di-n-octyl-phthalate, Endosulfan I, Endosulfan II, Endrin, Lindane, Heptachlor	Additional analyses did not detect any pesticides.
	Peter Pitchess Honor Rancho Landfill, Castaic Junction	Bis (2-ethylhexyl) phthalate	Phthalates are thought to be from PVC well casing. Monitoring continues at site.
	Royal Boulevard Land Reclamation Site, Torrance	Lindane, 1,3-Dichloropropene	Site is closed and capped.
	Port Disposal Landfill, Wilmington	Bis (2-ethylhexyl) phthalate, Di-n-Octyl-phthalate	Phthalates are thought to be from PVC well casing.
	Port Disposal Banning Pit and Macco Pit, Wilmington	Bis (2-ethylhexyl) phthalate, Naphthalene, Di-n-Butyl phthalate, 2-Methyl-naphthalene	Phthalates are thought to be from PVC well casing.
	City of Compton Landfill	Di(2-ethylhexyl) phthalate (DEHP), Di-n-Octyl-phthalate	Phthalates are thought to be from PVC well casing. Monitoring continues.

Table III-5. Actions Taken By The Regional Water Quality Control Board, Central Valley (Region 5, Sacramento), In FY 1998-99.

COUNTY	SITE	PESTICIDE	PREVENTION ACTION
Colusa	Moore Aviation	Atrazine, 2,4,5-TP, 2,4-D, 2,4-Dichlorophenol, 4-Nitrophenol	Ground water remediation ongoing. Soils bioremediation complete for most constituents.
Glenn	Barber Cashew Supply Corporation, Willows	Nitrate, ammonia, 1,2-DCE, PCE, TCE, toluene, carbon tetrachloride, chloroform, chlorobenzene	Cleanup and Abatement Order (CAO) issued. Need to define the ground water plume.
Merced	Merced Municipal Airport	1,2 Dichlorobenzene, 1,2 Dichloroethane, 1,2 Dichloroethane (cis), 1,2 Dichloroethane (trans), 1,3 Dichloropropane (cis), Alachlor, Benzene, Captan, Carbophenothion (trithion), Chloroform, DDT (total), Dicofol (Kethane), Dieldrin, Endosulfan I, II, Endosulfan sulfate, Endrin, Endrin aldehyde, Endrin ketone, Ethylbenzene, Heptachlor epoxide, Methoxychlor, Tetrachloroethylene (PCE), Toluene, Toxaphene, TPH-diesel, TPH-gasoline, Trichloroethylene (TCE), Vinyl chloride, Xylenes	Health Assessment completed. Feasibility study submitted.
	J.R. Simplot, Winton	1,2-DCP, Dieldrin, Benefin, 1,2,3-TCP, DBCM, DBCP, Endrin, Alachlor	Soil cleanup underway. Ground water remediation continues.
	BAC, Inc.	Hexavalent Chromium, Arsenic, Copper	RWQCB Lead Agency. Ground water extraction and treatment system in pilot study phase. Plume spreading due to lack of hydraulic containment by system. Implementing well reinjection, infiltration gallery. No discharges re: NPDES permit.
	Western Farm Service, Merced	1,2-DCP, DBCP, dinoseb, dalapon, nitrate, ammonia	Off-site assessment continues.
Sacramento	Sacramento Army Depot	Diazinon, Dursban	Assessment report requested. Federal Superfund work in progress. Cleanup of pesticides completed.
	Natomas Field	Dicofol, DDE, DDT, Endosulfan, Toxaphene, Dieldrin Endrin	Monitoring wells have been installed and sampled.
	Franklin Field Airport	Toxaphene	Requested feasibility study for soil cleanup and additional ground water sampling.
	McClellan Air Force Base	Aldrin, Alpha-BHC, Beta-BHC, Delta-BHC, Gamma-BHC, (Lindane), 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Dieldrin, Alpha Endosulfan, Endosulfan Sulfate, Heptachlor, Heptachlor Epoxide, 2,4-D, 2,4,5-T, 2,4,5-TP	Ground water cleanup underway. For the last 4-5 years, no pesticides found in ground water.
	Bureau of Land Management, Fitzgerald Ranch	Toxaphene	Buried empty pesticide containers found on land purchased by Bureau of Land Management (BLM). Soil containing toxaphene excavated and stockpiled onsite. BLM has proposed a pilot study for bioremediation of the stockpiled soils. No pesticides detected in three monitoring wells.
	Western Farm Service, Walnut Grove	Nitrate, ammonia, aldrin, beta-BHC, gamma-BHC, DDD, DDE, dieldrin, heptachlor epoxide, endosulfan, disultoton, TPH-diesel.	Investigation continuing. Regional Board is lead agency.

