SAMPLING FOR PESTICIDE RESIDUES IN CALIFORNIA WELL WATER

1988 UPDATE

WELL INVENTORY DATA BASE

THIRD ANNUAL REPORT TO THE LEGISLATURE,
STATE DEPARTMENT OF HEALTH SERVICES, AND
STATE WATER RESOURCES CONTROL BOARD

PURSUANT TO
THE PESTICIDE CONTAMINATION PREVENTION ACT

December 1, 1988

Environmental Hazards Assessment Program

STATE OF CALIFORNIA
Department of Food and Agriculture
Division of Pest Management, Environmental Protection and Worker Safety
Environmental Monitoring and Pest Management Branch
1220 N Street, Sacramento, California 95814

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THE PESTICIDE CONTAMINATION PREVENTION ACT

by

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December 1, 1988

ENVIRONMENTAL HAZARDS ASSESSMENT PROGRAM

EXECUTIVE SUMMARY

The Pesticide Contamination Prevention Act (PCPA), Assembly Bill 2021, became law on January 1, 1986. The PCPA [Food and Agricultural Code, Chapter 2 of Division 7, Article 15, Section 13152 (c)] requires that the California Department of Food and Agriculture (CDFA) maintain a statewide data base of wells sampled for pesticide active ingredients; subsection (e) requires the CDFA, in consultation with the California Department of Health Services (CDHS) and the State Water Resources Control Board (SWRCB), to annually report the information contained in the data base to the Legislature, the CDHS, and the SWRCB. This year's report is the second update to the first (1986) report, summarizing 18 agencies' well sampling results submitted to the CDFA between September 1, 1987 and June 30, 1988, which are now contained in the data base. The majority of results are from sampling conducted in 1986 and 1987; the remainder are from sampling conducted in 1988 or earlier (1979-1985). Reports of agricultural, non-agricultural, point and non-point sources of pesticide active ingredient residues in ground water were included in the data submitted. Those detections that were attributable to point sources have been referred to the SWRCB for further investigation.

Included in the 1988 additions to the data base were the analytical results of 43,056 well water samples taken from 2,977 wells sampled in 41 counties. Pesticide residues were detected in 115 wells in 14 counties. Of those 115 wells, 109, or 95% were positive for pesticides no longer registered for use in California.

Analyses for 179 pesticide active ingredients and related chemicals (breakdown products and isomers) were reported to the CDFA. Residues of ten of these pesticides were detected. Only one of these (simazine) was determined to be present in ground water as a result of legal agricultural use. The CDHS does not consider the low levels of simazine residues detected as cause for any health concerns (Russell _et al_., 1987).

The ten chemicals detected were: 1,2-Dichloropropane (1,2-D), 1,2-Dibromo-3-chloropropane (DBCP), dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyltrichloroethane (DDT), atrazine, bentazon, chlorthal-dimethyl, simazine, trifluralin and xylene. Of these, six were determined to be from point sources and were referred to the SWRCB: 1,2-D, atrazine, bentazon, chlorthal-dimethyl, trifluralin and xylene. Other 1,2-D finds were likely the result of the historical use of 1,2-D, which has not been allowed as a pesticide active ingredient since 1984. Three chemicals (DBCP, DDE and DDT) are no longer registered for agricultural use in California.

DBCP was the pesticide most frequently detected; residues were found in 102 wells, or 89% of all wells with positive samples. Residues of the other nine detected pesticides were each found in four or fewer wells.

The information in this report is presented in three parts; Parts I and II were contributed by the CDFA, Part III by the SWRCB. Included in Part I is a discussion of the number of wells sampled, the number of wells with detectable levels of pesticide residues for each county, and an analysis of the well sampling results to determine the probable source of the residues. Factors that contribute to the leaching of pesticides used in agriculture are also discussed in Part I and include the physical and chemical characteristics of the pesticide active ingredient, volume of use, method of application, irrigation practices, and types of soil and climate in areas where the pesticide active ingredient is applied. The actions the CDFA has taken to prevent pesticides from migrating to ground water are discussed in Part II. The CDFA's actions this year were the following: (1) proposing regulations to implement the PCPA; (2) issuing the Director's decision regarding prometon after a hearing and review by the Pesticide Registration and Evaluation Committee (PREC) subcommittee; (3) conducting an investigation for one new chemical, xylene, which was determined to be in ground water as a result of something other than legal agricultural use; (4) investigating two new detections of chemicals previously reviewed under the PCPA and recommending one additional Pesticide Management Zone (a geographical area of approximately one square mile which is sensitive to ground water contamination by pesticide leaching); and (5) continuing activities of the Environmental Hazards Assessment Program (EHAP).

Actions taken by the SWRCB to prevent pesticides from migrating to ground water are presented in Part III. The SWRCB has implemented or participates in several programs to identify, mitigate or prevent pesticide contamination of California ground water. These include the Pesticide Evaluation Program, Assembly Bill 2021-related activities, and special studies. Regional Water Quality Control Boards have investigated and mitigated a number of ground water contamination incidents originating from point sources, and are involved in the Assembly Bill 1803 Follow-Up Program. In addition, the State and Regional Boards work with the CDFA and County Agricultural Commissioners to mitigate problems of ground water contamination with pesticides resulting from non-point source agricultural use.

Numerical highlights from the last two well inventory reports (Brown, et al., 1986, and Ames, et al., 1987) and this 1988 report are presented in Table 1.

Data Limitations:

1. The data included in this report are not the results of a single study; rather, they are results of 30 different studies, designed and conducted by 18 different agencies. The results are from sampling that occurred during the past nine years (1979-1988), although the majority of results are from sampling conducted in 1986 and 1987.
2. Data in the well inventory data base do not represent a statistically valid sample of the state's population of wells because well sampling for pesticides has not occurred uniformly throughout the state. Also, not all pesticides used in any one county are sampled for, nor are all pesticides sampled for in every county where they are used. Therefore, the data only indicate which pesticides have been detected in California wells among those pesticides analyzed for, but not among all pesticides used statewide.
3. Sampling by agencies other than the CDFA is not necessarily related to suspected agricultural non-point sources of contamination. Therefore, it should not be assumed that all submitted results reflect the leaching potential of pesticides used in agriculture.
4. Because the amount of sampling varies widely between counties, it is not appropriate to conclude that certain areas are more sensitive to pesticide contamination than others based solely on information currently in the data base.

Table 1. Numerical highlights contained in the well inventory data base, by year of report.

Numerical Highlights	Report Year 1986[a]	1987[b]	1988[b]	Cumulative Total
Total samples	71,963	4,193	43,056	119,212
Positive samples	5,104	1,055	336	6,495
Wells sampled	8,376	530	2,977	10,929 [c]
Wells with positive samples	2,303	190	115	2,345 [c]
Counties sampled	53	19	41	55 [c]
Counties with positive samples	23	14	14	26 [c]
Pesticides and related compounds sampled	164	82	179	230 [c]
Pesticides and related compounds detected	16	16	10	29 [c]
Pesticide residues resulting from non-point source agricultural use	9	8	1	9 [c]

a The 1986 report was comprehensive, i.e., included all sampling data in the well inventory data base at that time (sampling from 1975 to August 31, 1986); the values in this column include both confirmed and non-confirmed detections.

b Numbers included are either confirmed positives (i.e., two or more positive samples per chemical and well) or negatives. Non-confirmed positives (i.e., single detections not confirmed by subsequent analyses) are not included in this column.

c In these cases, the cumulative total is not the sum of results recorded in the 1986 data base plus the results recorded in the 1987 and 1988 updates. For example, wells with results in the 1986 data base may have been resampled in 1987 and the results included in the 1988 update, but these wells are not counted twice in the cumulative total.

PREFACE

This report fulfills the requirements contained in Section 13152 (e) of the Food and Agricultural Code, which requires the preparation of a report to the Legislature, the California Department of Health Services (CDHS), and the State Water Resources Control Board (SWRCB), on sampling for pesticide residues in California ground water, due annually by December 1.

This report is the second update of the first annual report (Brown, et al., 1986), which summarized results of well water sampling for agricultural pesticide residues from 1975 to 1986. The first update (Ames et al., 1987), included data submitted between September 1, 1986 and August 31, 1987. This year's report includes well water sampling results submitted to the California Department of Food and Agriculture (CDFA) between September 1, 1987 and June 30, 1988.

The locations of wells sampled are summarized in this report by county. In the data base, results are specified by state well number, if available. The state well number consists of township, range, section, tract and sequence number of the well sampled, locating the well to within a 40 acre tract. However, because of the number of records contained in the data base for this year's report (43,056), a listing of all results for each well sampled is not possible here.

Parts I and II of this report were written by the CDFA staff; the SWRCB contributed Part III.

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Finally, we thank the many individuals who, by contributing their data, time and effort, made this data base and report possible.

DISCLAIMER

The mention of commercial products, their source or their use in connection with material reported herein is not to be construed as either an actual or implied endorsement of such product.

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I.

WELL INVENTORY DATA BASE

A. INTRODUCTION

Article 15, Chapter 2, Division 7 of the Food and Agricultural Code, also known as the Pesticide Contamination Prevention Act (PCPA), requires the California Department of Food and Agriculture (CDFA) to maintain a statewide data base of the results of well sampling for pesticide active ingredients, and all agencies to submit to the CDFA results of all such well sampling. The PCPA also requires that data submitted on the number and locations of wells sampled, and wells with detectable levels of pesticides be reported annually by the CDFA to the Legislature, the State Water Resources Control Board (SWRCB), and the California Department of Health Services (CDHS).

This is the third annual report and second update of the 1986 report entitled Sampling for Pesticide Residues in California Well Water, 1986 Well Inventory Data Base (Brown, et al., 1986). The 1987 report, entitled Sampling for Pesticide Residues in California Well Water: 1987 update - Well Inventory Data Base (Ames, et al., 1987) was the first update of the 1986 report. Results in this 1988 report are presented for the number of wells sampled and the number of wells in which pesticide residues were detected for each county. Although the data in this report were submitted between September 1, 1987 and June 30, 1988, many of the data are the results of sampling studies conducted prior to September 1, 1987.

The CDFA began developing the well inventory data base in late 1983, prior to enactment of the PCPA. The purpose of the data base was to allow the CDFA to: (1) identify reliable information on the occurrence of non-point source contamination of ground water by the agricultural use of pesticides; and (2) computerize the data to facilitate subsequent graphical, numerical, and spatial analysis of the data. The data base at that time included only results of sampling for pesticides in well water suspected of originating from agricultural non-point sources. To meet the requirements of the PCPA, sampling results from both point and non-point sources are now included in the data base.

B. MATERIALS AND METHODS

Data Collection:

Section 13152 (c) of the PCPA requires all agencies that sample wells for pesticides to submit their sampling data and analytical results to the CDFA for inclusion in the well inventory data base. In August, 1986, the CDFA notified federal and state agencies which sample well water for pesticide residues of this new state law, and requested them to submit required data either on a suggested reporting form, on a form of their own, or on magnetic tape.

The PCPA also requires that the CDFA, SWRCB, and CDHS jointly agree on minimum well sampling requirements for all results submitted to the CDFA. The three agencies agreed upon minimum well sampling reporting requirements, in an effort to standardize at least the types of well sampling information reported, instead of setting standard sampling requirements which could possibly limit the amount of data received. The following minimum reporting requirements were effective as of December 1, 1986, and are applicable only to samples taken after that date:

1. state well number (township/range/section/tract/sequence number/base and meridian)
2. county
3. date of sample (month/day/year)
4. chemical analyzed
5. individual sample concentration, in parts per billion
6. minimum detectable limit, in parts per billion
7. sampling agency
8. analyzing laboratory
9. street name and number of well location
10. well type
11. sample type (e.g., initial or confirmation)
12. date of analysis (month/day/year).

Optional information to be included when available:

1. method of analysis
2. well depth (in feet)
3. depths of top and bottom perforations of the well (in feet)
4. depth of standing water in the well at time of sampling (in feet)
5. year the well was drilled
6. whether a driller's log was located
7. known or suspected source of contamination.

These items are explained in Appendix A. Appendix B contains complete lists of the various codes used in the data base (e.g., chemical, sampling agency, laboratory).

Data collection required a significant amount of inter-agency cooperation. Agencies supplied the data as either published reports, raw laboratory results, or retrievals of information from other data bases transferred on magnetic tape. CDFA staff have also traveled to other agency offices to obtain photocopies of data, or to transcribe information directly onto computer coding sheets.

Data Evaluation:

Sample results were first evaluated to determine if they met the following necessary criteria for inclusion in the well inventory data base:

a. Sample results had to be for analyses of pesticides and related compounds ("related compounds" means breakdown products such as endrin aldehyde or isomers of lindane).
b. Samples had to be associated with ground water, i.e., taken from a well.
c. Samples had to be taken as close to the well head as possible.
d. Samples had to be obtained from an untreated and unfiltered system, because filtration or treatment could reduce or eliminate a chemical residue and, therefore, mask the possible presence of the chemical in the supplying aquifer or ground water.

e. Location of each well sampled had to be identified at least by township/range/section according to the U.S. Geological Survey's Public Lands Survey Coordinate system. This requirement was necessary to count the number of individual wells in the data base, as well as to evaluate ground water contamination by pesticides using other spatially-distributed data sets.

f. The data must not have been entered previously.

Published reports were evaluated to determine if the data met these criteria, or, in the case of unpublished laboratory results, verbal confirmation was requested from appropriate agency staff. Data that met the criteria were then coded into the well inventory data base format.

In order to increase the integrity and usefulness of the data, "confirmed" positive samples were distinguished from "unconfirmed" positive samples. The minimum reporting requirement that a sample be identified as either an initial or confirmed sample helped make this distinction possible. The document entitled "Contamination and Analytical Method Verification -- Definitions" (Appendix C), served as the basis for coding a sample as confirmed or not. The coding system that describes as specifically as possible what procedures were used, if any, to confirm a sample is explained in the "Well Inventory Data Base: Format and Codes" (Appendices A and B).

<u>Data Entry</u>:

Once data were coded into the appropriate format, they were keypunched into the PDP 11/23+ minicomputer in Riverside, CA. The data were proofread against the coding sheets, and edited as necessary. Next, the data files were transferred from the PDP to a PRIME computer (9750 model) at the CDFA headquarters in Sacramento. After the new files were checked with computer verification programs, the data were entered into the Scientific Information Retrieval (SIR) Data Base Management System, where the generation of tables was performed.

Computer-driven verification programs have been developed by the CDFA staff that are used to increase the accuracy of the data. Verification is performed on all new data before inclusion into the main file to check for:

(1) Township/range/section (T/R/S) verification:

The townships, ranges, and sections in each county were coded and entered into a computer file. A program was written that compares this file to well sampling records to be included in the data base. Errors, such as an incorrect township for a county, were noted and corrected.

(2) Column verification:

A computer program was written that compares all allowed values for each column to the actual entered values in each column and notes any errors for each line. For example, the column for township can only be "N" or "S"; any other digit would be an error. These errors were inspected and corrected.

The purpose of the original data base was to determine where sampling for pesticides used in agriculture had occurred and where pesticide residues in ground water due to agricultural use were present. The objective was enlarged with the PCPA to also provide an absolute count of the number of contaminated versus non-contaminated wells. This new requirement introduced the need for identifying individual wells from which samples were taken, as opposed to a simple recording of all sampling results. To meet this need, complete state well numbers have since been required. The California Department of Water Resources (DWR) is responsible for assigning these numbers.

Format Of The Data Base:

Each chemical analysis for a pesticide residue or related chemical in a well water sample constitutes one record in the data base. Each record contains 132 columns of data. The data base format is explained in Appendix A.

C. RESULTS AND DISCUSSION

The following agencies submitted well sampling results to the CDFA between September 1,1987 and June 30, 1988:

Federal: U. S. Department of Agriculture - Forest Service;

State: CDFA, CDHS, DWR, and Regional Water Quality Control Boards (RWQCB) - Central Coast (CCRWQCB), Central Valley (CVRWQCB), and San Diego (SDRWQCB);

County: the Environmental Health Departments for the counties of Imperial, Madera, Marin, Riverside, Sacramento, San Diego, Santa Barbara and Yolo;

Others: the City of Oceanside; and two water districts: the Solano Irrigation District and the Stockton East Water District.

The results submitted by the agencies listed above are presented in two sections: (1) confirmed detections and negative results; and (2) unconfirmed detections. Confirmed detections are detections of a particular pesticide residue in two or more discrete samples taken from the same well, during the time period of a single monitoring study; negative results are the analyses of well water samples in which pesticide residues were not detected. Unconfirmed detections include results for which a particular pesticide was detected in only one sample from a particular well, either because no other samples were taken or because no other subsequent samples contained detectable residues. Confirmed detections are distinguished from unconfirmed detections to increase the integrity of the data presented, and to establish consistency between the pesticide detections presented in this report and the pesticide detections that will be subject to regulatory action by the Director to prevent further ground water contamination by those pesticides (Food and Agricultural Code, Section 13149).

The results are summarized in two ways: (1) by pesticide active ingredient, showing which pesticides were tested for and which were detected; and (2) by county, indicating where sampling occurred and where pesticides were detected.

SECTION I. CONFIRMED DETECTIONS AND NEGATIVE RESULTS

Information on 179 pesticide active ingredients and related chemicals analyzed in 43,056 samples taken from 2,977 wells is included in this 1988 update to the 1986 well inventory data base. Ten of these 179 active ingredients were detected in well water. These pesticides, their sources, and their status are summarized in Table 2. Information about each pesticide detected is presented in the Status of Detected Pesticides section (pages 39 to 45).

RESULTS BY PESTICIDE ACTIVE INGREDIENT:

Sampling Distribution

Among the 179 pesticide active ingredients sampled for, there was great variability in the number of counties in which sampling occurred. For example, methyl bromide was sampled for in 32 counties, while captafol was sampled for in only one county. The following matrix is a brief summary of the distribution of pesticide sampling by number of counties.

	Number of Counties Sampled			
	30-33	20-29	10-19	1-9
Number of Analyzed Pesticides	8	6	40	125

As shown in the matrix, the majority of pesticides, 125, or 70%, were tested for in nine or fewer counties. The number of counties with positive results and the total number of counties with wells sampled for each of the 179 pesticides are summarized in Table 3.

Table 2. Status summary of the ten detected pesticides reported by various agencies from 9/87 through 6/88.

Pesticide Detected	Source(s)	Status of This Detection
1,2-D	Historical non-point	No action necessary because not due to current agricultural use.
	Point	Under investigation by various agencies.
DBCP	Not applicable[a]	Exempt from the PCPA because use was suspended in 1979.
DDE	Not applicable[a]	Exempt from the PCPA because the parent compound, DDT, is no longer registered as an active ingredient.
DDT	Not applicable[a]	Exempt from the PCPA because it is no longer registered as an active ingredient.
atrazine	Potential point	Referred to SWRCB because not due to agricultural use.
bentazon	Potential point	Under investigation.
chlorthal-dimethyl	Potential point	Referred to SWRCB because not due to agricultural use.
simazine	Non-point	Location will be declared a PMZ and its use regulated.
trifluralin	Potential point	Referred to SWRCB because not due to agricultural use.
xylene	Potential point	Referred to SWRCB because not due to agricultural use.

[a] "Not applicable" means that a source investigation was not required (and therefore, none was conducted) because of this chemical's exemption from the PCPA.

Table 3. The number of counties with positive results and the number of counties in which samples were taken, for each pesticide and related chemical. Results are from sampling reported between 9/87 and 6/88.