Table III-5 (cont.) Central Valley (Region 5, Sacramento)

COUNTY	SITE	PESTICIDE	PREVENTION ACTION
San Joaquin	Occidental Chemical	EDB, DBCP, Sulfolane	Site remediation occurring pursuant to stipulation and judgement approving settlement (1981).
	Defense Depot, Tracy	Dieldrin, Simazine	A Record of Decision (ROD) was finalized in February 1998; it includes soil cleanup levels for simazine and dieldrin, and a ground water cleanup level for dieldrin. Remedial design phase was initiated in July 1998.
	Sharpe Army Depot, Stockton	Bromacil	Assessment ongoing.
	Marley Cooling	Arsenic, Copper, Chromium	Ground water cleanup underway.
	U.S. Navy Computer and telecommunications Station, San Diego Detachment	DDD, DDE	Assessment ongoing. Soil removal actions have occurred and more are planned. Groundwater assessment underway.
	Triple "E" Produce	Chloroform	Triple "E" is not a pesticide site. The chloroform is a by-product of chlorine disinfection.
	Western Farm Service, Stockton (former Pure Gro/Brea)	1,2-DCP, Chloroform, PCE, Bromoform, 1,1-DCA, Dibromochloromethane, bromochloromethane, bromodichloromethane	Soil and ground water investigation ongoing. Off-site plume definition continuing. Two soil areas capped. MRP issued for semi-annual ground water monitoring and long-term cap maintenance.
	Former Oxychem/ Simplot/ PureGro	DBCP, 1,2-DCP, 1,1-DCE, 1,2-DCA, Chlorobenzene, 1,1,2-TCA, Mevinphos, Fensulfothion, Dinoseb, Dicamba, 2,4,5-T, Atrazine, Monuron, Carbaryl, Carbofuran, Protham, Diuron, Propoxur, 1,1,2,2-TCA, atraton, 2,4-DB, bromocil, chloromethane, tebuthiuron, simazine, methiocarb, MCP, fenuron, chloroform, chloroxuron, dichloroprop, EDB, oxamyl	Health risk assessment completed. Target cleanup level calculations underway. Off-site plume definition report submitted.
	Cal Farm Supply	b-BHC, Dieldrin, Prometon, Simazine, Atrazine, 2,4,5-TP, Dinoseb	Soils cleaned up. Ground water investigation continues.
	Western Farm Service, Vernalis	DBCP, EDB, diuron, methiocarb, diazinon, aldrin, nitrate, ammonia, 1,2-DCP	Remedial options for groundwater under consideration. MRP issued for quarterly ground water monitoring.
Solano	Wickes Forest Industries	Chromium (Cr ³⁺ and Cr ⁶⁺), Arsenic, Copper	Ground water cleanup ongoing.
	Rio Vista Army Reserve Center	Chlorodane, 4,4-DDE, 4,4-DDT, dieldrin	Site investigation is underway to determine threat to water quality.
Stanislaus	Chemurgic Agricultural Chemicals	BHC, DDT	1993 CAO rescinded. Waste Discharge Requirements adopted in June 1997 for a ground water extraction and treatment system. Excavation of areas with elevated BHC in soil completed by December 1995. Ground water monitoring ongoing.
	Geer Road Landfill	1,1-DCA, 1,1,1-TCA, TCE, Chloridazon, Freons	Ground water cleanup underway.
	Western Farm Service, Modesto	DBCP, EDB, nitrate, ammonia	Soil and groundwater investigation underway. Issued MRP for quarterly ground water monitoring.
	Rhone-Poulenc (formerly Union Carbide) Test Plots	Aldicarb	Monitoring has ended and wells were abandoned under the oversight of Stanislaus County Department of Environmental Resources. Site was closed in the spring of 1995.
	Shell Agricultural Research Facility	Cyanazine, Atrazine, Chloroform, Planavin, 1,1-DCE, DBCP, Nitrate	Requested feasibility study for groundwater cleanup.
	Valley Wood	Copper, Chromium, Arsenic	Out-of-court settlement. Federal Superfund site. Interim cleanup in progress.

Table III-5 (cont.) Central Valley (Region 5, Sacramento)

COUNTY	SITE	PESTICIDE	PREVENTION ACTION
Sutter	Bowles Flying Service	2,4-D, Thiobencarb, Diuron, Metalaxyl, Molinate, Simazine	Cease and Desist Order issued under the TPCA program. On DTSC's list as needing a Preliminary Endangerment Assessment. Monitoring wells installed.
	PureGro, Robbins	alachlor, aldrin, dicofol, monuron, 1,2-DCA, 1,2-DCP, diphenamid	MRP issued for quarterly ground water monitoring. Additional ground water characterization requested.
	John Taylor Fertilizers, Yuba City	1,2-DCP, 1,2,3-TCP, 1,2-DCB, chlorobenzene, DBCP	Groundwater and soil investigation initiated.
Yolo	Frontier Fertilizer Company, Davis	EDB, DCP, DBCP, Carbon tetrachloride	DTSC installed interim ground water treatment system. U.S. EPA expanded the system and is conducting an investigation to determine extent of plume.
	U.C. Davis	Chlorpyrifos, Dicamba, Atrazine, Aldrin, Simazine, Dieldrin, Endrin, DDT	New CAO and MRP issued.
	J.R. Simplot, Courtland	EDB, 2,4-DB, Dicofol, Dicamba, 2,4,5-TP, Carbophenthion, DDT, Dieldrin, Dinoseb, Picloram	Health risk assessment completed. Soil Remediation Plan submitted.
Yuba	Beale Air Force Base	Lindane	Ground water investigation underway.

Table III-6. Actions Taken By The Regional Water Quality Control Board, Central Valley (Region 5, Fresno), in FY 1998-99.

COUNTY	SITE	PESTICIDE	PREVENTION ACTION
Fresno	Blue Hills Disposal Site County of Fresno	Dicamba, 2,4-D, Silvex	Corrective action underway.
	Thompson Hayward Agriculture & Nutrition	Alpha-BHC, Beta-BHC, Gamma-BHC, Dieldrin, DBCP, Diphenamid, Heptachlor, Heptachlor Epoxide	State Superfund site. Contamination assessment ongoing.
	Occidental Chemical/ J.R. Simplot	Dieldrin	Monitoring of ground water continues.
	FMC Corporation	Aldrin, Dieldrin, DDT, DDD, DDE, Heptachlor, Lindane, Toxaphene, Ethyl Parathion, Malathion, Ethion, Endosulfan, Dimethoate, Furadan, Dinitroresol, Dinoseb (DNBP)	Finished capping of discharge area. Implementing off-site RAP.
	Britz, Inc., Five Points	Toxaphene, DDT, DNBP	State Superfund site. Remedial investigation and health assessment report submitted. Soil and ground water remediation feasibility study also submitted. Additional contamination assessment ongoing.
	Fresno County Wells	DBCP, EDB, 1,2-D	Pesticides detected in 146 wells (AB 1803 sampling). San Joaquin Valley DBCP Advisory Committee is overseeing studies on remedial alternatives for DBCP problems.
	Coalinga Airport	DDT, Chlorpyrifos, DEF, Ethion, Disyston	Contamination assessment needed.
	Union Carbide Test Plot	Aldicarb	Additional contamination assessment needed.
	Spain Air	Ethion, DEF, Parathion, Trithion, Dinoseb, Paraquat, DDE, DDT, Endosulfan II	Assessment needed.
	PureGro, Oxalis	1,2-Dichloropropane, nitrate	Requested off-site plume definition.

Table III-6 (cont.) Central Valley (Region 5, Fresno)