PESTICIDE	NUMBER OF COUNTIES WITH POSITIVE RESULTS	NUMBER OF COUNTIES SAMPLED
1,1,1-trichloroethane	0	4
1,1,2-trichloroethane	0	4
1,2-D	4	32
1,3-D	0	33
2,4,5-T	0	2
2,4,6-trichlorophenol	0	1
2,4-D	0	26
2,4-dinitrophenol	0	2
BHC (all isomers)	0	17
CDEC	0	1
DBCP	8	14
DDD	0	18
DDE	1	18
DDT	1	19
DDVP	0	1
DEF	0	4
DMPA	0	2
DNOC	0	6
EDB	0	7
EPTC	0	6
MCPA (sodium salt)	0	2
MCPA, alkanolamine salt	0	1

Table 3. (continued)

PESTICIDE	NUMBER OF COUNTIES WITH POSITIVE RESULTS	NUMBER OF COUNTIES SAMPLED
MCPA, butoxyethanol ester	0	1
MCPA, dimethylamine salt	0	3
MCPA, isooctyl ester	0	1
MCPP, diethanolamine salt	0	1
MCPP, dimethylamine salt	0	1
MCPP, potassium salt	0	1
PCNB	0	11
PCP	0	14
acenapthene	0	14
acephate	0	9
acifluorfen	0	1
alachlor	0	9
aldicarb	0	9
aldrin	0	17
ametryn	0	3
aminocarb	0	3
arsenic	0	2
atraton	0	3
atrazine	1	17
azinphos-methyl	0	7
barban	0	2
benefin	0	7
benomyl	0	13
bentazon	1	1

Table 3. (continued)

PESTICIDE	NUMBER OF COUNTIES WITH POSITIVE RESULTS	NUMBER OF COUNTIES SAMPLED
bromacil	0	9
bromide	0	2
captafol	0	1
captan	0	17
carbaryl	0	17
carbendazim	0	1
carbofuran	0	15
carbon tetrachloride	0	1
carbophenothion	0	6
chloramben	0	1
chlordane	0	18
chlordimeform	0	3
chloroform	0	1
chloropicrin	0	12
chlorothalonil	0	8
chlorpropham	0	7
chlorpyrifos	0	15
chlorthal-dimethyl	1	9
copper	0	1
coumaphos	0	1
crufomate	0	1
cyanazine	0	9
dalapon	0	1
demeton	0	7

Table 3. (continued)

PESTICIDE	NUMBER OF COUNTIES WITH POSITIVE RESULTS	NUMBER OF COUNTIES SAMPLED
diazinon	0	17
dicamba	0	3
dicofol	0	15
dicrotophos	0	1
dieldrin	0	17
dimethoate	0	14
dinoseb	0	12
dioxathion	0	1
diphenamid	0	7
diquat dibromide	0	2
disulfoton	0	14
diuron	0	14
endosulfan	0	20
endosulfan sulfate	0	18
endothall	0	9
endrin	0	29
endrin aldehyde	0	15
ethion	0	11
ethoprop	0	1
ethylan	0	1
ethylene dichloride	0	2
ethylene thiourea	0	4
fenamiphos	0	10
fenamiphos sulfone	0	3

Table 3. (continued)

PESTICIDE	NUMBER OF COUNTIES WITH POSITIVE RESULTS	NUMBER OF COUNTIES SAMPLED
fenamiphos sulfoxide	0	3
fensulfothion	0	4
fenthion	0	4
fenuron	0	2
fenvalerate	0	1
fluchloralin	0	2
fluometuron	0	4
fonofos	0	2
glyphosate	0	3
heptachlor	0	17
heptachlor epoxide	0	17
hexachlorobenzene	0	14
lindane (gamma-BHC)	0	30
linuron	0	5
malathion	0	11
maneb	0	10
merphos	0	6
methamidophos	0	12
methidathion	0	8
methiocarb	0	6
methomyl	0	14
methoxychlor	0	26
methyl bromide	0	32
methyl parathion	0	8

Table 3. (continued)

PESTICIDE	NUMBER OF COUNTIES WITH POSITIVE RESULTS	NUMBER OF COUNTIES SAMPLED
methyl trithion	0	1
methylene chloride	0	4
metolachlor	0	1
metribuzin	0	3
mevinphos	0	6
mexacarbate	0	4
mirex	0	1
molinate	0	1
monuron	0	5
naled	0	5
naphthalene	0	1
napropamide	0	5
neburon	0	4
nitrofen	0	3
orthodichlorobenzene	0	32
oryzalin	0	8
oxamyl	0	12
parachlorometacresol	0	1
paradichlorobenzene	0	32
paraquat	0	14
parathion	0	17
pendimethalin	0	1
permethrin (cis and trans)	0	3
phorate	0	13

Table 3. (continued)

PESTICIDE	NUMBER OF COUNTIES WITH POSITIVE RESULTS	NUMBER OF COUNTIES SAMPLED
phosalone	0	2
phosmet	0	2
phosphamidon	0	1
prometon	0	8
prometryn	0	12
propachlor	0	3
propanil	0	2
propargite	0	3
propazine	0	5
propham	0	8
propoxur	0	6
propyzamide	0	4
ronnel	0	1
screen (carbamate)	0	1
screen (chlorinated hydrocarbon)	0	1
screen (organophosphate)	0	1
secbumeton	0	3
siduron	0	4
silvex	0	24
simazine	1	20
simetryn	0	3
sulprofos	0	1
swep	0	2
terbuthylazine	0	3

Table 3. (continued)

PESTICIDE	NUMBER OF COUNTIES WITH POSITIVE RESULTS	NUMBER OF COUNTIES SAMPLED
terbutryn	0	3
tetrachlorophenol	0	1
tetrachlorvinphos	0	1
thiobencarb	0	1
thiophanate-methyl	0	1
toxaphene	0	31
trichlorobenzene	0	1
trichloroethylene	0	1
trichlorophenol	0	1
trichlorophon	0	4
trifluralin	1	7
xylene	2	32
ziram	0	7

There was also great variability in the number of wells sampled for each pesticide. For example, methyl bromide was sampled for in the greatest number of wells (2,383), while coumaphos was sampled for in only two wells. The following matrix is a brief summary of the number of pesticides analyzed, by number of wells sampled.

	Number of Wells Sampled for Pesticides				
	2,000-2,383	400-1,999	50-399	20-49	1-19
Number of Analyzed Pesticides	6	5	93	26	49

As shown in the matrix, the majority of pesticides (93, or 52%) were analyzed for in samples taken from a large number of wells (50 - 399), while 49, or 27% of all pesticides were analyzed for in fewer than 20 wells each. The numbers of positive, negative and total results per well and samples for these pesticides are displayed in Table 4.

Because of this variation in sampling distribution and extent of sampling conducted for each pesticide, this report does not present a complete picture of the impact of agricultural use of pesticides on California's ground water quality.

Detections

Ten (5.6%) of the 179 active ingredients and related chemicals reported were detected in well water, while 169, or 94.4% were not detected. These ten detected pesticides were: [1,2-Dichloropropane (1,2-D), 1,2-Dibromo-3-chloropropane (DBCP), dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyltrichloroethane (DDT), atrazine, bentazon, chlorthal-dimethyl, simazine, trifluralin, and xylene]. Of these, only simazine was determined to be present as a result of the agricultural use of a currently registered active ingredient. 1,2-D, atrazine, bentazon, chlorthal-dimethyl, trifluralin, and xylene were present in well water as a result of point source contamination. These detections have been referred to or are under investigation by the SWRCB/RWQCB. The remaining pesticides, DBCP,

Table 4. Total number of wells sampled and samples taken for each chemical. Results are from sampling reported between 9/87 and 6/88.

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
1,1,1-trichloroethane	0	0	38	49	38	49
1,1,2-trichloroethane	0	0	38	47	38	47
1,2-D	4	18	2375	3083	2379	3101
1,3-D	0	0	2380	6020	2380	6020
2,4,5-T	0	0	64	71	64	71
2,4,6-trichlorophenol	0	0	29	29	29	29
2,4-D	0	0	364	398	364	398
2,4-dinitrophenol	0	0	33	33	33	33
BHC (all isomers)	0	0	231	637	231	637
CDEC	0	0	6	6	6	6
DBCP	102	290	729	820	831	1110
DDD	0	0	234	254	234	254
DDE	2	4	235	257	237	261
DDT	1	2	250	273	251	275

Table 4. (continued)

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
DDVP	0	0	1	1	1	1
DEF	0	0	106	106	106	106
DMPA	0	0	50	50	50	50
DNOC	0	0	95	96	95	96
EDB	0	0	60	103	60	103
EPTC	0	0	150	150	150	150
MCPA (sodium salt)	0	0	31	38	31	38
MCPA, alkanolamine salt	0	0	2	3	2	3
MCPA, butoxyethanol ester	0	0	2	3	2	3
MCPA, dimethylamine salt	0	0	24	25	24	25
MCPA, isooctyl ester	0	0	2	3	2	3
MCPP, diethanolamine salt	0	0	1	1	1	1
MCPP, dimethylamine salt	0	0	1	1	1	1
MCPP, potassium salt	0	0	1	1	1	1

Table 4. (continued)

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
PCNB	0	0	158	159	158	159
PCP	0	0	209	231	209	231
acenapthene	0	0	178	192	178	192
acephate	0	0	198	206	198	206
acifluorfen	0	0	4	4	4	4
alachlor	0	0	151	158	151	158
aldicarb	0	0	128	130	128	130
aldrin	0	0	231	248	231	248
ametryn	0	0	23	23	23	23
aminocarb	0	0	50	50	50	50
arsenic	0	0	2	2	2	2
atraton	0	0	24	24	24	24
atrazine	2	6	317	329	319	335
azinphos-methyl	0	0	138	139	138	139
barban	0	0	32	32	32	32

Table 4. (continued)

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
benefin	0	0	174	174	174	174
benomyl	0	0	229	231	229	231
bentazon	1	2	4	4	5	6
bromacil	0	0	186	187	186	187
bromide	0	0	25	41	25	41
captafol	0	0	6	6	6	6
captan	0	0	193	202	193	202
carbaryl	0	0	326	330	326	330
carbendazim	0	0	3	3	3	3
carbofuran	0	0	283	285	283	285
carbon tetrachloride	0	0	4	5	4	5
carbophenothion	0	0	71	106	71	106
chloramben	0	0	17	17	17	17
chlordane	0	0	234	250	234	250
chlordimeform	0	0	66	66	66	66

Table 4. (continued)

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
chloroform	0	0	4	4	4	4
chloropicrin	0	0	425	440	425	440
chlorothalonil	0	0	84	86	84	86
chlorpropham	0	0	171	177	171	177
chlorpyrifos	0	0	295	304	295	304
chlorthal-dimethyl	2	5	160	166	162	171
copper	0	0	1	1	1	1
coumaphos	0	0	2	2	2	2
crufomate	0	0	6	6	6	6
cyanazine	0	0	130	136	130	136
dalapon	0	0	2	2	2	2
demeton	0	0	140	147	140	147
diazinon	0	0	274	286	274	286
dicamba	0	0	55	56	55	56
dicofol	0	0	283	291	283	291
dicrotophos	0	0	6	6	6	6

Table 4. (continued)

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
dieldrin	0	0	229	245	229	245
dimethoate	0	0	342	353	342	353
dinoseb	0	0	279	283	279	283
dioxathion	0	0	6	6	6	6
diphenamid	0	0	156	157	156	157
diquat dibromide	0	0	10	10	10	10
disulfoton	0	0	311	314	311	314
diuron	0	0	323	329	323	329
endosulfan	0	0	374	692	374	692
endosulfan sulfate	0	0	249	260	249	260
endothall	0	0	173	174	173	174
endrin	0	0	429	475	429	475
endrin aldehyde	0	0	160	168	160	168
ethion	0	0	202	209	202	209

Table 4. (continued)

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
ethoprop	0	0	2	2	2	2
ethylan	0	0	6	6	6	6
ethylene dichloride	0	0	5	6	5	6
ethylene thiourea	0	0	42	42	42	42
fenamiphos	0	0	260	272	260	272
fenamiphos sulfone	0	0	40	52	40	52
fenamiphos sulfoxide	0	0	40	52	40	52
fensulfothion	0	0	43	43	43	43
fenthion	0	0	12	12	12	12
fenuron	0	0	47	47	47	47
fenvalerate	0	0	5	5	5	5
fluchloralin	0	0	64	64	64	64
fluometuron	0	0	53	53	53	53
fonofos	0	0	18	18	18	18
glyphosate	0	0	51	51	51	51

Table 4. (continued)

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
heptachlor	0	0	229	245	229	245
heptachlor epoxide	0	0	228	245	228	245
hexachlorobenzene	0	0	173	187	173	187
lindane (gamma-BHC)	0	0	432	476	432	476
linuron	0	0	74	74	74	74
malathion	0	0	201	208	201	208
maneb	0	0	111	122	111	122
merphos	0	0	91	91	91	91
methamidophos	0	0	238	242	238	242
methidathion	0	0	144	146	144	146
methiocarb	0	0	77	77	77	77
methomyl	0	0	331	332	331	332
methoxychlor	0	0	326	357	326	357
methyl bromide	0	0	2383	3142	2383	3142
methyl parathion	0	0	118	126	118	126
methyl trithion	0	0	21	21	21	21

Table 4. (continued)

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
methylene chloride	0	0	10	14	10	14
metolachlor	0	0	17	17	17	17
metribuzin	0	0	22	22	22	22
mevinphos	0	0	179	180	179	180
mexacarbate	0	0	71	71	71	71
mirex	0	0	17	17	17	17
molinate	0	0	5	6	5	6
monuron	0	0	74	74	74	74
naled	0	0	34	34	34	34
naphthalene	0	0	4	4	4	4
napropamide	0	0	98	99	98	99
neburon	0	0	53	53	53	53
nitrofen	0	0	52	58	52	58
orthodichlorobenzene	0	0	2358	3193	2358	3193
oryzalin	0	0	147	148	147	148

Table 4. (continued)

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
oxamyl	0	0	230	230	230	230
parachlorometacresol	0	0	4	4	4	4
paradichlorobenzene	0	0	2356	3192	2356	3192
paraquat	0	0	102	103	102	103
parathion	0	0	307	315	307	315
pendimethalin	0	0	3	3	3	3
permethrin (cis and trans)	0	0	66	66	66	66
phorate	0	0	297	304	297	304
phosalone	0	0	22	22	22	22
phosmet	0	0	27	27	27	27
phosphamidon	0	0	21	21	21	21
prometon	0	0	172	173	172	173
prometryn	0	0	194	199	194	199
propachlor	0	0	51	51	51	51
propanil	0	0	27	27	27	27

Table 4. (continued)

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
propargite	0	0	66	66	66	66
propazine	0	0	75	76	75	76
propham	0	0	189	189	189	189
propoxur	0	0	76	76	76	76
propyzamide	0	0	84	84	84	84
ronnel	0	0	1	2	1	2
screen (carbamate)	0	0	5	5	5	5
screen (chlorinated hydrocarbon)	0	0	5	5	5	5
screen (organophosphate)	0	0	5	5	5	5
secbumeton	0	0	23	23	23	23
siduron	0	0	47	47	47	47
silvex	0	0	262	291	262	291
simazine	1	2	324	330	325	332
simetryn	0	0	18	18	18	18
sulprofos	0	0	2	2	2	2

Table 4. (continued)

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
swep	0	0	12	12	12	12
terbuthylazine	0	0	23	23	23	23
terbutryn	0	0	23	23	23	23
tetrachlorophenol	0	0	6	6	6	6
tetrachlorvinphos	0	0	2	2	2	2
thiobencarb	0	0	29	35	29	35
thiophanate-methyl	0	0	5	5	5	5
toxaphene	0	0	505	556	505	556
trichlorobenzene	0	0	4	4	4	4
trichloroethylene	0	0	1	1	1	1
trichlorophenol	0	0	4	4	4	4
trichlorophon	0	0	93	93	93	93
trifluralin	1	3	82	84	83	87
xylene	2	4	2281	2870	2283	2874
ziram	0	0	53	63	53	63
TOTAL SAMPLE RESULTS		336		42,720		43,056

DDE, and DDT are no longer registered for legal agricultural use in California, and are therefore exempt from the requirements of the PCPA.

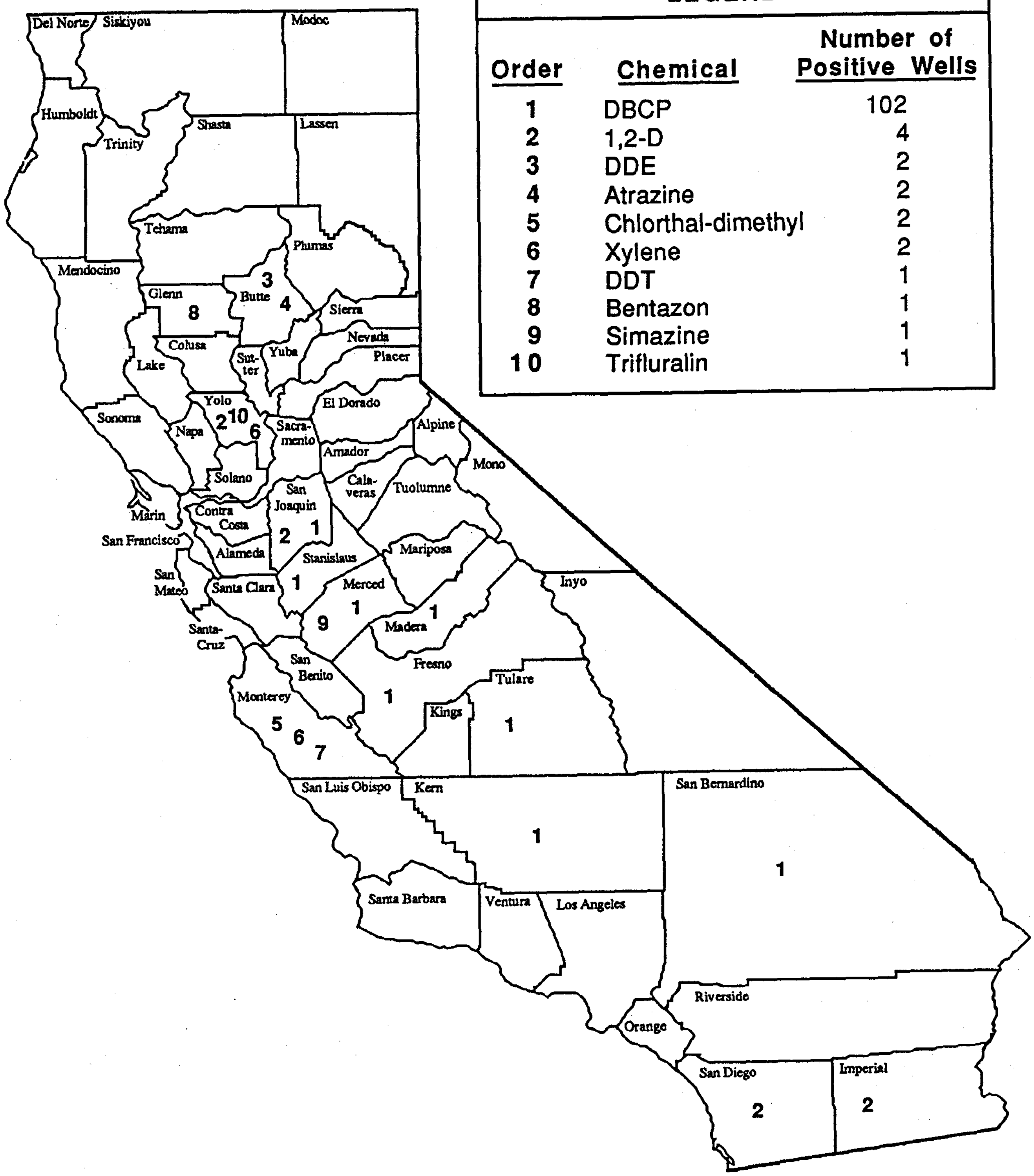
Pesticide residues were detected in a total of 336 well water samples taken from 115 wells. DBCP alone accounts for 89% (102 wells) of all wells with confirmed detections, and 86% (290) of all positive samples. The next most frequently detected pesticide was 1,2-D, found in 4 wells. Atrazine, chlorthal-dimethyl, DDE and xylene were each found in 2 wells; bentazon, DDT, simazine and trifluralin were found in 1 well each. The statewide distribution of these detected pesticides is shown in Figure 1.

The number of positive wells, samples and counties for each detected pesticide, as well as the total number of wells sampled, samples taken, and counties where sampling occurred for each pesticide are shown in Table 5. As shown in the table, there was no relationship between the number of samples taken and the frequency of detection of a particular pesticide in wells or counties.

RESULTS BY COUNTY:

Total Number of Samples

Well sampling results from 2,977 wells in 41 counties are included in the 1988 additions to the data base. The results of sampling in those counties, including the number of positive, negative and total samples taken and wells sampled are presented in Table 6. As shown in the table, San Bernardino had the largest number of wells sampled (377, or 13% of all wells sampled), while Kern County had the largest number of samples taken (8,336, or 19% of all samples) among the 41 counties. Santa Clara and Monterey Counties followed Kern in having the largest number of samples taken (5,611 and 3,645, respectively). More wells were sampled in Monterey County than in Kern County (276 wells compared to 253 wells), but nearly half as many samples were taken in Monterey County than in Kern County. Sampling in eight counties (Kern, Merced, Monterey, Riverside, San Bernardino, Santa Clara, Stanislaus, and Tulare) accounted for 75% of all samples taken and 64% of all wells sampled in the 1988 update to the data base.



LEGEND

Order	Chemical	Number of Positive Wells
1	DBCP	102
2	1,2-D	4
3	DDE	2
4	Atrazine	2
5	Chlorthal-dimethyl	2
6	Xylene	2
7	DDT	1
8	Bentazon	1
9	Simazine	1
10	Trifluralin	1

Figure 1. California counties where pesticides were detected in well water. Results are from sampling reported between 9/87 and 6/88.

Table 5. Detection and sampling frequency of the ten detected pesticides by number of positive and total wells, samples and counties. Results are from sampling reported between 9/87 and 6/88.

Pesticide Detected	POSITIVE Wells	POSITIVE Samples	POSITIVE Counties	TOTAL Wells	TOTAL Samples	TOTAL Counties
1,2-D	4	18	4	2317	3027	32
DBCP	102	290	8	831	1110	14
DDE	2	4	1	237	261	18
DDT	1	2	1	251	275	19
atrazine	2	6	1	319	335	17
bentazon	1	2	1	5	6	1
chlorthal-dimethyl	2	5	1	162	171	9
simazine	1	2	1	325	332	20
trifluralin	1	3	1	83	87	7
xylene	2	4	2	2283	2874	32

Table 7. The number of pesticides detected in well water and the total number of pesticides sampled for in each county. Results are from sampling reported between 9/87 and 6/88.

COUNTY	NUMBER OF PESTICIDES DETECTED	NUMBER OF PESTICIDES SAMPLED FOR
ALAMEDA	0	6
BUTTE	2	36
CONTRA COSTA	0	38
DEL NORTE	0	6
FRESNO	1	60
GLENN	1	11
HUMBOLDT	0	6
IMPERIAL	1	9
INYO	0	6
KERN	1	122
KINGS	0	38
LASSEN	0	6
LOS ANGELES	0	25
MADERA	1	59
MARIN	0	6
MENDOCINO	0	6
MERCED	2	78
MONTEREY	3	125
NAPA	0	23
ORANGE	0	25
PLUMAS	0	6
RIVERSIDE	0	89
SACRAMENTO	0	44
SAN BERNARDINO	1	71
SAN DIEGO	1	8
SAN JOAQUIN	2	55
SAN LUIS OBISPO	0	12
SAN MATEO	0	12
SANTA BARBARA	0	60
SANTA CLARA	0	102
SANTA CRUZ	0	24
SHASTA	0	18
SOLANO	0	29
SONOMA	0	41
STANISLAUS	1	29
TEHAMA	0	7
TRINITY	0	6
TULARE	2	64
VENTURA	0	2
YOLO	3	15
YUBA	0	21

Table. 8. Summary by county and pesticide of the number of wells with detected pesticide residues. Results are from sampling reported between 9/87 and 6/88.

COUNTY	1,2-D	DBCP	DDE	DDT	atrazine	bentazon	chlorthal-dimethyl	simazine	trifluralin	xylene
Butte			2		2					
Fresno		49								
Glenn						1				
Imperial	1									
Kern		2								
Madera		22								
Merced		4						1		
Monterey				1			2			1
San Bernardino		21								
San Diego	1									
San Joaquin	1	1								
Stanislaus		1								
Tulare		2								
Yolo	1								1	1
TOTALS	4	102	2	1	2	1	2	1	1	2

Figure 2 is a map of California indicating the townships within each county where at least one pesticide was detected in well water.

STATUS OF DETECTED PESTICIDES:

The following section describes the status of each detected pesticide in the 1988 update to the data base:

(1) 1,2-D:

The detection of 1,2-D was confirmed in 4 wells located in 4 counties, out of 2,379 wells sampled in 32 counties. One is a small water system well in Imperial County that was sampled by the Imperial County Environmental Health Department. The CDHS action level for 1,2-D is set at 10 ppb; the concentrations of detected residues ranged from 1.9 to 3.1 ppb. This well had previously been found to contain 1,2-D residues by the CDHS during the AB 1803 sampling survey of small water system wells; the source of the contamination is likely the result of the historical use of 1,2-D as an active ingredient which is no longer allowed.

The SDRWQCB confirmed the presence of 1,2-D residues in one well in San Diego; concentrations of detected residues ranged from 1.2 to 2.3 ppb. The contamination of this well is under investigation by the EPA and several state and local agencies. The contamination source was determined to be from the deliberate dumping of pesticide wastes into the well and into a nearby pit on the property. Monitoring wells have been installed at the site and are being regularly monitored.

The Stockton East Water District detected 1,2-D residues in one private well in San Joaquin County. Concentrations of detected residues ranged from 6.4 to 8.6 ppb. The source of the 1,2-D is likely the result of the historical use of 1,2-D as an active ingredient which is no longer allowed.

One small water system well in Yolo County had 1,2-D residues detected at concentrations of 32 to 50 ppb. This well has been under investigation by several state and local agencies; the source of the contamination has been determined to be from a point source.

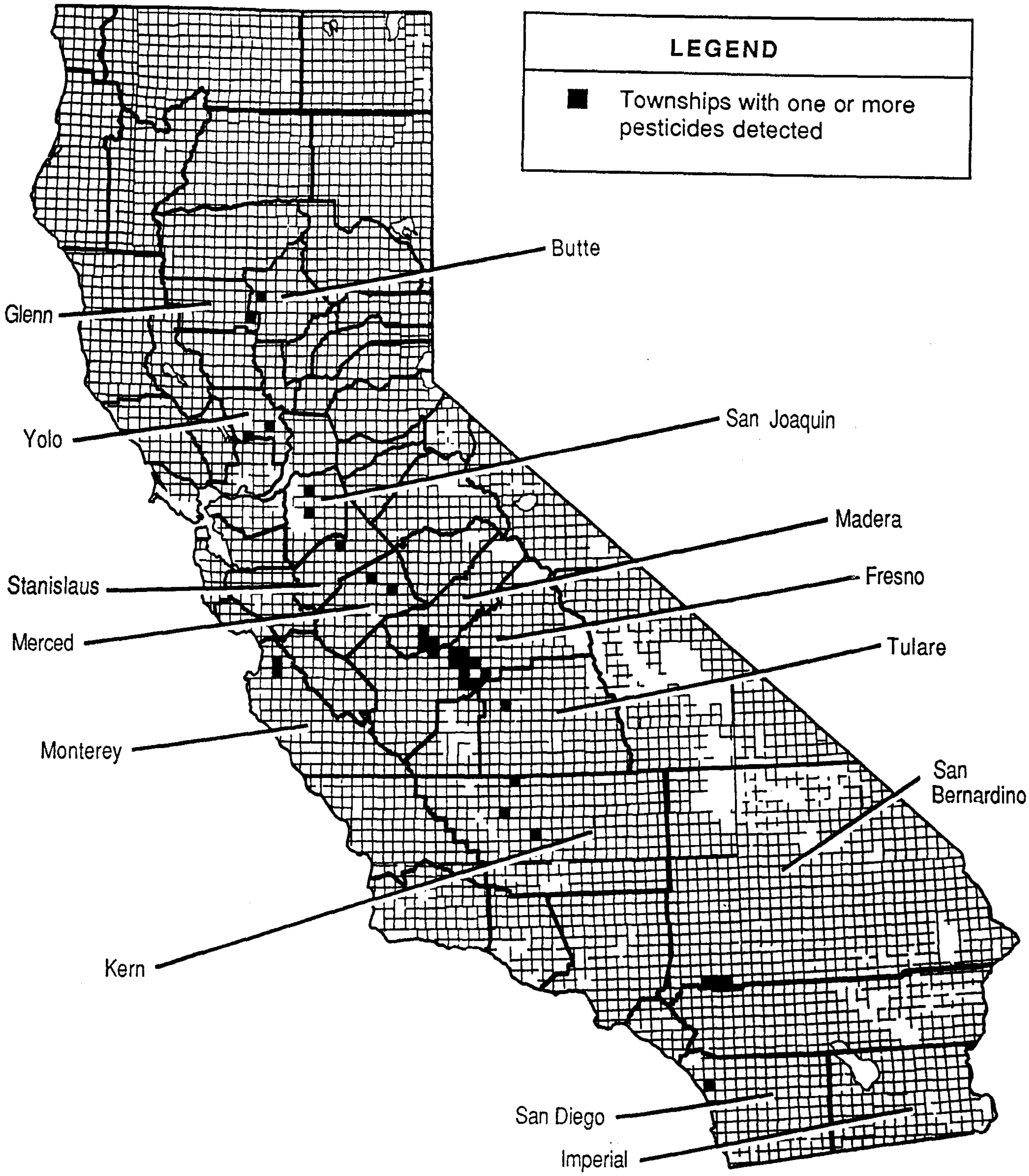


Figure 2. California townships with one or more pesticides detected in well water. Results are from sampling reported between 9/87 and 6/88.

Further investigation of the two wells each determined to be the result of point source contamination is now the responsibility of the SWRCB and appropriate RWQCB. The remaining two contaminated wells are most likely the result of the historical use of 1,2-D, which has not been allowed as a pesticide active ingredient since 1984. Therefore, 1,2-D has not been entered into the PCPA Pesticide Detection Response Process. An explanation of the Pesticide Detection Response Process is presented in Monk et al., 1987.

(2) **DBCP**:

Although the nematicide DBCP was officially suspended from use in 1979, DBCP residues are still being detected in wells. The detection of DBCP was confirmed in 102 wells located in eight counties, out of 831 wells sampled in 14 counties. The CDHS action level for DBCP is 1.0 ppb; the concentrations of residues detected ranged from 0.01 to 60.0 ppb. The CDHS is conducting ongoing monitoring for DBCP in some wells and, in cooperation with the DWR, is providing funds for mitigation actions. The Kern County Environmental Health Department is also conducting ongoing monitoring for DBCP. DBCP has not been entered into the PCPA Pesticide Detection Response Process because its use has already been suspended.

(3) **DDE:**

The detection of DDE was confirmed in two private, domestic wells in Butte County, out of 237 wells sampled in 18 counties. These wells were sampled in 1986 by the CVRWQCB because of their proximity to an aerial applicator's rinsewater disposal area, and because the regional hydrology indicated a potential for contamination. Concentrations of residues detected ranged from 0.04 to 0.09 ppb; there is no state action level for DDE at this time. DDE was not entered into the PCPA Pesticide Detection Response Process because DDT (the parent compound) is no longer registered for use in California.

(4) **DDT**:

The detection of DDT was confirmed in one monitoring well in Monterey County, out of 251 wells sampled in 19 counties. Concentrations of residues detected ranged from 0.1 to 0.12 ppb; there is no CDHS action level for DDT. This well is located on the premises of an abandoned pesticide formulation plant. The well was sampled in 1984 and again in 1986 by the CVRWQCB, which was investigating this site as a potential site of point source contamination. Because DDT is no longer registered, DDT was not entered into the PCPA Pesticide Detection Response Process.

(5) **atrazine:**

The detection of atrazine was confirmed in two private, domestic wells in Butte County, out of 319 wells sampled in 17 counties. These wells were sampled in 1986 by the CVRWQCB because of their proximity to an aerial applicator's rinsewater disposal area, and because the regional hydrology indicated a potential for contamination. The CDHS action level for atrazine is 15.0 ppb; concentrations of residues detected ranged from 0.61 to 3.5 ppb. One of these two wells was resampled by the CDFA, and atrazine was confirmed in that well, at concentrations from 0.61 - 0.83 ppb. Atrazine has been previously reviewed under the PCPA Pesticide Detection Response Process, and will be regulated in geographical areas of approximately 1 square mile which are sensitive to ground water contamination by pesticide leaching, called Pesticide Management Zones (PMZs). Following an investigation of this detection, it was determined that the contamination was not the result of the legal agricultural use of atrazine, and therefore this area should not be declared a PMZ.

(6) **bentazon:**

The detection of bentazon was confirmed in one domestic well in Glenn County, out of five wells sampled in this county. The CDHS action level for bentazon is 8.0 ppb; concentrations of residues detected ranged from 15 to 20 ppb. All five wells were sampled by the CVRWQCB in 1981 during a potential point source contamination investigation. The four wells sampled in an area surrounding the contaminated well did not contain bentazon residues. Following an investigation it was determined that these detections were not the result of the legal agricultural use of bentazon. Therefore, bentazon was removed from the PCPA Pesticide Detection Response Process.

(7) **chlorthal-dimethyl**:

Detections of chlorthal-dimethyl were confirmed in two monitoring wells located in Monterey County, out of 162 wells sampled in nine counties. Concentrations of residues detected ranged from 0.7 to 300 ppb. An action level for chlorthal-dimethyl has not been established by the CDHS. Both wells were installed at the request of the CCRWQCB, which is currently investigating this suspected point source contamination. The wells are situated near a waste disposal pool, on the premises of a pesticide formulation plant. The CDFA sampled five wells in nearby areas, and did not find any chlorthal-dimethyl in these wells. Therefore, it was determined that the chlorthal-dimethyl detections were most likely the result of point source contamination, so this chemical was removed from the PCPA Pesticide Detection Response Process.

(8) **simazine**:

The detection of simazine was confirmed in one domestic well in Merced County, out of 325 wells sampled in 20 counties. The CDHS action level for simazine is 150 ppb; concentrations of residues detected ranged from 0.4 - 0.8 ppb. Simazine was originally detected in this well by the CDFA, as part of an investigation of another well that contained simazine residues. Simazine has been previously reviewed under the PCPA Pesticide Detection Response Process, and will be regulated in PMZs. Following an investigation of this detection, it was recommended that the section the contaminated well is located in be declared a PMZ.

(9) **trifluralin**:

The detection of trifluralin was confirmed in one domestic well in Yolo County, out of 83 wells sampled in seven counties. Concentrations of trifluralin residues detected ranged from 0.01 - 0.20 ppb. An action level for this chemical has not been established by the CDHS. This well was sampled by the CDFA at the request of the Yolo County Department of Agriculture, which had previously found detectable levels of trifluralin in the well. After further investigation, trifluralin was removed from the PCPA Pesticide Detection Response Process because it was determined that its presence in well water was not the result of legal agricultural use.

(10) <u>**xylene**</u>:

The detection of xylene has been confirmed in two wells located in two counties (Monterey and Yolo), out of 2,283 wells sampled in 32 counties. The well in Monterey County is a monitoring well that was sampled by the CCRWQCB during a potential point source contamination investigation. The CDHS action level for xylene is set at 620 ppb; concentrations of residues detected ranged from 9.0 to 11.0 ppb.

The second well with xylene detections was located in Yolo County. Concentrations of residues detected ranged from 7.2 to 8.8 ppb. Xylene was originally detected in this well during the CDHS AB 1803 (small water systems) sampling survey. This well has been under investigation by the CVRWQCB, which suspects the source of contamination to be from a fuel product source; i.e., a point source. Following investigations of these detections, it was determined that the xylene residues were not the result of the legal agricultural use of a pesticide. As a result, xylene was removed from the PCPA Pesticide Detection Response Process.

SECTION 2. UNCONFIRMED DETECTIONS

Most of the unconfirmed detection (UD) data received for inclusion in the 1988 data base were the results of monitoring activity that took place before 12/1/86. As a result, these findings cannot be verified by a second laboratory or a second analytical method within 30 days, as specified in the PCPA. These UD samples may represent either valid detections of pesticide residues, or sample contamination, so they cannot be presented with the same confidence as detections with subsequent independent samples validating the presence of a pesticide. Therefore, these UDs are presented separately from the confirmed detections.

<u>RESULTS BY PESTICIDE ACTIVE INGREDIENT</u>:

A total of 201 UDs were included in the 1988 additions to the data base. These results represent sampling conducted for 24 pesticides and two breakdown products (DDE and ethylene thiourea), in a total of 180 wells.

Unconfirmed detections of DBCP occurred the most frequently (153 wells, or in 76% of all wells with UDs). The presence of the remaining 25 chemicals were unconfirmed in six or fewer wells each; 13 of these 25 chemicals were unconfirmed in one well each. (See Table 9).

All 26 chemicals with unconfirmed detections were previously presented in Section 1 of the Results because, in those cases, pesticide residues were either confirmed in wells (8 chemicals), or else the samples (for a particular pesticide and well) were negative (18 chemicals). In contrast, the 201 samples with detected residues presented in this Section (2) of the Results were all unconfirmed detections.

RESULTS BY COUNTY:

UDs were reported in 17 counties. Nearly 50% of the wells with UDs occurred in Fresno and Madera Counties (47 and 53 wells, respectively); DBCP was the only pesticide with UDs for these counties. Of the other 15 counties, 11 had unconfirmed detections in fewer than ten wells (per county); the remaining four counties each had unconfirmed detections in 11-20 wells.

Most of the counties (14) had wells with unconfirmed detections of three or fewer different pesticides; only Monterey, San Diego and San Joaquin Counties had more (eight, six and six pesticides, respectively). A county summary by pesticide and number of wells with unconfirmed detections is presented in Table 10.

Table 9. Number of wells and counties reported with single sample detections. These are results from sampling reported between 9/87 and 6/88.

PESTICIDES WITH SINGLE SAMPLE DETECTIONS	NO. OF WELLS	NO. OF COUNTIES
1,2-D	4	3
2,4-D	3	2
DBCP	153	9
DDE	3	1
DDT	2	2
EDB	3	2
aldrin	1	1
carbaryl	1	1
chlordane	1	1
chloroform	2	1
chloropicrin	2	1
chloropyrifos	1	1
chlorthal-dimethyl	1	1
diazinon	2	1
dieldrin	3	2
dinoseb	1	1
endosulfan	6	2
ethylene thiourea	1	1
lindane (gamma-BHC)	1	1
methyl bromide	1	1
molinate	1	1

Table 9. (continued)

PESTICIDES WITH SINGLE SAMPLE DETECTIONS	NO. OF WELLS	NO. OF COUNTIES
paradichlorobenzene	1	1
silvex	3	2
simazine	2	1
trifluralin	1	1
xylene	1	1

Table 10. Number of wells reported with unconfirmed detections, grouped by county and pesticide. Results are from sampling reported between 9/87 and 6/88.

COUNTY	UNCONFIRMED DETECTIONS (PESTICIDE)	NO. OF WELLS SAMPLED
Butte		
	DDT	1
	diazinon	2
Contra Costa		
	paradichlorobenzene	1
Fresno		
	DBCP	47
Glenn		
	molinate	1
	trifluralin	1
Kern		
	1,2-D	2
	DBCP	9
	EDB	2
Madera		
	DBCP	53
Merced		
	DBCP	1

Table 10. (continued)

COUNTY	UNCONFIRMED DETECTIONS (PESTICIDE)	NO. OF WELLS SAMPLED
Monterey		
	DDE	3
	DDT	1
	carbaryl	1
	chloroform	2
	chlorthal-dimethyl	1
	dieldrin	2
	dinoseb	1
	endosulfan	5
Riverside		
	DBCP	3
	simazine	2
San Bernardino	DBCP	18
San Diego		
	2,4-D	1
	aldrin	1
	chlordane	1
	dieldrin	1
	lindane (gamma-BHC)	1
	silvex	1

Table 10. (continued)

COUNTY	SINGLE SAMPLE DETECTIONS (PESTICIDE)	NO. OF WELLS SAMPLED
San Joaquin		
	1,2-D	1
	DBCP	3
	EDB	1
	chloropicrin	2
	ethylene thiourea	1
	methyl bromide	1
Santa Clara		
	1,2-D	1
	2,4-D	2
	silvex	2
Santa Cruz	endosulfan	1
Stanislaus	DBCP	5
Tulare		
	DBCP	14
Yolo	chlorpyrifos	1
	xylene	1

LIMITATIONS ON INTERPRETING THE DATA

The well inventory data base is a compilation of the results of various studies and monitoring activities designed by federal, state and local agencies to investigate possible well water contamination by pesticides. Some agencies have sampled hundreds of wells for a few pesticides, while others have sampled only a few wells for many pesticides. There has never been one central agency guiding or coordinating the sampling or monitoring efforts of all agencies in an attempt to characterize the presence of agricultural chemicals in a representative number of wells in the state. Because of the resulting variation in the amount and extent of sampling data among the 58 counties, it would be inappropriate to use the data in this report alone to draw general conclusions about the overall impact of pesticide use on the ground waters of this state.

Following are some examples of information deficiencies in the data submitted that limit the scope of their interpretation:

1. Few of the studies are of an ongoing nature, and many of the data are from studies conducted in the late 1970's and early 1980's. Therefore, it is not always possible to determine the source of contamination of wells that were once sampled and found to contain pesticides, or if those wells are still contaminated. This kind of information is necessary for drawing conclusions about the impact of the leaching of pesticides on present ground water quality in California.

2. Information on the condition of a well and its construction is important when determining the source of contamination of that well. A pesticide can reach ground water directly through a well via surface water run-off if the well is not properly sealed, as well as from leaching through the soil. However, well construction information (e.g., existence or type of a sanitary seal) is rarely reported because most studies are designed to identify presence or absence of pesticides in wells and not to determine the source of pollution or the condition of wells sampled. Thus, one cannot assume that a pesticide detected in a well is the result of the pesticide having leached through the soil to ground water.

3. Other well construction information, such as well depth or depth of perforations, as well as information on depth to ground water, is also important when the likelihood of a pesticide having reached ground water by leaching through the soil is determined. For example, shallow wells and wells with shallow perforation depths (typical of wells in areas with high water tables) are more vulnerable to ground water contamination from pesticides because there is less soil for a pesticide to leach through and therefore less time for the chemical to be broken down by biological, chemical, or physical processes in the soil before it reaches ground water. It is difficult in these situations to determine if the presence of a pesticide in a well is the product of circumstances (i.e., shallow well, shallow ground water), or if the pesticide is a real "leacher" (i.e., can migrate deeply into the soil without breaking down). In contrast, deeper wells, and wells with deeper perforation depths that contain pesticide residues more likely indicate that contamination has occurred because of the leaching properties of the chemical. Unfortunately, well construction information is rarely reported in studies submitted to the CDFA, so it is not always possible to explain how particular wells became contaminated with pesticides.