COUNTY	SITE	PESTICIDE	PREVENTION ACTION
Kern	Brown & Bryant, Inc., Arvin	1,2-D, 1,3-D, DBCP, Dinoseb, EDB	Federal Superfund site. U.S. EPA has prepared Remedial Information Feasibility Study Report.
	Puregro Company, Bakersfield	DBCP	State Superfund site. Further assessment conducted. The waste discharge requirements for closure of a former dry well were issued March 1994 and amended March 1996.
	Guimarra Vineyard	DBCP	Contamination assessment and pond closure plan needed.
	Dick Garriott Crop Dusting, Bakersfield	Chlordane, DDE, DDT, PCNB, Endosulfan I & II, Methoxychlor, Carbofuran, Carbaryl, Bufencarb, DEF, Tedion, Diazinon, Chlorpyrifos, Ethyl Parathion, Diuron, Dinoseb, Dicamba	CAO issued in 1993. TPCA site. Hydrogeological Assessment Report completed in 1993. Work in progress to determine extent of ground water degradation. Impoundment is covered.
	USDA, Shafter	Dichlobenil, EPTC, Prometryne, DDT, DDE, DDD, Dieldrin, Toxaphene, Silvex, PCP, Chlorpropham, Ametryn, Atrazine	Developing a closure plan.
	Brown and Bryant, Inc., Shafter	Chlordane, DDD, DDE, DDT, Dieldrin, Endrin, Heptachlor, Toxaphene	State Superfund site. Contamination assessment ongoing.
	Kern County Wells	DBCP, 1,2-D, EDB	Pesticides detected in 57 wells (AB 1803 sampling). No assessment underway.
Madera	Chowchilla Municipal Airport	Dieldrin, Alpha-BHC, Endosulfan, PCNB, DDT, DDE, Lindane	Contamination assessment needed.
	Madera County Wells	DBCP, 1,2-D, EDB	DBCP detected in two wells (AB 1803 sampling). No assessment underway.
	Western Farm Service, Inc.	Dinoseb, DBCP, Dieldrin	Assessment ongoing. Impoundment closed. Impacted soils have been capped.
	Madera Municipal Airport	DDT, DDE, Toxaphene, Dicofol, Endrin	Soil and ground water investigation underway. Impacted soils have been capped.
Kings	Lemoore N.A.S.	Unspecified	Investigation ongoing.
	Blair Field	2,4-D, Dicofol, Diazinon, Propargite	Assessment needed.
	Blair Aviation	Trifluralin, Mevinphos, Phorate	Contamination assessment needed.
	Lakeland Dusters	DDT, Toxaphene	Contaminated soils excavated and stockpiled on site. Remediation underway.
Tulare	Mefford Field, City of Tulare	p,p'-DDT, p,p'-DDE, 2,4,5-TCP, Dicamba, DNBP, Diuron	Contamination assessment and mitigation reports needed.
	Tulare Airport	2,4-D, DNBP	Assessment needed.
	Kaweah Crop Dusters	DDT, 2,4-D, 2,4,5-T, Methoxychlor	DHS Remedial Action Order issued January 1984. Cleanup ongoing.
	Tulare County Wells	1,2-D	Detected in wells through AB 1803 sampling. No assessment underway.
Tuolumne	Tuolumne County Wells	Methylene Chloride	Detected in one well (AB 1803 sampling).

Table III-7. Actions Taken By The Regional Water Quality Control Board, Lahontan (Region 6), In FY 1998-99.

COUNTY	SITE	PESTICIDE	PREVENTION ACTION
El Dorado	Tahoe Paradise Golf Course	PCNB	Last tested on 5/23/97 and was non-detect at a detection limit of 0.02 mcg/l.
	Lake Valley State Recreation Area Golf Course	2,4 D, Dicamba, MCP	All were tested, last on 11/5/97, and all were non-detect at detection limits of 1.6, 0.32, and 150 mcg/l respectively.
Inyo	Haiwee Reservoir	Copper sulfate	In response to fish kills that may be related to the algaecide application, potential for ground and surface water contamination will be evaluated through a chronic toxicity study as required by a Cleanup and Abatement Order. Most recent fish kill occurred in June 1998.
Placer	Resort at Squaw Creek	Triclopyr	Although no herbicide application is currently approved, the Resort is conducting a study to assess the mobility of triclopyr. The study involves soil samples, surface water runoff samples and ground water from shallow monitoring wells. As triclopyr was detected in some soil and runoff samples, future evaluation is needed before application of triclopyr will be allowed at the Resort.
San Bernardino	George Air Force Base	Dieldrin	Of the three wells sampled at the base, two wells tested positive for dieldrin (0.10 mcg/l, 0.62 mcg/l). The Air Force was asked to conduct a PA/SI to include surface soil sampling to evaluate potential sources and reasons for the continued low levels found in the ground water.

Table III-8. Actions Taken By the Regional Water Quality Control Board, Colorado River Basin (Region 7),
In FY 1998-99.