4. Agencies that sample wells for pesticides have limited resources, and monitoring studies can be very expensive, considering personnel and travel time, equipment, and laboratory costs ($100 to $800/sample, depending upon the chemical). Consequently, only a small percentage of potentially impacted wells in a designated study area are ever sampled; only a limited number of pesticides are sampled for; and fewer wells are sampled in sparsely populated rural areas, despite their proximity to pesticide use. Also, not all pesticides are sampled for that are used in any one county, nor are all pesticides sampled for in every county where they are used. As a result, the data base does not represent a statistically valid sample of the State's population of wells, nor the extent of use of any particular pesticide throughout the State. Thus, interpretation of the significance of results included in the data base must be limited to those areas sampled. Because well sampling for pesticide residues has not occurred uniformly statewide, it is inappropriate to draw conclusions about some areas of

California being more sensitive to pesticide contamination than others based solely on results included in the well inventory data base.

5. This data base does not contain the kinds of information necessary to determine the exact conditions and mechanisms which cause the contamination of ground water by pesticides. Many factors that must be considered, such as pesticide use patterns and cultural practices, vary between geographical areas, and within local areas, depending on the practices of individual growers. Therefore, the detection of a particular pesticide in any two wells may be the result of entirely different sets of conditions and mechanisms. Thus, the results recorded in the data base should first be examined individually before being grouped together for analysis; general conclusions cannot be drawn as to a single pesticide's mobility in soil in all areas of the state.

Despite these limitations, the information on pesticide residues contained in the well inventory data base can be used in the following applications:

1) displaying the geographic distribution of well sampling;
2) displaying the known geographic distribution of pesticide contamination in wells among those wells sampled;
3) identifying areas potentially sensitive to pesticide leaching (i.e., areas with contaminated wells);
4) designing studies for future sampling.

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

BACKGROUND:

Effective regulation of pesticide use to prevent contamination of California's ground water requires (a) an understanding of the processes by which contamination occurs, and (b) reliable methods for preventing or mitigating contamination.

Contamination and subsequent mitigation methods vary depending on the nature of the contamination source. Contamination can result from either point or non-point sources. Pollutants from point sources, such as storage or waste sites, are initially deposited and concentrated in small, well-defined areas. Residues eventually leach from the upper to lower soil layers, encounter ground water and then follow the movement of ground water from that location. The movement can be traced back to its source by locating a residue plume. In contrast, pollution from a non-point source, such as applications of agricultural chemicals to crops, cannot be traced to a single, definable location. Instead, the pollutants are dispersed over a large, poorly defined area. When a non-point source results in soil leaching, locating a distinct residue plume is not possible and pollutant movement is very difficult to predict or trace back to its source.

Pesticide residues in ground water can result from industrial or agricultural activities. Pollution from the industrial sector is usually attributed to point sources such as leaks at manufacturing, storage or waste sites. Industrial point sources have been the subject of considerable scientific research, and state and federal agencies have developed techniques to identify contamination sites and to designate mitigation methods (California Department of Health Services, 1985; California Assembly Resources Subcommittee on Status and Trends, 1983). Because the land mass affected by point source contamination is usually small, clean-up can be accomplished by removal and treatment of soil or by containment and treatment of the polluted ground water plume (Hunt, et al., 1985). In addition, future contamination may be prevented by proper design and placement of storage or waste sites.

Residues of pesticides registered for agricultural use can reach ground water from both point and non-point sources. Point sources include pesticide storage or disposal sites and applicator wash-off sites. Most of the pesticide residue detections in wells cited in the reports Water Quality and Pesticides: a California Risk Assessment Program (Cohen and Bowes, 1984) and The Leaching Fields (Price, et al., 1985) were associated with point sources.

Agricultural non-point source problems are more difficult to identify and mitigate because of the large land masses involved, the lower concentration of chemicals in the soil, and the lack of well-defined contamination plumes. Unlike research on point sources of contamination, research to understand the processes involved in leaching of agricultural pesticides is only in its initial phase. Eventually, information gained from this research will be used to identify new agricultural practices that minimize the possibility of ground water pollution.

The agricultural scientist is at a disadvantage in finding solutions to the problem of agricultural pesticide residues in ground water for a number of reasons:

1) Pesticides are intentionally and repeatedly applied to the soil to avert crop loss by pests. Point source problems may be mitigated by stopping exposure to the soil, but use of this option with non-point sources from agricultural applications would result in crop loss.

2) To date, agricultural research on application of pesticides has sought to find low but effective rates of application so that costs of production are kept low. Can these rates be lowered further and still provide cost-effective protection? More research is needed to examine this question, but where rates are already at their lowest effective level, new pest control methods will have to be devised.

3) Some procedures for mitigating contamination from point sources are not appropriate for agricultural non-point sources because of the large land masses involved. Removal of soil to appropriate waste sites is not a viable clean-up option. Relocation of farms and communities established around crops that grow well in areas sensitive to leaching is out of the question.

For these reasons, research is needed on new effective pest control methods specifically designed to prevent future ground water contamination.

DISCUSSION:

The PCPA requires the CDFA to provide the Legislature with a general discussion of the factors that contribute to the movement of pesticides to ground water. These factors include the amount of pesticide used, method of application, physical and chemical characteristics of pesticides, irrigation practices, and soil type.

Pesticide residues in soil may disappear from the initial site of deposition in a number of ways: (1) through microbial action; microbes detoxify or break down the pesticide to nontoxic compounds; (2) through chemical degradation processes, such as hydrolysis which produces breakdown products; (3) through volatilization; the chemical diffuses from the soil surface; (4) through leaching; the pesticide is transported from the upper to lower layers of soil; or (5) through runoff of water from agricultural land. A ground water problem arises when leaching occurs at a faster rate than other processes. Previously, researchers thought that under non-point source conditions, leaching occurred at such a low rate that pesticides would not move from the upper to the lower layers of soil. However, since 1979, detections of pesticides in ground water have provided strong evidence for the importance of leaching as a source of ground water contamination.

Since there are no known economically feasible methods to remove pesticide residues found in ground water due to agricultural non-point sources, the best available way to mitigate the problem lies in regulation of pesticides before or at their point of use. However, for non-point source leaching problems, much less information exists on which to base regulatory decisions than for point source problems. The CDFA is conducting studies that will provide this kind of information, i.e., information on the factors that contribute to pesticide mobility in soil. A discussion of current findings on each of these factors follows.

USE AND METHOD OF APPLICATION:

Known non-point source pesticide pollutants are almost exclusively active ingredients that are applied to the soil. Pesticides that are applied to foliage, such as protective foliar fungicides and many insecticides, may not be important leachers for two reasons: (1) exposure to sun enhances the rate of degradation; and (2) concentrations that eventually reach the soil are low enough to allow for rapid degradation before leaching. Thus, direct soil application, soil incorporation, or both are important factors contributing to ground water contamination. Also, there are no known differences in the leaching abilities of different pesticide formulations, such as wettable powder, granular or emulsifiable concentrate. There has been some research on the use of slow release formulations as a method to prevent pesticide movement through the soil; however, the results are preliminary, and the exact use of these formulations under agricultural conditions has yet to be determined.

IRRIGATION PRACTICES:

An irrigation study conducted by the CDFA compared soil movement of water and pesticide under four different methods of irrigation with the amount of water added based on a water budgeting method. The water budget method uses measures of evapotranspiration (ETp) to estimate the amount of water required to replenish that lost from evaporation and transpiration. The DWR maintains weather stations that record daily ETp values under the project "California Irrigation Management Information Systems" (CIMIS) (Snyder et al., 1985). The Office of Conservation - DWR, under contract with the University of California, has developed methods to incorporate ETp into water budgeting methods for agricultural use. Water budgeting appears to have potential in regulating water addition to soil, but the application of this concept to different methods of irrigation needs validation. The current irrigation studies are part of this process.

The results for 1987 indicated that at similar amounts of water applied, water movement and its distribution in soil differed between the irrigation methods. For example, sprinkler applications were made weekly whereas basin irrigations were made only when a critical accumulated ETp value had been attained. Application of water in basin irrigation was much less frequent but of greater volume per irrigation. The movement of bromide, a tracer that mimicked water movement, was deeper in the basin treatments than in the sprinkler treatments. Theoretically, movement should have been similar if the same amount of water was applied. It appears that differences in the efficiency of irrigation methods will have to be considered in the development of an effective water budget method that prevents pesticide movement in soil.

Differences in pesticide movement were also measured between irrigation treatments. Three levels of water were applied at 0.75 ETp, 1.25 ETp and 1.75 ETp. For sprinkler irrigations, pesticide moved past the 10-foot depth, the deepest sample, only at the highest amount of water application (1.75 ETp). For border/flood irrigation, pesticide moved past the 10-foot depth at the 1.25 and 1.75 ETp treatments. Because pesticide movement was retarded with respect to the bromide water tracer, the use of parameters derived for water movement as descriptors of pesticide movement will require refinement.

In summary, the use of available measures of ETp in conjunction with water budgeting methods could be an effective technique for controlling water and, subsequently, pesticide movement in soil. However, the use of ETp values in limiting pesticide movement will require further refinement when applied to different methods of irrigation. It should be noted that models could aid in the development of the necessary criteria. The CDFA is sponsoring research to assess the fit of the irrigation data to currently developed soil water and pesticide movement models. If a model proves satisfactory, it will be used as an aid in the development of suitable criteria.

PHYSICAL AND CHEMICAL CHARACTERISTICS OF PESTICIDES:

The physical and chemical characteristics of pesticides thought to be important in movement through soil are: soil adsorption (usually denoted by the coefficient of soil versus water partitioning, Kd or Koc), hydrolysis half-life due to microbial or chemical activity, vapor pressure, and water solubility. These factors are used in models of pesticide transport through soils (Rao, 1985). Cohen, et al. (1984) estimated values to act as indicators of leaching potential. In addition, the PCPA requires the Department to set specific numerical values for these factors that are used to identify pesticides with the potential to leach to ground water. The Department is preparing a separate report to update the established Specific Numerical Values described by Wilkerson and Kim (1986).

SOIL TYPE:

The CDFA recognizes soil type as a very important factor in determining leaching of pesticides. Teso et al. (1988) have described the occurrence of DBCP residues in California in relation to soil type. A data base is being created that contains the occurrence of soil series in mapped portions of California on a section basis. Evaluation of these data for regulatory use is ongoing.

RAINFALL:

Climatic factors, such as precipitation, may override all of the previously mentioned factors in causing ground water contamination. An example of the influence of climate is the experience with residues of aldicarb in well water in Del Norte County (Lee, 1983). Because soils in that area are high in organic matter, they may be expected to retard pesticide movement. However, annual rainfall is over 100 inches, and it occurs primarily in winter months. Aldicarb was applied in the fall to lily bulb fields to control nematode problems in the soil. The amount of rainfall was apparently sufficient to drive pesticide residues to the shallow ground water located at approximately ten feet in spite of the high soil organic matter.

An opposite result was observed in a study recently completed by the CDFA (Troiano and Garretson, 1988.) The effect of winter rain on movement of pesticides was investigated in Fresno, in the central San Joaquin Valley. Because soils are sandy, this area might be expected to be vulnerable to pesticide leaching. However, winter rainfall is usually much less than in the Northern Coastal areas. In the winter of 1985-86, a total of only 10 inches of rainfall was recorded over a 164 day period. An inorganic ion was added to the soil to trace the movement of water. Most of the tracer was measured to about the 5.5 feet depth in the soil with some detected down to 10 feet, the lowest depth sampled. In contrast, most of the pesticide (known to leach through soils) was recovered in the first 6-inches of soil, with some residues detected down to 6 feet. At this site there was some retardation in movement of the pesticide compared to water flow. In this situation, the amount of winter rainfall was insufficient to move pesticide residues to significant depths. Thus, climatic conditions, such as rainfall, must not be overlooked as important factors in the leaching of pesticides through soils, and they may be important considerations in timing applications of pesticides.

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II.

ACTIONS TAKEN BY THE CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE TO PREVENT PESTICIDES FROM ENTERING GROUND WATER AS A RESULT OF AGRICULTURAL USE

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

The CDFA has responsibility for regulating the sales and use of pesticides in California. This responsibility includes providing for the proper, safe and efficient use of pesticides for protection of the public health and safety, and protecting the environment from environmentally harmful pesticides. In the case of ground water, this means (a) identifying which pesticides present a threat to ground water quality as a result of agricultural use and (b) taking appropriate regulatory action to prevent or mitigate ground water contamination. Actions of the CDFA to prevent agricultural pesticides from entering ground water accordingly focused on these goals. The actions occurred in two major areas: implementation of the PCPA, and environmental monitoring activities, including continued development of data as part of a Ground Water Protection Plan. These activities are described below.

PESTICIDE CONTAMINATION PREVENTION ACT:

In addition to compiling the statewide inventory of wells sampled for pesticides described in this report, the CDFA has taken the following major actions between September 1, 1987 and June 30, 1988 to implement the PCPA.

Proposed Regulations (December, 1987)
The Director is proposing to adopt regulations in Titles 3 and 26 of the California Code of Regulations pertaining to ground water protection. These regulations would implement or make specific the Ground Water Protection List, the specific numerical values, the use reporting requirement and the sales reporting requirement as specified in the PCPA. In addition, these regulations would establish the framework for implementing the Director's finding of "modification of use" under the PCPA for pesticides found in ground water or soil under certain conditions. Specifically, these regulations would require that any pesticide found (under certain conditions) in ground water or in soil be declared a restricted material. Further, the agricultural, outdoor industrial and outdoor institutional uses of such materials would either be modified in areas sensitive to ground water pollution, or prohibited in such areas. These sensitive areas, called Pesticide Management Zones (PMZs), will be designated in regulation. When

modified use is allowed, users would be required to obtain a permit from the County Agricultural Commissioner before purchasing the material. No permit would be issued unless the application for the permit is accompanied by a written recommendation of a licensed pest control adviser who has completed a ground water protection training program approved by the Department. In addition, these proposed regulations were made specific for atrazine by prohibiting agricultural, outdoor industrial, and outdoor institutional uses of atrazine in PMZs. These regulations are expected to go into effect in early 1989.

Prometon Decision (February, 1988)
As part of the Pesticide Detection Response Process for prometon detected in ground water in Glenn County, the Director issued a decision to prohibit use of prometon in PMZs where prometon was found.

Agricultural Use Determinations
Positive finds of new pesticide residues in well water or soil under certain conditions may be the result of monitoring studies conducted by the CDFA or may be reported to the CDFA by other state, local or federal agencies that conduct monitoring. Once a positive find of a new pesticide residue has been reported and verified, the PCPA requires the Department to determine if the residue resulted from legal agricultural use. If the residue is determined to be due to legal agricultural use, the Department notifies registrants of agricultural use products that could have resulted in the residue, of their opportunity to request a hearing. If requested, such a hearing of the PREC subcommittee is held pursuant to Sections 13149 and 13150 of the PCPA.

The agricultural use investigation includes a determination of whether or not (1) the residue is formulated in, or is a breakdown product of, an economic poison registered for agricultural use in California, (2) the application of such an economic poison in the vicinity of the detection was reasonably likely, (3) a point source was a likely cause, (4) a non-agricultural use of the economic poison was a likely source, or (5) an illegal use of an economic poison was a likely source.

Depending on the type of detection, the CDFA conducts two types of surveys to assist in the source determination. First, for reports of detections in ground water, a well survey is conducted to locate a second positive well (i.e., a well with a confirmed detection of a pesticide) in the same area as the initial positive well to help determine that the residue did not result from a point source. The well survey consists of collecting water samples from a maximum of five wells that are in the same section as the reported positive well and/or in one or more of the three adjacent sections located closest to the positive well. Selection of wells is made based on proximity to the positive well and availability. Second, a land use survey is conducted to identify potential sources of pesticide contamination. Locations and sizes of crop and non-crop areas (such as natural vegetation, residential or industrial) are identified on a map, and the area immediately surrounding the positive well is carefully investigated.

Based on reported detections of xylene, two agricultural use investigations were conducted in Fresno and Tulare Counties between January 1 and June 30, 1988. Following these investigations, it was determined that residues of xylene in ground water were not attributable to agricultural use.

An agricultural use investigation was also conducted following the detection of fenamiphos below 8 feet in soil. The PCPA requires investigation of pesticide residues in soil when found at or below the deepest of the following depths: (1) 8 feet below the soil surface, (2) below the root zone of the crop where the active ingredient was found, or below the soil microbial zone. Since the CDFA was not aware of any generally accepted scientific definitions of "root zone" and "soil microbial zone", 8 feet was considered the deepest depth for the purposes of implementing the PCPA. On that basis, and following an investigation, the CDFA determined that the fenamiphos residue was due to legal agricultural use and notified registrants of fenamiphos as the next step in the Pesticide Detection Response Process. However, this approach was challenged by legal counsel representing a pesticide registrant for failing to meet the statutory standard for initiating an agricultural use determination. As a result, the CDFA rescinded the fenamiphos notice to registrants and initiated a project to define "root zone" and "soil microbial zone" to make operable the section of the PCPA that addresses detections of pesticides in soil.

New PMZs

A total of two detections of pesticides previously reviewed under the PCPA were investigated. These investigations were conducted in Merced County to determine if detections of atrazine and simazine should result in creation of new PMZs. Based on the results, recommendations were made to create one new PMZ for simazine in Merced County.

ENVIRONMENTAL MONITORING ACTIVITIES:

Since 1979, the CDFA has been working to gain a clearer understanding of the movement of pesticides through soil in order to prevent ground water contamination through effective regulation of pesticide sales and use. The CDFA's Environmental Hazards Assessment Program (EHAP), in the Environmental Monitoring and Pest Management Branch, forms the core of this effort. The EHAP conducts monitoring in soil and ground water, gathers environmental fate data on registered pesticides, and tests mathematical models predicting the behavior of pesticides in soils. Information gained from this work guides the CDFA in the regulatory decision-making process.

The EHAP first began monitoring soils and ground water for pesticide residues in 1979 in response to the discovery of aldicarb and DBCP in ground water in several states. At that time, very little ground water sampling had been done, and most soil sampling did not test for pesticide residues at depths below 100 centimeters. A complete list of EHAP's published reports is available from the Environmental Monitoring and Pest Management Branch of the CDFA. A list follows of the EHAP's recently published reports and studies in progress which examine aspects of pesticide movement to ground water.

Published Reports

1. Monitoring the persistence and movement of fenamiphos in soils of lily bulb fields in Del Norte County, 1986 (March, 1988)
   Four lily bulb fields were monitored for the downward leaching of fenamiphos residues over a 9-14 month period. The nematicide persisted throughout the study period and leaching was observed in all fields. In one field, fenamiphos residues were found deeper than 8 feet. Soil conditions and high rainfall probably contributed to the persistence and leaching of fenamiphos.

2. <u>Sampling for residues of molinate and thiobencarb in well water and soil in the Central Valley</u> (March, 1988)

   The EHAP conducted a well survey in 17 rice growing counties in the Central Valley. No residues of molinate or thiobencarb were detected in 169 sampled wells. Soil cores were collected from two rice fields in Colusa County and Merced County to determine the soil distribution of the two herbicides. Residues were confined mainly to the shallower soil layer indicating low soil mobility. The results indicated that use of molinate and thiobencarb in rice-growing areas did not pose a hazard to ground water.

3. <u>Effects of agronomic and geologic factors on pesticide movement in soil: comparison of two ground water basins in California (Coastal and Inland)</u> (August, 1986)

   This paper describes the results of a study conducted by the CDFA which compares the soil distribution of herbicides in two ground water basins in the state. In a previous study, residues of several agricultural chemicals were detected in numerous wells in two inland ground water basins, while only one contaminated well was found in two coastal basins.

   Soil cores were collected in two citrus-growing regions, one inland (in the San Joaquin Valley, Tulare County), and one coastal (in the Santa Clara River Valley, Ventura County). Information on agricultural practices and climatic conditions for four years (1981-1984) was obtained from growers and other sources. In order to maximize detection of pesticides in deeper soil layers, sites for soil coring were chosen at locations where the same procedures for application of herbicides had been practiced annually over the same four-year period.

   In the spring, at the inland sites, simazine was found in soil and ground water samples at 28 feet. At the coastal sites, no simazine was detected deeper than 8 feet below the soil surface, and diuron and bromacil residues occurred only near the surface. Pesticide residues were also detected in wells sampled near the inland sites whereas no residues were detected in the coastal sites. Differences between the two basins may be explained in part by the lower organic matter content and higher percentage of sand in the San Joaquin Valley soil.

Studies in Progress

1. Monitoring the movement of non-fumigant nematicides through the soil profile after application through drip irrigation.
2. Effects of seasonal winter rainfall on pesticide leaching in Riverside County.
3. Effects of type and amount of irrigation on pesticide movement.
4. Contracted research to evaluate five models of pesticide leaching.
5. Contracted research to compare the amount of recharge water resulting from different methods of irrigation.
6. Movement through soil: comparison of alachlor, aldicarb, atrazine, carbofuran, diazinon, malathion, oxamyl, simazine.
7. Coastal subsoil characteristics.
8. Monitoring persistence and movement through soil of nematicides registered for use on flower bulbs.
9. Determination of soil adsorption for pesticides.
10. Sampling for alachlor, metolachlor, atrazine, and nitrate in well water in Merced County.

In addition to conducting these technical studies, the Environmental Monitoring and Pest Management Branch continues to implement the Ground Water Protection Plan described below.

GROUND WATER PROTECTION PLAN:

In 1984, the CDFA began developing a long range plan to selectively control the application of ground-applied pesticides to reduce their potential for ground water contamination. This Ground Water Protection Plan will incorporate the results of laboratory studies, well sampling, soil coring and computer modeling studies to estimate the potential for a pesticide to reach ground water. Localized information on factors that influence movement of pesticides through soils to ground water will be collected, standardized, and distributed to County Agricultural Commissioners, who may use this information to make local regulatory decisions.

Two data sets previously established in the plan were again updated:

1. Geographic areas in each county where selected pesticides were applied primarily to the soil.

2. A pesticide chemistry and environmental fate data base which contains information on ground water detections in California and nationwide, surface water detections in California, and water quality and physiochemical parameters for individual pesticides.

The CDFA is also continuing to work on other data sets which will consist of factors influencing the movement of pesticides to ground water, such as depth to ground water, soil type, and geologic and climatic conditions. Eventually all data will be classified geographically by section (one square mile).

Data classified by section will provide Agricultural Commissioners with a scale of analysis specific enough to make sound decisions regulating pesticide use spatially by section, township (36 square miles), or by combinations of sections.

III.

ACTIONS TAKEN BY THE STATE WATER RESOURCES CONTROL BOARD TO PREVENT PESTICIDES FROM ENTERING GROUND WATER

INTRODUCTION

In compliance with Section 13152(e)[4] of the Food and Agricultural Code, the State Water Resources Control Board provides to the State Legislature actions taken by the agency to prevent pesticides from migrating to the ground waters of the State.

State of California

Memorandum

To : Jack C. Parnell, Director
Department of Food and Agriculture
1220 N Street, Room A-149
Sacramento, CA 95814

Date : OCT 26 1988

W. Don Maughan
W. Don Maughan
Chairman

From : STATE WATER RESOURCES CONTROL BOARD

Subject: AB 2021 (PESTICIDE CONTAMINATION PREVENTION ACT)

The Pesticide Contamination Prevention Act requires that actions by the State Water Resources Control Board to prevent economic poisons from migrating to the ground waters of the State be reported to the Legislature annually. The attached report is a summary of actions during the past year, and pursuant to Section 13152(e)[4] of the Act, this information is submitted for inclusion in the report to the Legislature.

If you have any questions on this report, please telephone Dr. Syed Ali at 3-7609.

Attachment

cc: Regional Board Executive Officers

Regional Board Branch Offices
Fresno, Redding, and Victorville

Dr. Ken Kizer, Director
Department of Health Services

Ron Oshima
Department of Food and Agriculture

Dale Claypoole, Chief
Program Control Unit

PESTICIDE CONTAMINATION PREVENTION ACT (AB 2021):
ANNUAL REPORT TO THE LEGISLATURE
STATE WATER RESOURCES CONTROL BOARD
DECEMBER 1988

Actions taken by the State Water Resources Control Board (State Board) and Regional Water Quality Control Boards (Regional Boards) to prevent pesticides from entering ground water.

A. <u>STATE WATER RESOURCES CONTROL BOARD</u>

The State Board regulates water quality and water allocation in California and, together with the nine Regional Boards (Figure 1), the State Board protects the beneficial uses of surface (inland and coastal) and ground waters.

1. Pesticide Evaluation

- o Staff detected the herbicide simazine in 4 of 19 wells in Fresno and Tulare counties.

- o Following a review of the Environmental Impact Report for rotenone application in the Kaweah-Tulare Lake Basin, staff requested the Department of Fish and Game to include the analysis of inert ingredients in the rotenone formulation (benzene, ethyl benzene, napthalene, alkyl benzene, TCE, and xylene) for the well water samples collected in the treated area.

- o Staff assisted in the preparation of a report to the Assembly Committee of Water, Parks, and Wildlife on targeted research needs over the next three years for agricultural evaporation ponds. The report concluded that studies leading to improved design and management guidelines are needed to make evaporation ponds environmentally safe and efficient.

- o The State Board held public hearings on the inventory of nonpoint source pollution and pollution assessment in March and June. Staff is drafting a program for nonpoint source management that will be considered for adoption by the State Board in November 1989.

- o The State Board published the Toxic Substances Monitoring Report for 1986-87 and the State Mussel Watch Report for 1986-87. The findings from these two monitoring programs form a major part of the State Board's Water Quality Assessment Report.

- o The State Board completed a study on tributyltin, which has been instrumental in investigating and controlling the impact of tributyltin in antifouling

FIG. 1. STATE WATER RESOURCES CONTROL BOARD
P. O. Box 100, Sacramento, CA 95801

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARDS

NORTH COAST REGION (1)
1440 Guerneville Road
Santa Rosa, CA 95403
(707) 576-2220

SAN FRANCISCO BAY REGION (2)
1111 Jackson Street, Rm. 6040
Oakland, CA 94607
(415) 464-1255

CENTRAL COAST REGION (3)
1102-A Laurel Lane
San Luis Obispo, CA 93401
(805) 549-3147

LOS ANGELES REGION (4)
107 South Broadway, Rm. 4027
Los Angeles, CA 90012
(213) 620-4460

CENTRAL VALLEY REGION (5)
3443 Routier Road
Sacramento, CA 95827-3098
(916) 361-5600

Fresno Branch Office
3614 East Ashlan Ave.
Fresno, CA 93726
(209) 445-5116

Redding Branch Office
100 East Cypress Avenue
Redding, CA 96002
(916) 225-2045

LAHONTAN REGION (6)
2092 Lake Tahoe Boulevard
P. O. Box 9428
South Lake Tahoe, CA 95731
(916) 544-3481

Victorville Branch Office
15371 Bonanza Road
Victorville, CA 92392
(619) 241-6583

COLORADO RIVER BASIN REGION (7)
73-271 Highway 111, Stè. 21
Palm Desert, CA 92260
(619) 346-7491

SANTA ANA REGION (8)
6809 Indiana Avenue, Ste. 200
Riverside, CA 92506
(714) 782-4130

SAN DIEGO REGION (9)
9771 Clairemont Mesa Blvd. Ste. B
San Diego, CA 92124
(619) 265-5114

8-87

paint. Staff commented to the Department of Food and Agriculture on the proposed regulation, which made tributyltin a restricted pesticide but had provisions less restrictive than legislation (AB 637). Staff asked that paints with high release rates of tributyltin not be permitted, that records of tributyltin sales or use be maintained, that restrictions cover all applicable uses of tributyltin, and that the State retain authority to evaluate and further restrict tributyltin use where necessary.

2. Special Studies

- Soil Gas Sampling: Monitoring wells have been installed at the Santa Maria landfill, where PCE, benzene, toluene, and xylene have been detected with soil gas samplers in a study designed to test the effectiveness of these samplers to identify ground water threatened by pollutants.

- Public Well Survey: The State Board conducted a survey of local agencies for well location, operating status, and presence of pollutants.

- Agricultural Drainage: A progress report on selenium and agricultural drainage in California summarizes studies and activities for management and regulation. The report includes progress made by State, federal, university, and local entities between September 1986 and December 1987.

3. Pesticide Contamination Prevention Act (AB 2021)

- Circumstances Under Which Pesticide Use Should Be Eliminated: The State Board recommended that the Director of the Department of Food and Agriculture should consider banning any pesticide found in soil to a depth of eight feet if:

  (1) The water table is within ten feet of the soil depth where the pesticide residues were detected; and

  (2) The soil has greater than 70 percent sand and less than 20 percent clay, and one percent organic matter.

- Prometon: The subcommittee representing the State Board, the Department of Food and Agriculture, and the Department of Health Services evaluated prometon, the fifth pesticide to be considered under this Act because of its findings in ground water as a result of sufficient toxicological and environmental fate evidence and no demonstrated modifications of use that prevent further residues in subsoil or ground water.

- Proposed Regulations: The State Board commented to the Department of Food and Agriculture that the proposed AB 2021 regulations for the Act continue to allow unmodified use of reviewed economic poisons in most areas of the State.

- Fenamiphos (Nemacur): The State Board provided information on lily bulbs root zone and microbial metabolism of fenamiphos to the Department of Food and Agriculture and requested that the Department consider this information for reissuing the notice to registrants for a public hearing.

- Implementation: The State Board provided the Department of Food and Agriculture a number of recommendations for implementing the Act:

  (1) Request environmental fate information for each active ingredient in each registered economic poison, for inert ingredients identified by the U.S. Environmental Protection Agency as posing a health concern or potential concern, and for all ingredients formulated with the reviewed ingredients atrazine, simazine, bromacil, diuron, and prometon.

  (2) Provide written reasons and analyses to support conclusions that a number of pesticide ingredients did not enter ground water as a result of agricultural use.

  (3) Follow-up historical and unconfirmed detections of pesticide ingredients in subsoil and groundwater.

  (4) Issue the Groundwater Protection List.

  (5) Address tank mix uses and other post-formulation additions of compounds.

B. <u>REGIONAL WATER QUALITY CONTROL BOARDS</u>

The nine Regional Boards protect California's ground and surface waters from discharges of pollutants, including pesticides. The State Porter-Cologne Water Quality Control

Act of 1969 and the Federal Water Pollution Control Acts of 1972 and 1977 enable the Regional Boards to regulate discharges through:

1. Adoption of water quality objectives in basin plans to protect specified beneficial uses of water in each of California's 15 watershed basins.

2. Submission of monitoring data by dischargers with Waste Discharge Requirements and National Pollutant Discharge Elimination System permits.

3. Enforcement of cleanup actions through issuance of compliance schedules, Cease and Desist or Cleanup and Abatement Orders, or administrative civil liabilities.

4. Requirements for technical reports from State or local agencies and dischargers for AB 1803 follow-up investigations.

Information on mitigation of pesticide pollution is listed in Tables 1 through 9. Some actions were initiated in prior years and are ongoing. The Lahontan Regional Board reported no pesticide pollution during the past year.

In addition to the actions indicated in Table 8, the Santa Ana Regional Board is currently cooperating in a study concerning ground water contamination in the Redlands area of the Bunker Hill Basin where 30 wells have been found to contain the nematicide 1,2-dibromo-3-chloropropane (DBCP). The study is intended to determine if using ground water containing low concentrations of TCE and DBCP for agricultural irrigation, after minimal treatment, is feasible as a means to mitigate the migration of a TCE plume and, in the process, remove TCE and DBCP from the basin. Laboratory studies are being performed to determine whether DBCP would be introduced back into the ground water under such a scheme. Although this study is intended to be specific to conditions in the Bunker Hill Basin, it should also have positive statewide implications.

In 1987, the Santa Ana Regional Board approved two projects to be included in the Agricultural Drainage Loan Program. The State Board subsequently approved these projects. One project is the Arlington Desalter proposed by the Santa Ana Watershed Project Authority. This project involves extracting ground water in the Arlington Basin and providing treatment to remove DBCP and nitrates. The other project is a proposal from the City of Redlands to provide treatment to remove DBCP from one of the City's drinking water wells.

In addition to the above projects, Board staff is tracking pilot studies being undertaken by the City of Loma Linda and the City of Riverside to provide well head treatment for the removal of DBCP.

Table 1. Actions taken on pesticide pollution in the North Coast region (Region 1).

County	Site	Pesticide	Mitigation
Humbolt	Stone Forest Industries, Happy Camp	Chlorophenol fungicides	Concentrations below DHS action levels after discontinued fungicide use.
Siskoyou	Pine Mtn. Lumber Co., Yreka	Chlorophenol fungicides	Issued Cleanup and Abatement Order; contaminated soil has been excavated.
	Hi-Ridge Lumber Co., Yreka	Chlorophenol fungicides	Issued a Cleanup and Abatement Order; cleanup is planned.
	Sierra Pacific Industries, Hayfork	Chlorophenol fungicides	Concentrations below DHS action levels after discontinued fungicide use.

Table 2. Actions taken on pesticide pollution in the San Francisco Bay region (Region 2).

County	Site	Pesticide	Mitigation
Contra Costa	Chevron Chemicals, Richmond	Difolatan Orthene Chlordane Lindane Aldrin DDT/DDD Dieldrin	Submitted closure plan for Class I impoundment. Ongoing ground water assessment program.
	Dow Chemicals, Pittsburg	Vikane Dowcil 75 Dowcil 100	RCRA ground water assessment ongoing. Class I surface impoundments in process of closing. Updated Waste Discharge Requirements for Toxic Pits Control Act 6/87, 870-064. Ongoing site cleanup.

Table 3. Actions taken on pesticide pollution in the Central Coast region (Region 3).

County	Site	Pesticide	Mitigation
Monterey	Soilserv, Inc. Salinas	Chloroform Carbaryl Dieldrin DNBP Dacthal Endosulfan	Reported to the Department of Food and Agriculture for agricultural use determination. Additional sampling underway.

Table 4. Actions taken on pesticide pollution in the Los Angeles region (Region 4).

County	Site	Pesticide	Mitigation
Los Angeles	So.Cal. Water Co. S. Arcadia Well 015/11W-09Q045	Atrazine	Potential discharger requested to conduct soil sampling.
	Los Angeles Co. wells	Atrazine Simazine Methylene chloride Ethylene thiourea DBCP	AB 1803 sampling detected these pesticides in 72 wells.

Table 5. Actions taken on pesticide pollution in the Central Valley region (Region 5).

County	Site	Pesticide	Mitigation
Fresno	Fresno Co. wells	DBCP	AB 1803 sampling detected this pesticide in 113 wells.
Kern	Kern Co. wells	DBCP 1,2-D	AB 1803 sampling detected these pesticides in 41 wells.
Madera	Madera Co. wells	DBCP	AB 1803 sampling detected this pesticide in 2 wells.
San Joaquin	San Joaquin Co. wells	DBCP 1,2-D	AB 1803 sampling detected these pesticides in 17 wells.
Stanislaus	Stanislaus Co. wells	DBCP	AB 1803 sampling detected this pesticide in 22 wells.
Tulare	CWS, Visalia	1,2-D	AB 1803 sampling detected this pesticide .
Yolo	Conaway Farms,	1,2-D	AB 1803 sampling detected these pesticides.

Table 6. Actions taken on pesticide pollution in the Lahontan region (Region 6).

County	Site	Pesticide	Mitigation

The Lahontan Regional Board reported no pesticide pollution during the past year.

Table 7. Actions taken on pesticide pollution in the Colorado River Basin region (Region 7).

County	Site	Pesticide	Mitigation
Imperial	Visco Flying Co.	Unspecified	Hydrogeological Assessment Report requested pursuant to the Toxic Pits Cleanup Act.
	City of Brawley Airport	Lindane DDE Dichloroprop Dinosb	Hydrogeological Assessment Report requested pursuant to the Toxic Pits Cleanup Act.
	D.S. Dusters	DDE Endosulfan I Endosulfan II	Surface impoundments closing pursuant to Subchapter 15.
	Val-Air Co.	DDE Endosulfan I Heptachlor	Surface impoundments closing pursuant to Subchapter 15.
	Central Brave Agricultural Service	DDE Endosulfan II	Hydrogeological Assessment Report requested pursuant to Toxic Pits Cleanup Act.
	Farm Air Service	Gamma-BHC Heptachlor Aldrin DDE	Surface impoundments closing pursuant to Subchapter 15.

Table 8. Actions taken on pesticide pollution in the Santa Ana region (Region 8).

County	Site	Pesticide	Mitigation
Orange	Great Western Savings, Irvine	1,2-D EDB	NPDES permit issued November 1986. Ground water extraction and treatment continuing.
	City of Orange (well 01, mun)	Simazine Atrazine	Well water is being blended for domestic use. Investigation needed to confirm if solely nonpoint source related.
	City of Seal Beach (Beverly Mnr. mun)	1,2-D	Investigation needed to confirm if solely non-point source related. Other VOCs such as DBCM, BDCM, methylene chloride also found.
Riverside	Lake Hemet MWD (well A, mun)	DBCP	Investigation needed to confirm if solely non-point source related.
	Sunnymead MWC (well 03, mun)	DBCP	Investigation needed to confirm if solely non-point source related.
	Arlington Basin	DBCP	Funding has been confirmed under the SWRCB Agricultural Drainage Loan Program for ground water cleanup by local agency. Cleanup is awaiting purchase of property for treatment system.
	City of Corona (well 8, mun)	Simazine	Chemical questionnaires have been sent to nearby potential sources to determine if solely nonpoint source related.

(continued)

Table 8 (continued). Actions taken on pesticide pollution in the Santa Ana region (Region 8).

County	Site	Pesticide	Mitigation
Riverside	Home Garden CWD (wells 2 & 3, mun)	DBCP Simazine	Investigation needed to confirm if solely non-point source related.
	Victoria Farm MWC (weel 01, mun)	DBCP	Investigation needed to confirm if solely non-point source related.
	City of Riverside (Twin Spring, mun)	DBCP	Investigation needed to confirm if solely non-point source related.
	City of Riverside (Moor-Griff, mun)	DBCP	Investigation needed to confirm if solely non-point source related.
	City of Riverside (Russell "B", mun)	Simazine DBCP	Investigation needed to confirm if solely non-point source related.
	City of Riverside (1st St., mun)	DBCP	Investigation needed to confirm if solely non-point source related.
	City of Riverside (Hunt, mun)	DBCP	Investigation needed to confirm if solely non-point source related.
	City of Riverside (4 wells, emergency, Downtown Riv.)*	DBCP	These 4 wells also contaminated with industrial organic solvents. Investigation is underway to determine the source of solvents. Several of the wells have been used for irrigation purposes in the past years. In addition, City of Riverside has recently experimented with a system (BEDTRON)

(continued)

Table 8 (continued). Actions taken on pesticide pollution in the Santa Ana region (Region 8).

County	Site	Pesticide	Mitigation
Riverside	City of Riverside (4 wells, emergency, Downtown Riv.) (cont.)		to determine if removal of DBCP and nitrate from ground water in this area is feasible. Test results have been promising.
	Riverside County Hall Record (pr)	DBCP	Investigation needed to confirm if solely non-point source related.
	Loma Linda University, Arlington (mun)	DBCP	Investigation needed to confirm is solely non-point source related.
	Home Gardens School (mun)	DBCP	Investigation needed to confirm if solely non-point source related.
	Buschlen, Dwight (mun)	DBCP	Investigation needed to confirm is solely non-point source related.
San Bernardino	Gage System Wells (10 wells, mun)*	DBCP	The City of Riverside operated the Gage System which consists of 13 wells located along the Santa Ana River. The 10 wells containing DBCP are blended for domestic use.
	Bunker Hill II Basin: Crafton/Redlands area (30 wells)*	DBCP	The Santa Ana Regional Board heads Technical Advisory Committee of local agency study to explore specific mitigation alternatives (TCE & DBCP). A bench-scale study using lab-scale models of soil columns is underway to collect necessary data

(continued)

Table 8 (continued). Actions taken on pesticide pollution in the Santa Ana region (Region 8).

County	Site	Pesticide	Mitigation
San Bernadino	Bunker Hill II Basin: (cont.)		to determine if ground water contaminated with the above constituents can safely be used for irrigation purposes without introducing the contaminants back into the aquifer. City of Redlands has also submitted application under Agricultural Drainage Loan Program for DBCP treatment. Investigation continuing to confirm if solely nonpoint source related.
	So.San Berdo. Co. Water Dist. (3 wells, mun)*	DBCP	Investigation needed to confirm if solely nonpoint source related.
	City of Loma Linda (4 wells, mun)*	DBCP	Investigation needed to confirm if solely nonpoint source related. The City is performing a test on one well using a Rotor Strip unit to remove the DBCP.
	Cucamonga CWD (4 wells, mun)*	DBCP	Investigation needed to confirm if solely nonpoint source related.
	Monte Vista CWD (3 wells, mun)*	DBCP	Investigation needed to confirm if solely nonpoint source related.
	City of Upland (5 wells, mun)*	DBCP	Investigation needed to confirm if solely nonpoint source related.

Table 8 (continued).