COUNTY	SITE	PESTICIDE	PREVENTION ACTION
Imperial	Central Brave Agricultural Service	4,4'-DDE, Endosulfan	Recalcitrant Discharger. Referred to Attorney General for nonpayment of fees.
	City of Brawley	4,4'-DDE, Dieldrin	Contaminated soil excavated and transported to Class I facility. Site closed.
	Visco Flying Service	4,4'-DDE, 4,4'-DDD, 4,4'-DDT, Endosulfan I & II	Impoundment remediated, capped, and closed in place.
	J.R. Simplot Company, Sandin Siding Facility	Dieldrin, 4,4'-DDT, Endrin	CAO issued. Site in remediation. Risk base corrective action in-progress
	Stoker Company	Endosulfan I & II, Dinoseb, 2,4-DB	Land treatment facility undergoing closure.
	Ross Flying Service	4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Dieldrin	Closure of surface impoundment.
Riverside	West Coast Flying	Endosulfan I & II, Disulfoton	Recalcitrant discharger. Referred to Attorney General for nonpayment of fees.
	Woten Aviation Services	Disyston, DEF, Ethyl Parathion, Methyl Parathion	CAO issued. U.S. EPA has lead in cleanup.
	Foster Gardner, Inc., Coachella Facility	1,2-Dichloroethane, 1,2-D, Ethylene Dibromide	CAO issued October 1991 by RWQCB. Imminent and Substantial Endangerment Order issued by DTSC on August 21, 1992. Cleanup on going.
	Farmers Aerial Service, Inc.	4,4'-DDE, Endosulfan I	Closure of disposal area.
	Coachella Valley Mosquito Abatement District	DDT	Under investigation. Pesticide contamination insignificant, UST Cleanup only.
	Crop Production Services, Blythe (Formerly Pure Gro MW-24)	1,2-Dichloropropane	Undergoing cleanup.

Table III-9. Actions Taken By The Regional Water Quality Control Board, Santa Ana (Region 8), In FY 1997-98.

COUNTY	SITE	PESTICIDE	PREVENTION ACTION
Orange	Great Lakes Chemical Corporation (formerly Great Western Savings), Irvine	1,2-D, EDB, 1,2-DCE	A new NPDES permit was issued July 7, 1995. Ground water extraction and treatment continuing. GLCC was issued a CAO by RWQCB on 4/17/97 for off-site remediation of impacted ground water. Work plan for off-site investigation was submitted on March 11, 1999.
Riverside	Sunnymead Mutual Water Company (North and South Well)	DBCP	Both wells were sold to Eastern Municipal Water District in February 1991. Customers are being served by the new District from other supply sources. North Well has been completely rehabilitated. South Well will be used for emergency purposes only.
Riverside	Arlington Basin	DBCP	Construction of a 7 MGD reverse osmosis plant with partial flow through a GAC unit for treatment of TDS, NO ₃ and DBCP was completed in September 1990. About 1.0 MGD of ground water is treated and 0.5 MGD is bypassed. Treated water is mixed with the bypassed water and discharged to the Arlington Channel for ground water recharge purposes by the Orange County Water District. Salt brine (0.2 MGD) is discharged to the Santa Ana Regional Interceptor which discharges to the ocean via the Orange County Sanitation District. A second parallel transmission line has been completed to bring extracted ground water from three wells to the reverse osmosis unit. Possible sale of this water to Cities of Norco and Jurupa in near future.
Riverside	City of Corona (Well 8, mun.)	Simazine	Well has been completely rehabilitated. Simazine was not detected in the sampling after rehabilitation work. No further action being taken. Trace of TCE has been detected in recent sampling. No further action being taken.
Riverside	Home Gardens County Water District (Wells 2 & 3, mun.)	DBCP, Simazine	Water purveyor has closed these wells and is now purchasing water from the City of Riverside.
Riverside	City of Riverside, Twin Spring, mun.	DBCP	Well is out of service. Mitigation measures are being considered.
San Bernardino	Victoria Farms MWC (Well 01 & 03, mun.)	DBCP	Water purveyor has closed these wells and is now purchasing water from the City of San Bernardino.
Riverside	City of Corona (Well 17, mun.)	Simazine, DBCP	Well is being used. Trace of DBCP was detected in March 1991 sampling. Trace of TCE has been detected in recent sampling.
Riverside	City of Riverside (Russell "B")	Simazine, DBCP	Water is being blended with other supply wells in the area. Mitigation measures are being considered.
Riverside	City of Riverside (1st Street)	DBCP	Well is not being used due to high concentrations of DBCP. No mitigation measures in effect.
Riverside	City of Riverside (Electric Street, mun.)	DBCP	Well water is being blended with water from other supply wells; blended water is sampled on a bi-weekly basis.
Riverside	City of Riverside (Palmyrita, mun.)	DBCP	Well is not being used due to high concentrations of DBCP. Mitigation measures are being considered.
Riverside	City of Riverside (3 wells, mun.)	DBCP	Water from Hunt Wells No. 6, 10, and 11 is being blended with other wells in the area.
Riverside	City of Riverside (3 wells, emergency, Downtown Riverside)	DBCP	No mitigation measures in effect. These three wells are also contaminated with industrial organic solvents.

Table III-9 (cont.) Santa Ana (Region 8).

COUNTY	SITE	PESTICIDE	PREVENTION ACTION
Riverside	Riverside County Hall Record, (pr)	DBCP	No mitigation measures in effect. Volatile organic chemicals such as Trichloroethylene and Perchloroethylene have also been found. Well is used for emergency purposes only.
Riverside	Loma Linda University, Arlington, (Wells 1 & 2, mun.)	DBCP	The University water supply system is tied into the City of Riverside domestic water supply distribution system. These two wells are used for irrigation purposes at the school.
Riverside	City of Riverside (Moor-Griffith, mun.)	DBCP	Well is out of service. Mitigation measures are being considered.
Riverside	Lake Hemet MWD (Wells A and B, mun.)	DBCP	Well A is being used for irrigation purposes by the District. Well B is being used by a local farmer for irrigation purposes.
Riverside	Buschlen, Dwight (mun.)	DBCP	Well was abandoned about ten years ago. A second well on the property with traces of DBCP is being used for irrigation only.
San Bernardino	Gage System Wells (12 wells, mun.)	DBCP	The City of Riverside and the Gage Canal Company operate the Gage System which consists of 15 wells located along the Santa Ana River. These wells are being blended for domestic use. Trace amounts of radon have been detected in some of these wells. The City installed three deep wells in the area to increase blending capacity. Mitigation measures are being considered.
San Bernardino	Bunker Hill Basin: Crafton/Redlands area (36 wells)	DBCP	The City of Redlands started construction of a 6,000 gpm granular activated carbon (GAC) treatment system in September 1991. This GAC system treats ground water from two wells. Treated water is being put into the local water supply distribution system. Funding for this system is from the SWRCB (\$2.8 million) and bond money through the State Expenditure Plan (\$1.9 million) which is managed by DTSC. The system has been off line since July 1997 due to presence of perchlorate above provisional Action Level in both production wells.
San Bernardino	South San Bernardino Company Water District (4 wells, mun.)	DBCP	All four wells are out of service. The City of San Bernardino Water Department purchased the water district in July 1991. The City now supplies all the customers in the area.
San Bernardino	Cucamonga CWD (4 wells, mun.)	DBCP	Well No. 13 has not been used since 1991. The other three wells are standby wells and are used on a limited basis. Water is being purchased from Metropolitan Water District (MWD).
San Bernardino	Monte Vista CWD (3 wells, mun.)	DBCP	All three wells are on standby status. Water is being purchased from MWD.
San Bernardino	City of Upland (14 wells)	DBCP	Seven wells are out of operation. Three wells are currently on standby. Four wells are being used and are being blended with other supply wells.
San Bernardino	City of Loma Linda (6 wells, mun.)	DBCP	Two wells have been abandoned. One well is out of operation due to high nitrates. The City also purchases treated water from the City of San Bernardino. A new well will be on line next year.

Table III-10. Actions Taken By The Regional Water Quality Control Board, San Diego (Region 9), In FY 1998-99.

COUNTY	SITE	PESTICIDE	PREVENTION ACTION
San Diego	City of Oceanside Water Utility District (Well No. 12-11S/ 4W-18L1 S)	1,2-DCP (1,2-Dicloropropane)	This backup drinking water well is located in the San Luis Rey River Valley. Up to 2.3 ppm has been detected in this well. The City of Oceanside is continuing monitoring of this well and reports to the State's DHS.
	Truly Nolen Exterminating, Inc.	Aldrin, Dieldrin, Chlordane	This is an on-site abandoned well which allegedly received pesticide wastes several years ago. Contaminated soil has been removed. Trace levels still exist in ground water. No further monitoring required. (RWQCB lead)