* Well Identification and Use

Site	Wells	
Gage System Wells	Gage 29-2	(mun)
	Gage 46-1	(mun)
	Gage 66-1	(mun)
	Gage 29-1	(mun)
	Gage 27-2	(mun)
	Gage 27-1	(mun)
	Gage 26-1	(mun)
	Gage 21	(mun)
	Gage 51-1	(mun)
	Gage 56-1	(mun)
Riverside, City of	Freeway	(mun)
	Mulberry	(mun)
	11th Street	(mun)
	Fill	(mun)
Bunker Hill II Basin	Paine 1	(ag)
	Nevada Street	(ag)
	Stowe	(ag)
	King Street	(ag)
	Mascart	(ag)
	Marigold	(ag)
	Gladysta	(ag)
	Armstrong	(ag)
	Tennessee	(ag)
	Fairview	(ag)
	Crim	(ag)
	Lugo	(ag)
	40	(ag)
	41	(ag)
	Raught	(ag)
	31A	(mun)
	30A	(mun)
	32	(mun)
	34	(mun)
	35	(mun)
	Crafton	(mun)
	10	(mun)
	11	(mun)
	13	(mun)
	14	(mun)
	16	(mun)
	Agate 1	(mun)
	New York	(mun)
	Lee	(mun)
	37	(mun)

(continued)

Table 8 (continued).

* Well Identification and Use (continued)

Site	Wells	
South San Berdo. Co. Water District	Norman	(mun)
	Gould	(mun)
	Bennett	(mun)
Loma Linda, City of	Court Street	(mun)
	Nies	(mun)
	Mt. View 1	(mun)
	Dart	(mun)
Cucamonga CWD	10	(mun)
	13	(mun)
	17	(mun)
	20	(mun)
Upland, City of	San Ant. 25	(mun)
	West End 1	(mun)
	West End 2	(mun
	3	(mun)
	8	(mun)
Monte Vista CWD	1	(mun)
	4	(mun)
	9	(mun)

(mun=municipal well, ag=agricultural wells)

Table 9. Actions taken on pesticide pollution in the San Diego region (Region 9).

County	Site	Pesticide	Mitigation
San Diego	Truly Nolen Exterminators	Chlordane Lindane Aldrin Dieldrin	Site is subject to the Toxic Pits Cleanup Act of 1984. Hydrogeologic Assessment Report has been submitted. Investigation of the extent of contamination is in progress.
	City of Oceanside (well #12)	1,2-D	Investigation indicates potential agricultural use. Referred to Department of Food and Agriculture.

APPENDICES

APPENDIX A

FORMAT OF DATA ENTRY SHEETS

Format of Data Entry Sheets:

Each chemical analysis for a pesticide residue in a well water sample constitutes one record in the data base. Each record contains 132 columns of data. The following is an explanation of the format:

a. County code (Columns 1-2): This is a minimum reporting requirement. The 2-digit state code for counties is used, so as to coincide with the CDFA Pesticide Use Report format.

b. State well number (township/range/section/tract/sequence number) (Columns 3-13): This is a minimum reporting requirement. This is the U.S. Geological Survey's Public Lands Survey Coordinate System (Davis and Foote, 1966) used by the DWR to numerically identify individual wells. Township lines (T) are oriented from north to south and are 6 miles long. Range lines (R) are oriented east to west and are 6 miles wide. A 6 X 6 mile township is divided into 36, 1 mile by 1 mile sections (S), numbered consecutively from 1 to 36. Each section is again divided into 16 individual 40 acre tracts (Tr) that are identified by letters (A through R, excluding I and O). In some cases, wells in a tract are further identified with a sequential number in the order of identification by the DWR. Most large water system wells have this sequence number, while most private wells do not.

   Many sampled wells had their T/R/S location indicated on data sheets or in a final report. The state well numbers for large system wells were found by cross-referencing the names of the well and water district to the well number in the CDHS station location file. This file is stored on the State Water Quality Information System (SWQIS) data base, which files large system wells by district, county, station name, well name and/or number.

   Tract letter and numbers for all wells were included when available. Private wells lacking T/R/S location were omitted from the main file because it was not possible to accurately locate them. In the future, wells should be identified by the complete, DWR-assigned state well number, as this number is now a minimum requirement for all submitted data.

c. Base line and meridian (Column 15): This is a minimum reporting requirement, and is included in the state well number. These lines divide the state into three areas: Humboldt, Mount Diablo and San Bernardino, forming the basic structure for the Township/Range/Section numbering system.

d. Columns 16, 17, 70 and 112 = blank spaces.

e. Study number (Columns 18-19): Numbers were assigned consecutively as studies were obtained.

f. Sampling agency code (Columns 20-23): Numbers were originally assigned consecutively to each contributing agency. The original codes were replaced with the DWR 4-digit code to increase compatibility of state data bases.

g. Date of sample (Columns 24-29): This is a minimum reporting requirement. In the original data base, only month and year of sample were recorded, and the sampling results from wells that were sampled more than once a month were averaged. Day, month and year of each sampling record is now included. The middle month of an indicated period is used when the date given is only a season, e.g., "all samples were taken in spring of 1982." However, the precise sampling date is recorded for most studies.

h. Chemical code (Columns 30-34): This is a minimum reporting requirement. Each chemical is assigned a 5-digit chemical code, corresponding to the chemical code used in the Pesticide Use Reporting System maintained by the Information Services Branch, CDFA. Breakdown products of pesticides are included, and are marked with an asterisk or a dollar sign to distinguish them from the parent compound, e.g., 01857 = fenamiphos, *1857 = fenamiphos sulfone, $1857 = fenamiphos sulfoxide. Pesticides sampled for that have not been registered for use in California are numbered sequentially, e.g., from ****1 to ****n. This code list will be updated as necessary.

i. Sample type (Column 35): This field was the "Value Code" column in the 1985 report, with an "A" for averaged values and an "O" for single observations. Data from the 1985 data base have retained the "A" and "O" codes, but new data are identified as individual samples, and assigned the appropriate code (see Appendix B: Explanation of Codes for sample type code definitions).

j. Chemical concentration (Columns 36-41): This is a minimum reporting requirement. Analytical results are recorded in parts pers billion (ppb), in scientific notation. Cols. 36-39 are the significant figures, col. 40 is the sign of the exponent (+ or -), and col. 41 is the exponent (power of 10). Trace amounts, non-detected, or less than the minimum detectable limit values are all recorded as non-detected (0.00+0).

k. Minimum detectable limit (MDL) (Columns 42-47): This is a minimum reporting requirement. The MDL for the chemical assay is recorded in ppb, in the same format as chemical concentration. The MDL for a given compound will vary by laboratory, date, or year, reflecting differences in analytical techniques. However, MDL values are not always reported by laboratories, especially when the results are positive.

l. Analyzing laboratory (Columns 48-51): This is a minimum reporting requirement. Data submitted from samples taken after December 1, 1986 must include this information.

m. Method of analysis (Column 52): Specification of analytical method is limited to : EPA-approved, In-house, or Pesticide Analytical Method (PAM) at this time. Very few records currently in the data base contain this information.

n. Date of analysis (Columns 53-58): Month/day/year. This is also a minimum reporting requirement. However, many records in the data base that were from sampling conducted prior to December 1, 1986 do not have this information.

o. File code (Columns 59-62): Internal file designation.

p. Summary year (Columns 63-64): This indicates the year of the Well Inventory Summary Report in which each record appears. This will be used for extracting from the main file only that data to be included in yearly updates.

q. Well location information (Columns 65-114): These fields designate specific well locations so that each record is identified with the well from which it came.

r. - w. Well-specific information (Columns 115-131): Water well driller's reports, or well logs, contain valuable (and confidential) well construction information such as completed well depth and perforation depths. However, well log information is available in only a few studies.

r. Well depth (in feet) (Columns 115-118): This is the completed well depth, as recorded on a well log.

s. Depth to top of perforation (in feet) (Columns 119-121): Taken from a well log.

t. Depth to bottom of perforation (in feet) (Columns 122-125): Taken from a well log; often corresponds to depth of completed well.

u. Water depth (Columns 126-129): The value originally recorded in this field was "depth to standing water after well development," as recorded in the well log. This depth now corresponds to depth of standing water at time of sampling.

v. Log year (Columns 130-131): Year the well was drilled; information obtained from well log, raw data, or verbally from a well owner.

w. Well code (Col. 132): This is a minimum reporting requirement. This code indicates well use, e.g., private domestic or irrigation well, or both.

APPENDIX B

EXPLANATION OF CODES

I. County Code*

Code	County	Code	County	Code	County
01*	Alameda	21*	Marin	41*	San Mateo
02	Alpine	22	Mariposa	42*	Santa Barbara
03	Amador	23*	Mendocino	43*	Santa Clara
04*	Butte	24*	Merced	44*	Santa Cruz
05	Calaveras	25	Modoc	45*	Shasta
06	Colusa	26	Mono	46	Sierra
07*	Contra Costa	27*	Monterey	47	Siskiyou
08*	Del Norte	28*	Napa	48*	Solano
09	El Dorado	29	Nevada	49*	Sonoma
10*	Fresno	30*	Orange	50*	Stanislaus
11*	Glenn	31	Placer	51	Sutter
12*	Humboldt	32*	Plumas	52*	Tehama
13*	Imperial	33*	Riverside	53*	Trinity
14*	Inyo	34*	Sacramento	54*	Tulare
15*	Kern	35	San Benito	55	Tuolumne
16*	Kings	36*	San Bernardino	56*	Ventura
17	Lake	37*	San Diego	57*	Yolo
18*	Lassen	38	San Francisco	58*	Yuba
19*	Los Angeles	39*	San Joaquin		
20*	Madera	40*	San Luis Obispo		

* Counties included in the 1988 data base.

II. Base Meridian Code

H = Humboldt
M = Mt. Diablo
S = San Bernardino

III. Well Study Code

Code	Agency	Pesticide(s) Analyzed
03	CDHS	DBCP
47	CDHS	DBCP, EDB, D-D mix, simazine, xylene
49	RWQCB	aldrin, ametryn, atrazine, azinphos-methyl, BHC (alpha, beta, delta), carbamate, chlordane, DDE, 4,4-DDD, DDT, demeton, diazinon, dieldrin, disulfoton, endosulfan I and II, endosulfan sulfate, endrin, ethion, heptachlor, heptachlor epoxide, lindane, malathion, methoxychlor, methyl parathion, ethyl parathion, prometon, prometryn, propazine, simazine, terbutryn, toxaphene, thiocarbamate
51	USF	(USDA - Forest Service); 2,4-D, endrin, lindane, methoxychlor, silvex, toxaphene
54	RWQCB	aldrin, arsenic, A- and G-BHC, bromide, carbophenothion, chlordane, 2,4-D, demeton, diazinon, dieldrin, disulfoton, endosulfan I, endrin, endrin aldehyde, ethion, ethyl parathion, heptachlor, heptachlor epoxide, malathion, methidathion, methoxychlor, methyl parathion, phosalone, toxaphene, silvex, toxaphene.
59	SCEHD	(Sacramento Co. Env. Health Dept.); 2,4-D, endrin, lindane, methoxychlor, toxaphene, silvex
60	RWQCB	bentazon, carbofuran, methidathion, molinate, treflan
71	CDHS	chlordane, 2,4-D, diuron, endrin, lindane, methoxychlor, silvex, toxaphene
72[a]	KCEHD	(Kern Co. Env. Health Dept.); DBCP, EDB
73	DWR	aldicarb, benomyl, carbaryl, carbofuran, CIPC, DBCP, diuron, EDB, EPTC, IPC, methomyl, oxamyl
75	CDFA	chlorpyrifos, trifluralin
76	RWQCB	aldrin, chlordane, 1,2-D, dieldrin, lindane
77	DWR	various chemicals
78	SID	(Solano Irrigation District); 2,4-D, endrin, lindane, methoxychlor, silvex, toxaphene
79	MCEHD	(Marin Co. Env. Health Dept.); 2,4-D, endrin, lindane, methoxychlor, silvex, toxaphene
80	RWQCB	1,2-dichloropropane
81	CDFA	fenamiphos, fenamiphos sulfoxide and sulfone
82	CDFA	1,2-dichloropropane, EDB, xylenes
83	SEWD	(Stockton East Water District); acephate, atrazine, carbaryl, carbofuran, chloropicrin, cyanazine, DBCP, diazinon, 1,2-dichloropropane, cis 1,3-dichloropropene, trans 1,3-dichloropropene, dimethoate, dinoseb, diphenamid, chlorpyrifos, EDB, endothall, ethylene thiourea, maneb/ziram, methamidophos, methomyl, methyl

		bromide, fenamiphos, phorate, prometryne, toxaphene, trichloropropanes
84	RWQCB	various (69) chemicals
85	MCEHD	2,4-D, endrin, lindane, methoxychlor, silvex, toxaphene
86	MCEHD	2,4-D, endrin, lindane, methoxychlor, silvex, toxaphene
87	RWQCB	chloroform, 1,2-D, ethyl benzene, toluene, xylenes
88[a]	CDHS	various chemicals; data from 2/28/87 to 12/1/87
89	SBCHD	(Santa Barbara Co. Health Dept.); title 22 and other chemicals
90	RCAC	(Riverside Co. Ag. Comm.); CHC screen, carbamate screen, OP screen, methomyl, fensulfothion, mevinphos, fenvalerate, metribuzin, endosulfan, thiophanate-methyl
91	CDHS	DBCP
92	CDFA	simazine
93	CDFA	atrazine
94	ICEHD	(Imperial Co. Env. Health Dept.); benzene, 1,2-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichloroproane, 1,3-dichloropropylene, ethylene dibromide, methylene chloride, 1,1,1-trichloroethane, 1,1,2-trichloroethane, xylenes
96	CDFA	atrazine, diazinon
97	MCEHD	2,4-D, endrin, lindane, methoxychlor, silvex, toxaphene
98	SDHD	(San Diego Health Dept.); 2,4-D, silvex

a= Data from this study will be included in the 1989 database.

IV. Sampling Agency Code

Code	Agency Name
4323	California Dept. of Food and Agriculture (CDFA - Environmental Hazards Assessment Program)
5060	California Dept. of Health Services (CDHS - Sanitary Engineering Branch)
5050	California Dept. of Water Resources (DWR)
8493	California Regional Water Quality Control Board (RWQCB), Region 3 (Central Coast)
5055	California Regional Water Quality Control Board (RWQCB), Region 5 (Central Valley)
5089	California Regional Water Quality Control Board (RWQCB), Region 9 (San Diego)
5202	City of Oceanside
9007	Imperial County (Environmental Health Department)
5128	Madera County (Environmental Health Department)
7736	Marin County (Environmental Health Services)
9091	Riverside County (Environmental Health Department)
5108	Sacramento County (Environmental Health Department)
1401	San Diego County (Department of Agriculture)
9039	Santa Barbara County (Environmental Health Services)
2684	Solano Irrigation District
5550	Stockton East Water District
5005	USDA -Forest Service
5104	Yolo County (Department of Agriculture)

V. Chemical Codes

Code	Common Name
00506	1,2-D
00573	1,3-D
00639	2,4,5-T
00636	2,4-D
90359	BHC (all isomers)
00115	CDEC
00183	DBCP
00184	DDD
02092	DDE
00186	DDT
00187	DDVP
00190	DEF
00632	DMPA
00533	DNOC, sodium salt
00271	EDB
00264	EPTC
00788	MCPA (sodium salt)
00784	MCPA, alkanolamine salt
00785	MCPA, butoxyethanol ester
00786	MCPA, dimethylamine salt
00787	MCPA, isooctyl ester
00790	MCPP, diethanolamine salt
01016	MCPP, dimethylamine salt
01303	MCPP, potassium salt
00464	PCNB
00465	PCP
***11	acenapthene
01685	acephate
02218	acifluorfen
00678	alachlor
00575	aldicarb
00009	aldrin
00018	ametryn
****1	aminocarb
00710	arsenic
****2	atraton
00045	atrazine
00314	azinphos-methyl
00055	barban
00053	benefin
01552	benomyl
01944	bentazon
00083	bromacil
*0385	bromide
00292	captafol
00104	captan
00105	carbaryl
02176	carbendazim
00106	carbofuran
00109	carbon tetrachloride
00110	carbophenothion

Code	Common Name
02184	chloramben
00130	chlordane
00300	chlordimeform
00133	chloroform
00136	chloropicrin
00677	chlorothalonil
00141	chlorpropham
00253	chlorpyrifos
00179	chlorthal-dimethyl
00714	copper
00165	coumaphos
00519	crufomate
01640	cyanazine
00180	dalapon
00566	demeton
00198	diazinon
00200	dicamba
00346	dicofol
00072	dicrotophos
00210	dieldrin
00216	dimethoate
00221	2,4-dinitrophenol
00238	dinoseb
00192	dioxathion
00226	diphenamid
00229	diquat dibromide
00230	disulfoton
00231	diuron
00259	endosulfan
*0259	endosulfan sulfate
00260	endothall
00262	endrin
*0262	endrin aldehyde
00268	ethion
00404	ethoprop
00472	ethylan
00274	ethylene dichloride
----1	ethylene thiourea (breakdown product)
01857	fenamiphos
*1857	fenamiphos sulfone
$1857	fenamiphos sulfoxide
00181	fensulfothion
00063	fenthion
***12	fenuron
01963	fenvalerate
01848	fluchloralin
00166	fluometuron
00254	fonofos
01855	glyphosate
00317	heptachlor
*0317	heptachlor epoxide
00321	hexachlorobenzene
00359	lindane (gamma-BHC)
00361	linuron
00367	malathion

Code	Common Name
00369	maneb
00293	merphos
01697	methamidophos
01689	methidathion
00375	methiocarb
00383	methomyl
00384	methoxychlor
00385	methyl bromide
00394	methyl parathion
***16	methyl trithion
00388	methylene chloride
01996	metolachlor
01692	metribuzin
00480	mevinphos
00623	mexacarbate
00402	mirex
00449	molinate
00408	monuron
00418	naled
00421	naphthalene
01728	napropamide
00424	neburon
00592	nitrofen
00578	orthodichlorobenzene
01868	oryzalin
01910	oxamyl
01813	parachlorometacresol
00455	paradichlorobenzene
00458	paraquat
00459	parathion
01929	pendimethalin
02008	permethrin (cis and trans)
00478	phorate
00479	phosalone
00335	phosmet
00482	phosphamidon
00499	prometon
00502	prometryn
00511	propachlor
00503	propanil
00445	propargite
00504	propazine
00339	propham
00062	propoxur
00694	propyzamide
00517	ronnel
***CB	screen (carbamate)
***CH	screen (chlorinated hydrocarbon)
***OP	screen (organophosphate)
****4	secbumeton
00603	siduron
00530	silvex
00531	simazine
****5	simetryn

Code	Common Name
02006	sulprofos
***13	swep
****6	terbuthylazine
01691	terbutryn
00777	tetrachlorophenol
00305	tetrachlorvinphos
01933	thiobencarb
01696	thiophanate-methyl
00594	toxaphene
01619	trichlorobenzene
00138	1,1,1-trichloroethane
01425	1,1,2-trichloroethane
00595	trichloroethylene
01189	trichlorophenol
00640	2,4,6-trichlorphenol
00088	trichlorophon
00597	trifluralin
00622	xylene
00629	ziram

VI. Sample Type Code

The following codes are used to identify additional information that is available for results of chemical analyses CDFA has received. Definitions of terms used, i.e., initial detection, split and replicate sample, are included.

Definitions:

Initial detection sample:
For a single study and one particular well, the initial detection sample for a chemical will be the positive sample with the earliest sampling date and/or time. Splits and replicates are coded in relation to the initial detection sample.

Split sample:
A single sample which is divided into subsamples. In reference to a single chemical, one of the subsample results may be coded as an initial detection sample. The other subsample results would then be coded as splits of the initial detection sample. If all of the subsample results are negative, the results would be coded as "S", for split samples.

Replicate sample:
A discrete sample taken from the same well as the initial detection sample. In reference to a single chemical, discrete samples taken during a single study will be recorded as replicates of the initial detection sample. If a replicate of the initial detection sample is split, then the results for the splits are still recorded as replicates of the initial detection sample. Information indicating that the replicates were also split samples is not recorded in the data base.

Codes:

(I) INITIAL DETECTION SAMPLE, NOT CONFIRMED
- -only one positive analysis
- -method and laboratory may or may not be known
- -no further sampling

(B) INITIAL DETECTION SAMPLE, w/FURTHER QUALITATIVE OR QUANTITATIVE ANALYSES HAVING ALL NEGATIVE RESULTS
- -initial detection with negative subsequent analyses
- -subsequent analyses are assigned the appropriate sample type codes "D" through "L" or "-"

(Q) INITIAL DETECTION SAMPLE, w/ FURTHER ANALYSES
- -initial detection with at least one positive subsequent analysis
- -no qualitative analyses
- -subsequent analyses are assigned the appropriate sample type codes "D" through "L" or "-"

(C) INITIAL DETECTION SAMPLE, CONFIRMED BY DATA SOURCE AGENCY
- -pertains to data from agencies other than CDFA
- -method of analysis and laboratory are unknown
- -a single value with no subsequent sampling
- -data confirmed by written or verbal statement from data source agency

(M) INITIAL DETECTION SAMPLE, QUALITATIVELY CONFIRMED
- -initial detection sample is confirmed only qualitatively (eg. by using mass spectrophotometer)
- -no further quantitative analyses

(P) INITIAL DETECTION, w/FURTHER QUANTITATIVE AND QUALITATIVE ANALYSES
- -indicates that beyond the quantitative values recorded for the initial and subsequent analyses, some qualitative analyses were also performed
- -qualitative analyses can be either for the initial or for the subsequent analyses
- -at least one positive subsequent analysis
- -subsequent analyses are coded with the appropriate sample type codes "D" through "L" or "-"

(D) SPLIT SAMPLE, METHOD- Different, LAB- Same
- -a split sample analyzed with a different analytical method(s) but by the same laboratory as the initial detection sample

(E) SPLIT SAMPLE, METHOD- Same, LAB- Different
- -a split sample analyzed with the same analytical method(s) but by a different laboratory than the initial detection sample

(F) SPLIT SAMPLE, METHOD- Different, LAB- Different
- -a split sample analyzed with a different analytical method(s) and by a different laboratory than the initial detection sample

(G) SPLIT SAMPLE, METHOD- Same, LAB- Same
- -a split sample analyzed with the same analytical method(s) and by the same laboratory as the initial detection sample

(H) REPLICATE SAMPLE, METHOD- Different, LAB- Same
- -a replicate sample analyzed with a different analytical method(s) but by the same laboratory as the initial detection sample

(J) REPLICATE SAMPLE, METHOD- Different, LAB- Different
- -a replicate sample analyzed with a different analytical method(s) and by a different laboratory as the initial detection sample

(K) REPLICATE SAMPLE, METHOD- Same, LAB- Different
- -a replicate sample analyzed with the same analytical method(s) but by a different laboratory as the initial detection sample.

(L) REPLICATE SAMPLE, METHOD- SAME, LAB-SAME
- -a replicate sample analyzed with the same analytical method(s) but by a different laboratory as the initial detection sample

(A) AVERAGED RESULT
- -averaged lab results from two or more samples
- -as of 1986, code no longer used

(N) SINGLE, NON-DETECTED
- -negative lab result from a single sample
- -as of 7-27-87, code no longer used

(O) SINGLE RESULT
- -a positive or a negative value for a single observation
- -as of 1986, code no longer used

(R) ROUTINE, ONGOING
-analyses from wells which are sampled on a regular, periodic basis
-these samples must have an initial sample to correspond to

(S) SPLIT SAMPLE
-no initial detection sample
-all split samples are negative

(-) NOT SPECIFIED
-used when laboratory or analytical methods are unknown for analyses subsequent to initial detection sample
-used when all discrete samples are negative

VII. Analyzing Laboratory Code

Code	Laboratory Name
1833	Aerojet-General Corportation, Solid Propulsion Lab
2378	Analytical Technologies, Inc. Lab
3346	Anatec, Inc., Lab
5991	Anlab- Dewante and Stowell Lab
2371	Appl, Inc., Lab
4792	Associated Lab
5806	B C Lab
4790	Babcock and Sons Lab
5810	Braun, Skaggs, and Kevorkian Lab
9534	Brelje and Race Lab
5819	Brown and Caldwell (Emeryville) Lab
2134	Brown and Caldwell (Pasadena) Lab
5811	California-American Water Company, Monterey Lab (CT & TEL)
9527	California Analytical Lab
4323	Cal. Dept. Food and Agriculture Lab
5060	Cal. Dept. Health Services- Berkeley Lab
5091	Cal. Dept. Health Services- So. Cal. Lab
1050	California State University Lab (Fresno)
5146	California Water Labs
5701	California Water Service Company Lab
9541	Caltest Lab
9535	Canonie Environmental Services Lab
5664	Central Coast Environmental Lab
9485	CH2M Hill Lab
1016	City of Los Angeles, Bureau of Sanitation Lab
1200	City of Los Angeles, Dept. of Water and Power Lab
9490	City of Santee WWTP Lab
1431	City of Sunnyvale, WPCP Lab
7706	Dellavalle, Inc., Lab
6291	EAL Corporation Lab
7184	Environmental Monitoring and Services, Inc., Lab
5138	Fireman's Fund Insurance Companies, Environmental Lab
5112	Fresno County Health Department Lab
5867	Fruit Growers Lab
4704	IT Corporation, Lab
5119	Kern County Health Department Lab
5133	Kern County Water Agency Lab
2993	McKesson Environmental Service Lab

Code	Laboratory Name
9590	Montgomery, James M., Consulting Engineers Lab
7445	Multi-Tech, Inc., Lab
3334	North Coast, LTD, Lab
9435	Oilwell Research Lab
4417	Orange County Water District Lab
4737	S-cubed Lab
3761	San Bernardino Clinical Lab
7998	Scientific Environmental Lab
5113	Sequoia Analytical Lab
5809	Stoner Lab
3759	Thorpe Lab
9469	Truesdail Lab
5802	Twining, Fresno Lab
7227	US Department of Air Force, Brooks Base, Texas Lab
7726	US Department of Navy, Postgraduate School Lab
1190	Westco Lab

VIII. Method of Analysis Code

E = EPA approved Method
I = In-house
P = P.A.M. (Pesticide Analytical Method)
O = Other

IX. Road Code

AV = Avenue
BL = Boulevard
CR = Circle
CT = Court
DR = Drive
HY = Highway
LN = Lane
PL = Place
RD = Road
RT = Route
ST = Street
WY = Way

X. Well (Type) Code

USGS Code	CDFA Code	
	B =	Both I and D
	C =	Community well
	D =	Domestic (private) well (residences)
	I =	Irrigation (agricultural) well
	L =	Large Water System well (more than 200 service connections)
	N =	Non-community well (schools, hospitals, restaurants, filling stations, parks, campgrounds - see Title 22 for more detailed definitions)
	S =	State Small Water System well (less than 200 service connections)
	T =	Test, monitoring, or observation well
	U =	Unknown type of well
	X =	Irrigation and industrial well
	Y =	Industrial well
(D)	W =	Dewatering well (see USGS definition below)
(C)	( )=	Commercial well (we will include this category in whichever CDFA category it bests fits, for example, industrial or non-community, depending on the described use of the well; see USGS definition below).)
(S)	R =	Stock (see USGS definition below)
(U)	A =	Unused well (see USGS definition below)

(D) Dewatering means the water is pumped for dewatering a construction or mining site, or to lower the water table for agricultural purposes. In this respect, it differs from a drainage well that is used to drain surface water underground. If the main purpose for which the water is withdrawn is to provide drainage, dewatering should be indicated even though the water may be discharged into an irrigation ditch and subsequently used to irrigate land.

(C) Commercial use refers to use by a business establishment that does not fabricate or produce a product. Filling stations and motels are examples of commercial establishments. If some product is manufactured, assembled, remodeled, or otherwise fabricated, use of water for that plant should be considered industrial, even though the water is not used directly in the product or in the manufacturing of the product.

(S) Stock supply refers to the watering of livestock.

(U) Unused means water is not being removed from the site for one of the purposes described above. A test hole*, oil or gas well, recharge, drainage, observation*, or waste-disposal well will be in this category. * = this type of well will be given the CDFA code of "T"; the others will get a CDFA code of "A".

APPENDIX C

CONTAMINATION AND ANALYTICAL METHODS--VERIFICATION

Contamination and Analytical Method Verification—Definitions

Contamination Verification

Contamination verification can occur in two ways: 1) two laboratories analyze two discrete samples from the same well (taken either at the same time or through time) and both detect the presence of contamination; or 2) the same laboratory which analyzed the initial sample and detected contamination analyzes a second sample from the same well taken at a later time--within 30 days of initial sample, but preferably 24 hours subsequent to initial sampling--and also finds contamination. Simply stated, contamination verification must occur through the detection of an A.I. in two distinct samples.

Analytical Method Verification

Analytical method verification occurs when: 1) a single sample is found positive by two different analytical methods (see definition of second method below); or 2) a sample is found positive by a second laboratory even if the second laboratory uses the same method as the initial analyzing laboratory. (See definition of second method below.)

Definition of a Second Method

The criteria for second method can be met by: 1) following a detection on the GC by a detection on the HPLC (or vice versa); or 2) by using a second column in combination with a different detector on the same instrument on either the GC or HPLC; or 3) by using mass spectrometer, IR spectrometry or wet chemical analysis in conjunction with other analytical instruments.

It should be noted that, although possible, a change in detector is seldom made on the HPLC. Because of this, achievement of a second method when the initial detection occurred on the HPLC will most likely occur through the use of another type of analytical instrument.

Miscellaneous

Soil samples must meet the same verification standards as water samples.

APPENDIX D

SUMMARY OF WELL STUDIES IN THE 1988 UPDATE OF THE WELL INVENTORY DATA BASE

I. USDA - FOREST SERVICE

<u>Agency No. 5005:</u>

Study No. 51	Title 22 sampling (endrin, lindane, methoxychlor, toxaphene, 2,4-D, silvex, 2,4,5-TP; Fresno, Tulare, Kern Counties - July 1979 to October 1987; Lassen County - September 1979, 9 wells sampled; Trinity County - July 1983, July 1984, August 1984, August 1987, 10 wells sampled; Fresno County - January 1986, November 1986, December 1986, April 1987, June-July 1987, 9 wells sampled.

II. DEPARTMENT OF FOOD AND AGRICULTURE (CDFA)

<u>Agency No. 4323</u>: [Environmental Hazards Assessment Program (EHAP)]

Study No. 75	chlorpyrifos, trifluralin; Yolo County; May-June 1987. 9 wells sampled.
Study No. 81	Troiano J., Turner B., and Miller, N. <u>Sampling for Residues of Fenamiphos, Fenamiphos sulfoxide and Fenamiphos sulfone in Well Water.</u> Fresno, San Joaquin and Kern Counties; December 1987. 41 wells sampled.
Study No. 82	1,2-dichloropropane, EDB, xylenes; Yolo County; August 1987. 1 well sampled
Study No. 92	simazine PMZ sampling; Merced County; April 1988. 5 wells sampled.
Study No. 93	atrazine PMZ sampling; Merced County; April 1988. 5 wells sampled.
Study No. 96	atrazine and diazinon PMZ sampling; Butte County; April 1988. 6 wells sampled.

III. DEPARTMENT OF HEALTH SERVICES

<u>Agency No. 5060</u>: [Sanitary Engineering Branch (SEB)]

Study No. 03	DBCP data for Madera County (from original study no. 03 files); October 1979 to January 1984. 199 wells sampled.
Study No. 47	AB 1803 data; small water system wells.
Study No. 91	EPA's National Pesticide Survey Pilot Study; DBCP; Merced County; June 1987. 3 wells sampled.

IV. REGIONAL WATER QUALITY CONTROL BOARD

<u>Agency No. 5055:</u> Region 5

Study No. 49	DDE, DDT, atrazine, carbamate, thiocarbamate, phenoxy herbicide; Butte County; June and August 1986. 4 wells sampled. various contaminants; Butte County; August 1987 and January 1988. 8 wells sampled.

Study No. 54 Strawberry fumigation monitoring; various contaminants; Shasta and Tehama Counties; March - May 1984 and December 1985. 29 wells sampled.

Study No. 60 treflan, molinate, bentazon, carbofuran, and methidathion; Glenn County; July and August 1981. 5 wells sampled.

Agency No. 5089: Region 9

Study No. 76 San Diego County nonpoint source data; 1,2-D, chlordane, lindane, aldrin, dieldrin; January 1985, June 1985, March to April 1987, and June 1987. 2 wells sampled.

Study No. 80 AB 1803 update; 1,2-dichloropropane, San Diego County; January 1985, June 1985, and April 1987. 1 well sampled.

Agency No. 8493: Region 3

Study No. 84 Wilbur Ellis Co., Crop Flight, Inc., Soil Serv, Western Farm Service, and Puregro Co., data; various contaminants; Santa Cruz and Monterey Counties; October 1984 to September 1987. 5 wells sampled.

Study No. 87 Conway Farms AB1803 Followup; 1,2-D, ethyl benzene, xylenes, chloroform; Yolo County; June 1987 and October 1987. 4 wells sampled.

V. DEPARTMENT OF WATER RESOURCES

Agency No. 5050:

Study No. 73 Kern Water Bank Toxics; EDB, DBCP, aldicarb, benomyl, carbaryl, carbofuran, CIPC, EPTC, IPC, methomyl, oxamyl, and diuron; Kern County; June 1987. 5 wells sampled.

Study No. 77 Kern County Ground Water Sampling; various contaminants; Kern County; June 1987. 29 wells sampled.

VI. IMPERIAL COUNTY ENVIRONMENTAL HEALTH DEPARTMENT

Agency No. 9007:

Study No. 94 Sportsman's Paradise Well sampling; various contaminants; Imperial County; April 1987, September 1987, and February 1988. 1 well sampled.

VII. MARIN COUNTY DEPARTMENT OF HEALTH

Agency No. 7736:

Study No. 79 Title 22 monitoring; endrin, lindane, methoxychlor, toxaphene, 2,4-D, silvex; Marin County; August 1987. 1 well sampled.

Study No. 85 VS Hotel Title 22 sampling; 2,4-D, silvex, lindane endrin, methoxychlor, toxaphene; Marin County; December 1987. 1 well sampled.

Study No. 86 El Novato Trailer Park Title 22 sampling; lindane, endrin, toxaphene, methoxychlor, silvex, 2,4-D; Marin County; November 1987. 1 well sampled.

Study No. 97 Estero Mutual Well #12 Title 22 sampling; endrin, lindane, methoxychlor, toxaphene, 2,4-D, silvex; Marin County; December 1987. 1 well sampled.

VIII. RIVERSIDE COUNTY HEALTH DEPARTMENT

Agency No. 9091:

Study No. 90 OP screen, CHC screen, carbamate screen, fensulfothion, fenvalerate, methomyl, endosulfan, mevinphos, metribuzine, thiophanate-methyl; Riverside County; March 1988. 5 wells sampled.

IX. SACRAMENTO COUNTY HEALTH DEPARTMENT

Agency No. 5108:

Study No. 59 Title 22 sampling; endrin, lindane, methoxychlor, toxaphene, 2,4-D, and silvex; Sacramento County; October 1983 and March 1980. 2 wells sampled.

X. SAN DIEGO COUNTY HEALTH DEPARTMENT

Agency No. 1401:

Study No. 98 San Diego point source data; 2,4-D, silvex; San Diego County; May 1984 and September 1984. 5 well sampled.

XI. SANTA BARBARA COUNTY HEALTH DEPARTMENT

Agency No. 9039:

Study No. 89 Casmalia Area Wells; various contaminants; Santa Barbara County; June to August 1987. 5 wells sampled.

XII. SOLANO IRRIGATION DISTRICT

Agency No. 2684:

Study No. 78 Title 22 sampling; endrin, lindane, methoxychlor, toxaphene, 2,4-D, silvex; Solano County; January to July 1987. 27 wells sampled.

XIII. STOCKTON EAST WATER DISTRICT

Agency No. 5550:

Study No. 83 Federal Clean Water District; various contaminants; San Joaquin County; March 1987. 40 wells sampled.

APPENDIX E

RESULTS BY COUNTY

AND

BY PESTICIDE ACTIVE INGREDIENT

COUNTY: ALAMEDA

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
1,2-D	0	0	10	19	10	19
1,3-D	0	0	10	38	10	38
methyl bromide	0	0	10	19	10	19
orthodichlorobenzene	0	0	10	19	10	19
paradichlorobenzene	0	0	10	19	10	19
xylene	0	0	10	19	10	19

TOTAL SAMPLE RESULTS 0 133 133

COUNTY: BUTTE

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
1,2-D	0	0	11	11	11	11
1,3-D	0	0	9	18	9	18
BHC (all isomers)	0	0	3	5	3	5
DBCP	0	0	5	5	5	5
DDD	0	0	1	1	1	1
DDE	2	4	1	1	3	5
DDT	0	0	1	1	1	1
PCP	0	0	1	1	1	1
acenapthene	0	0	3	3	3	3
aldrin	0	0	1	1	1	1
atrazine	2	6	5	5	7	11
benomyl	0	0	5	5	5	5

COUNTY: BUTTE

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
captan	0	0	5	5	5	5
carbaryl	0	0	5	5	5	5
chlordane	0	0	5	5	5	5
diazinon	0	0	12	14	12	14
dieldrin	0	0	1	1	1	1
dinoseb	0	0	5	5	5	5
endosulfan	0	0	8	11	8	11
endosulfan sulfate	0	0	3	3	3	3
endrin	0	0	1	1	1	1
endrin aldehyde	0	0	3	3	3	3
heptachlor	0	0	1	1	1	1
heptachlor epoxide	0	0	1	1	1	1
hexachlorobenzene	0	0	1	1	1	1
lindane (gamma-BHC)	0	0	1	1	1	1
methyl bromide	0	0	11	11	11	11
orthodichlorobenzene	0	0	11	14	11	14
oryzalin	0	0	5	5	5	5
paradichlorobenzene	0	0	11	13	11	13
paraquat	0	0	5	5	5	5
parathion	0	0	5	5	5	5
simazine	0	0	5	5	5	5
toxaphene	0	0	1	1	1	1
xylene	0	0	9	9	9	9
ziram	0	0	5	5	5	5

TOTAL SAMPLE RESULTS 10 183 193

COUNTY: CONTRA COSTA

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
1,2-D	0	0	4	4	4	4
1,3-D	0	0	4	8	4	8
2,4-D	0	0	1	1	1	1
DDD	0	0	1	1	1	1
DDE	0	0	2	2	2	2
DDT	0	0	2	2	2	2
atrazine	0	0	1	1	1	1
azinophos-methyl	0	0	1	1	1	1
benomyl	0	0	1	1	1	1
captan	0	0	1	1	1	1
carbaryl	0	0	1	1	1	1
carbofuran	0	0	1	1	1	1
chlordane	0	0	1	1	1	1
chlorpyrifos	0	0	1	1	1	1
demeton	0	0	1	1	1	1
diazinon	0	0	1	1	1	1
dicofol	0	0	1	1	1	1
disulfoton	0	0	1	1	1	1
endosulfan	0	0	2	3	2	3
endosulfan sulfate	0	0	1	1	1	1
ethion	0	0	1	1	1	1
lindane (gamma-BHC)	0	0	1	1	1	1
malathion	0	0	1	1	1	1
methomyl	0	0	1	1	1	1
methoxychlor	0	0	1	1	1	1
methyl bromide	0	0	4	4	4	4

COUNTY: CONTRA COSTA

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
methyl parathion	0	0	2	3	2	3
mevinphos	0	0	1	1	1	1
orthodichlorobenzene	0	0	4	4	4	4
oxamyl	0	0	1	1	1	1
paradichlorobenzene	0	0	3	3	3	3
paraquat	0	0	1	1	1	1
parathion	0	0	1	1	1	1
phorate	0	0	1	1	1	1
simazine	0	0	1	1	1	1
toxaphene	0	0	1	1	1	1
trifluralin	0	0	1	1	1	1
xylene	0	0	4	4	4	4
TOTAL SAMPLE RESULTS		0		65		65

COUNTY: DEL NORTE

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
2,4-D	0	0	3	3	3	3
endrin	0	0	3	4	3	4
lindane (gamma-BHC)	0	0	3	4	3	4
methoxychlor	0	0	3	3	3	3
silvex	0	0	3	3	3	3
toxaphene	0	0	3	3	3	3
TOTAL SAMPLE RESULTS		0		20		20

COUNTY: FRESNO

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
1,2-D	0	0	20	22	20	22
1,3-D	0	0	20	44	20	44
2,4-D	0	0	8	9	8	9
BHC (all isomers)	0	0	2	4	2	4
DBCP	49	135	77	90	126	225
DDD	0	0	2	2	2	2
DDE	0	0	2	2	2	2
DDT	0	0	2	2	2	2
DDVP	0	0	1	1	1	1
DEF	0	0	1	1	1	1
EDB	0	0	4	4	4	4
PCNB	0	0	1	1	1	1
PCP	0	0	1	1	1	1
acenapthene	0	0	1	1	1	1
acephate	0	0	1	1	1	1
aldicarb	0	0	1	1	1	1
aldrin	0	0	2	2	2	2
arsenic	0	0	1	1	1	1
captan	0	0	1	1	1	1
carbaryl	0	0	1	1	1	1
carbofuran	0	0	1	1	1	1
carbophenothion	0	0	1	1	1	1
chlordane	0	0	2	2	2	2
chlorpyrifos	0	0	2	2	2	2
copper	0	0	1	1	1	1
diazinon	0	0	1	1	1	1

COUNTY: FRESNO

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
dicofol	0	0	2	2	2	2
dieldrin	0	0	2	2	2	2
dimethoate	0	0	2	2	2	2
dinoseb	0	0	2	2	2	2
disulfoton	0	0	1	1	1	1
diuron	0	0	1	1	1	1
endosulfan	0	0	4	6	4	6
endosulfan sulfate	0	0	1	1	1	1
endrin	0	0	10	11	10	11
endrin aldehyde	0	0	1	1	1	1
ethion	0	0	1	1	1	1
fenamiphos	0	0	24	28	24	28
fenamiphos sulfone	0	0	24	28	24	28
fenamiphos sulfoxide	0	0	24	28	24	28
fenthion	0	0	1	1	1	1
heptachlor	0	0	2	2	2	2
heptachlor epoxide	0	0	1	1	1	1
hexachlorobenzene	0	0	1	1	1	1
lindane (gamma-BHC)	0	0	10	11	10	11
malathion	0	0	1	1	1	1
methamidophos	0	0	1	1	1	1
methoxychlor	0	0	10	11	10	11
methyl bromide	0	0	20	22	20	22
naled	0	0	1	1	1	1
orthodichlorobenzene	0	0	20	23	20	23
paradichlorobenzene	0	0	20	23	20	23

COUNTY: FRESNO

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
paraquat	0	0	2	2	2	2
parathion	0	0	1	1	1	1
phorate	0	0	1	1	1	1
silvex	0	0	8	9	8	9
simazine	0	0	1	1	1	1
toxaphene	0	0	10	11	10	11
trifluralin	0	0	1	1	1	1
xylene	0	0	20	22	20	22
TOTAL SAMPLE RESULTS		135		459		594

COUNTY: HUMBOLDT

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
2,4-D	0	0	2	2	2	2
endrin	0	0	2	2	2	2
lindane (gamma-BHC)	0	0	2	2	2	2
methoxychlor	0	0	2	2	2	2
silvex	0	0	2	2	2	2
toxaphene	0	0	2	2	2	2
TOTAL SAMPLE RESULTS		0		12		12

COUNTY: GLENN

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
1,2-D	0	0	5	5	5	5
1,3-D	0	0	5	10	5	10
bentazon	1	2	4	4	5	6
carbofuran	0	0	5	6	5	6
methidathion	0	0	5	6	5	6
methyl bromide	0	0	5	5	5	5
molinate	0	0	5	6	5	6
orthodichlorobenzene	0	0	5	5	5	5
paradichlorobenzene	0	0	5	5	5	5
trifluralin	0	0	5	6	5	6
xylene	0	0	5	5	5	5
TOTAL SAMPLE RESULTS		2		63		65

COUNTY: IMPERIAL

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
1,1,1-trichloroethane	0	0	1	4	1	4
1,1,2-trichloroethane	0	0	1	2	1	2
1,2-D	1	2	0	0	1	2
1,3-D	0	0	1	3	1	3
EDB	0	0	1	1	1	1
methylene chloride	0	0	1	3	1	3
orthodichlorobenzene	0	0	1	3	1	3
paradichlorobenzene	0	0	1	3	1	3
xylene	0	0	1	2	1	2
TOTAL SAMPLE RESULTS		2		21		23

COUNTY: INYO

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
1,2-D	0	0	6	7	6	7
1,3-D	0	0	6	14	6	14
methyl bromide	0	0	6	7	6	7
orthodichlorobenzene	0	0	6	7	6	7
paradichlorobenzene	0	0	6	7	6	7
xylene	0	0	6	7	6	7
TOTAL SAMPLE RESULTS		0		49		49

COUNTY: KERN

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
1,1,1-trichloroethane	0	0	29	35	29	35
1,1,2-trichloroethane	0	0	29	35	29	35
1,2-D	0	0	222	309	222	309
1,3-D	0	0	226	607	226	607
2,4,5-T	0	0	29	35	29	35
2,4,6-trichlorophenol	0	0	29	29	29	29
2,4-D	0	0	32	39	32	39
2,4-dinitrophenol	0	0	29	29	29	29
BHC (all isomers)	0	0	31	40	31	40
CDEC	0	0	6	6	6	6
DBCP	2	4	80	123	82	127
DDD	0	0	31	37	31	37

COUNTY: KERN

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
DDE	0	0	31	37	31	37
DDT	0	0	34	40	34	40
DEF	0	0	29	29	29	29
DMPA	0	0	29	29	29	29
DNOC	0	0	64	64	64	64
EDB	0	0	33	65	33	65
EPTC	0	0	71	71	71	71
MCPA (no salt)	0	0	29	35	29	35
PCNB	0	0	33	34	33	34
PCP	0	0	91	98	91	98
acenapthene	0	0	61	61	61	61
acephate	0	0	66	66	66	66
alachlor	0	0	30	37	30	37
aldicarb	0	0	6	7	6	7
aldrin	0	0	32	38	32	38
aminocarb	0	0	29	29	29	29
atrazine	0	0	74	83	74	83
azinophos-methyl	0	0	95	95	95	95
barban	0	0	29	29	29	29
benefin	0	0	93	93	93	93
benomyl	0	0	89	89	89	89
bromacil	0	0	93	93	93	93
captafol	0	0	6	6	6	6
captan	0	0	32	39	32	39
carbaryl	0	0	101	102	101	102
carbofuran	0	0	100	100	100	100

COUNTY: KERN

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
carbophenothion	0	0	29	64	29	64
chlordane	0	0	34	40	34	40
chlordimeform	0	0	64	64	64	64
chloropicrin	0	0	68	69	68	69
chlorothalonil	0	0	9	10	9	10
chlorpropham	0	0	99	105	99	105
chlorpyrifos	0	0	96	103	96	103
chlorthal-dimethyl	0	0	31	37	31	37
crufomate	0	0	6	6	6	6
cyanazine	0	0	44	46	44	46
demeton	0	0	95	101	95	101
diazinon	0	0	34	41	34	41
dicamba	0	0	29	29	29	29
dicofol	0	0	96	103	96	103
dicrotophos	0	0	6	6	6	6
dieldrin	0	0	31	37	31	37
dimethoate	0	0	96	97	96	97
dinoseb	0	0	94	95	94	95
dioxathion	0	0	6	6	6	6
diphenamid	0	0	93	93	93	93
disulfoton	0	0	96	97	96	97
diuron	0	0	100	106	100	106
endosulfan	0	0	35	49	35	49
endosulfan sulfate	0	0	35	36	35	36
endothall	0	0	65	66	65	66
endrin	0	0	34	42	34	42

COUNTY: KERN

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
endrin aldehyde	0	0	1	1	1	1
ethion	0	0	95	101	95	101
ethylan	0	0	6	6	6	6
fenamiphos	0	0	99	103	99	103
fenamiphos sulfone	0	0	4	8	4	8
fenamiphos sulfoxide	0	0	4	8	4	8
fenthion	0	0	6	6	6	6
fenuron	0	0	29	29	29	29
fluchloralin	0	0	63	63	63	63
fluometuron	0	0	29	29	29	29
heptachlor	0	0	30	36	30	36
heptachlor epoxide	0	0	30	36	30	36
hexachlorobenzene	0	0	61	61	61	61
lindane (gamma-BHC)	0	0	34	42	34	42
linuron	0	0	29	29	29	29
malathion	0	0	95	101	95	101
maneb	0	0	1	2	1	2
merphos	0	0	64	64	64	64
methamidophos	0	0	67	68	67	68
methidathion	0	0	72	73	72	73
methiocarb	0	0	29	29	29	29
methomyl	0	0	101	102	101	102
methoxychlor	0	0	34	41	34	41
methyl bromide	0	0	232	387	232	387
methyl parathion	0	0	29	35	29	35
mevinphos	0	0	66	66	66	66

COUNTY: KERN

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
mexacarbate	0	0	29	29	29	29
monuron	0	0	29	29	29	29
napropamide	0	0	64	65	64	65
neburon	0	0	29	29	29	29
nitrofen	0	0	29	35	29	35
orthodichlorobenzene	0	0	231	376	231	376
oryzalin	0	0	63	63	63	63
oxamyl	0	0	100	100	100	100
paradichlorobenzene	0	0	231	376	231	376
paraquat	0	0	1	2	1	2
parathion	0	0	99	106	99	106
permethrin (cis and trans)	0	0	64	64	64	64
phorate	0	0	99	106	99	106
phosmet	0	0	6	6	6	6
prometon	0	0	95	95	95	95
prometryn	0	0	44	46	44	46
propachlor	0	0	29	29	29	29
propanil	0	0	6	6	6	6
propargite	0	0	64	64	64	64
propazine	0	0	29	29	29	29
propham	0	0	100	100	100	100
propoxur	0	0	29	29	29	29
propyzamide	0	0	70	70	70	70
siduron	0	0	29	29	29	29
silvex	0	0	32	39	32	39
simazine	0	0	74	77	74	77

COUNTY: KERN

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
tetrachlorophenol	0	0	6	6	6	6
thiobencarb	0	0	29	35	29	35
toxaphene	0	0	37	45	37	45
trichlorophon	0	0	66	66	66	66
trifluralin	0	0	29	29	29	29
xylene	0	0	197	285	197	285
TOTAL SAMPLE RESULTS		4		8332		8336

COUNTY: KINGS

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
1,2-D	0	0	16	16	16	16
1,3-D	0	0	16	32	16	32
2,4-D	0	0	16	16	16	16
PCNB	0	0	16	16	16	16
alachlor	0	0	16	16	16	16
aldicarb	0	0	16	16	16	16
atrazine	0	0	16	16	16	16
captan	0	0	16	16	16	16
carbaryl	0	0	16	16	16	16
chloropicrin	0	0	16	16	16	16
chlorothalonil	0	0	16	16	16	16
chlorpyrifos	0	0	16	16	16	16

COUNTY: KINGS

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
diazinon	0	0	16	16	16	16
dicofol	0	0	16	16	16	16
dimethoate	0	0	16	16	16	16
dinoseb	0	0	16	16	16	16
disulfoton	0	0	16	16	16	16
endosulfan	0	0	16	16	16	16
endosulfan sulfate	0	0	16	16	16	16
endothall	0	0	16	16	16	16
endrin	0	0	16	16	16	16
lindane (gamma-BHC)	0	0	16	16	16	16
maneb	0	0	16	16	16	16
methamidophos	0	0	16	16	16	16
methidathion	0	0	16	16	16	16
methomyl	0	0	16	16	16	16
methoxychlor	0	0	16	16	16	16
methyl bromide	0	0	16	16	16	16
napropamide	0	0	16	16	16	16
orthodichlorobenzene	0	0	16	16	16	16
paradichlorobenzene	0	0	16	16	16	16
paraquat	0	0	16	16	16	16
parathion	0	0	16	16	16	16
phorate	0	0	16	16	16	16
silvex	0	0	16	16	16	16
simazine	0	0	16	16	16	16
toxaphene	0	0	16	16	16	16
xylene	0	0	16	16	16	16
TOTAL SAMPLE RESULTS		0		624		624

COUNTY: LASSEN

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
2,4-D	0	0	5	5	5	5
endrin	0	0	5	5	5	5
lindane (gamma-BHC)	0	0	5	5	5	5
methoxychlor	0	0	5	5	5	5
silvex	0	0	5	5	5	5
toxaphene	0	0	5	5	5	5
TOTAL SAMPLE RESULTS		0		30		30

COUNTY: LOS ANGELES

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
1,2-D	0	0	80	100	80	100
1,3-D	0	0	80	200	80	200
DBCP	0	0	22	22	22	22
atrazine	0	0	22	22	22	22
chlorpyrifos	0	0	23	23	23	23
cyanazine	0	0	23	24	23	24
demeton	0	0	23	23	23	23
dicofol	0	0	23	23	23	23
dimethoate	0	0	23	23	23	23
disulfoton	0	0	23	23	23	23
ethion	0	0	23	23	23	23
fenamiphos	0	0	23	23	23	23

COUNTY: LOS ANGELES

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
malathion	0	0	23	23	23	23
methamidophos	0	0	23	23	23	23
methidathion	0	0	23	23	23	23
methyl bromide	0	0	80	100	80	100
mevinphos	0	0	23	23	23	23
orthodichlorobenzene	0	0	80	100	80	100
paradichlorobenzene	0	0	80	100	80	100
parathion	0	0	23	23	23	23
phorate	0	0	23	23	23	23
prometryn	0	0	23	24	23	24
simazine	0	0	23	24	23	24
trichlorophon	0	0	23	23	23	23
xylene	0	0	79	99	79	99
TOTAL SAMPLE RESULTS		0		1137		1137

COUNTY: MADERA

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
1,2-D	0	0	63	64	63	64
1,3-D	0	0	63	128	63	128
2,4-D	0	0	6	6	6	6
BHC (all isomers)	0	0	3	9	3	9
DBCP	22	53	90	91	112	144

COUNTY: MADERA

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
DDD	0	0	3	3	3	3
DDE	0	0	3	3	3	3
DDT	0	0	3	3	3	3
DEF	0	0	36	36	36	36
PCNB	0	0	37	37	37	37
PCP	0	0	3	3	3	3
acenapthene	0	0	3	3	3	3
acephate	0	0	1	1	1	1
alachlor	0	0	37	37	37	37
aldicarb	0	0	15	16	15	16
aldrin	0	0	3	3	3	3
atrazine	0	0	30	30	30	30
benomyl	0	0	29	29	29	29
bromacil	0	0	29	29	29	29
captan	0	0	19	19	19	19
carbaryl	0	0	29	29	29	29
carbofuran	0	0	29	29	29	29
chlordane	0	0	3	3	3	3
chloropicrin	0	0	19	19	19	19
chlorothalonil	0	0	35	35	35	35
chlorpyrifos	0	0	38	38	38	38
chlorthal-dimethyl	0	0	37	37	37	37
cyanazine	0	0	30	30	30	30
diazinon	0	0	37	37	37	37
dicofol	0	0	37	37	37	37
dieldrin	0	0	3	3	3	3
dimethoate	0	0	39	39	39	39

COUNTY: MADERA

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
disulfoton	0	0	38	38	38	38
diuron	0	0	29	29	29	29
endosulfan	0	0	38	80	38	80
endosulfan sulfate	0	0	3	3	3	3
endrin	0	0	9	9	9	9
endrin aldehyde	0	0	3	3	3	3
fenamiphos	0	0	38	38	38	38
heptachlor	0	0	3	3	3	3
heptachlor epoxide	0	0	3	3	3	3
hexachlorobenzene	0	0	3	3	3	3
lindane (gamma-BHC)	0	0	9	9	9	9
merphos	0	0	2	2	2	2
methamidophos	0	0	1	1	1	1
methomyl	0	0	29	29	29	29
methoxychlor	0	0	6	6	6	6
methyl bromide	0	0	63	64	63	64
orthodichlorobenzene	0	0	63	67	63	67
oxamyl	0	0	29	29	29	29
paradichlorobenzene	0	0	63	67	63	67
parathion	0	0	38	38	38	38
phorate	0	0	39	39	39	39
prometryn	0	0	29	29	29	29
propazine	0	0	22	22	22	22
silvex	0	0	6	6	6	6
simazine	0	0	8	8	8	8
toxaphene	0	0	9	9	9	9
xylene	0	0	63	64	63	64

TOTAL SAMPLE RESULTS 53 1584 1637

COUNTY: MARIN

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
2,4-D	0	0	4	4	4	4
endrin	0	0	4	4	4	4
lindane (gamma-BHC)	0	0	4	4	4	4
methoxychlor	0	0	4	4	4	4
silvex	0	0	4	4	4	4
toxaphene	0	0	4	4	4	4

TOTAL SAMPLE RESULTS 0 24 24

COUNTY: MENDOCINO

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
1,2-D	0	0	1	1	1	1
1,3-D	0	0	1	2	1	2
methyl bromide	0	0	1	1	1	1
orthodichlorobenzene	0	0	1	1	1	1
paradichlorobenzene	0	0	1	1	1	1
xylene	0	0	1	1	1	1

TOTAL SAMPLE RESULTS 0 7 7

COUNTY: MERCED

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
1,2-D	0	0	63	66	63	66
1,3-D	0	0	63	130	63	130
2,4-D	0	0	24	24	24	24
BHC (all isomers)	0	0	21	64	21	64
DBCP	4	10	53	54	57	64
DDD	0	0	21	21	21	21
DDE	0	0	21	21	21	21
DDT	0	0	21	21	21	21
DMPA	0	0	21	21	21	21
EPTC	0	0	21	21	21	21
MCPA, dimethylamine salt	0	0	21	21	21	21
PCNB	0	0	9	9	9	9
alachlor	0	0	21	21	21	21
aldrin	0	0	21	21	21	21
atrazine	0	0	45	45	45	45
azinophos-methyl	0	0	21	21	21	21
benefin	0	0	20	20	20	20
benomyl	0	0	21	21	21	21
captan	0	0	21	21	21	21
carbaryl	0	0	21	21	21	21
carbofuran	0	0	21	21	21	21
carbophenothion	0	0	21	21	21	21
chlordane	0	0	21	21	21	21
chloropicrin	0	0	21	21	21	21
chlorpyrifos	0	0	21	21	21	21
chlorthal-dimethyl	0	0	21	21	21	21

COUNTY: MERCED

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
diazinon	0	0	21	21	21	21
dicamba	0	0	21	21	21	21
dicofol	0	0	21	21	21	21
dieldrin	0	0	21	21	21	21
dimethoate	0	0	21	21	21	21
dinoseb	0	0	21	21	21	21
diphenamid	0	0	21	21	21	21
disulfoton	0	0	21	21	21	21
diuron	0	0	21	21	21	21
endosulfan	0	0	21	42	21	42
endosulfan sulfate	0	0	21	21	21	21
endrin	0	0	24	24	24	24
ethion	0	0	21	21	21	21
fenamiphos	0	0	21	21	21	21
fensulfothion	0	0	21	21	21	21
heptachlor	0	0	21	21	21	21
heptachlor epoxide	0	0	21	22	21	22
lindane (gamma-BHC)	0	0	24	24	24	24
linuron	0	0	21	21	21	21
malathion	0	0	21	21	21	21
merphos	0	0	21	21	21	21
methamidophos	0	0	21	21	21	21
methidathion	0	0	21	21	21	21
methiocarb	0	0	21	21	21	21
methomyl	0	0	21	21	21	21
methoxychlor	0	0	23	23	23	23

COUNTY: MERCED

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
methyl bromide	0	0	63	67	63	67
methyl parathion	0	0	21	21	21	21
methyl trithion	0	0	21	21	21	21
mevinphos	0	0	21	21	21	21
mexacarbate	0	0	21	21	21	21
monuron	0	0	21	21	21	21
naled	0	0	21	21	21	21
nitrofen	0	0	21	21	21	21
orthodichlorobenzene	0	0	57	60	57	60
oxamyl	0	0	21	21	21	21
paradichlorobenzene	0	0	57	60	57	60
parathion	0	0	21	21	21	21
phorate	0	0	21	21	21	21
phosalone	0	0	21	21	21	21
phosmet	0	0	21	21	21	21
phosphamidon	0	0	21	21	21	21
prometon	0	0	21	21	21	21
propachlor	0	0	21	21	21	21
propanil	0	0	21	21	21	21
propham	0	0	21	21	21	21
propoxur	0	0	21	21	21	21
silvex	0	0	24	24	24	24
simazine	1	2	44	44	45	46
toxaphene	0	0	24	24	24	24
trifluralin	0	0	21	21	21	21
xylene	0	0	61	62	61	62
TOTAL SAMPLE RESULTS		12		2106		2118

COUNTY: MONTEREY

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
1,2-D	0	0	264	352	264	352
1,3-D	0	0	262	668	262	668
2,4,5-T	0	0	35	36	35	36
2,4-D	0	0	68	71	68	71
BHC (all isomers)	0	0	10	19	10	19
DBCP	0	0	67	68	67	68
DDD	0	0	14	19	14	19
DDE	0	0	14	21	14	21
DDT	1	2	25	33	26	35
EDB	0	0	1	4	1	4
EPTC	0	0	1	1	1	1
MCPA (sodium salt)	0	0	2	3	2	3
MCPA, alkanolamine salt	0	0	2	3	2	3
MCPA, butoxyethanol ester	0	0	2	3	2	3
MCPA, dimethylamine salt	0	0	2	3	2	3
MCPA, isooctyl ester	0	0	2	3	2	3
MCPP, diethanolamine salt	0	0	1	1	1	1
MCPP, dimethylamine salt	0	0	1	1	1	1
MCPP, potassium salt	0	0	1	1	1	1
PCNB	0	0	2	2	2	2
PCP	0	0	4	4	4	4
acenapthene	0	0	4	4	4	4
acephate	0	0	16	16	16	16
acifluorfen	0	0	4	4	4	4
alachlor	0	0	3	3	3	3
aldicarb	0	0	9	9	9	9

COUNTY: MONTEREY

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
aldrin	0	0	11	12	11	12
ametryn	0	0	1	1	1	1
aminocarb	0	0	3	3	3	3
atraton	0	0	1	1	1	1
atrazine	0	0	22	22	22	22
azinophos-methyl	0	0	4	5	4	5
barban	0	0	3	3	3	3
benefin	0	0	3	3	3	3
benomyl	0	0	36	37	36	37
bromacil	0	0	1	1	1	1
captan	0	0	34	35	34	35
carbaryl	0	0	22	22	22	22
carbofuran	0	0	9	9	9	9
carbophenothion	0	0	2	2	2	2
chlordane	0	0	11	12	11	12
chloroform	0	0	4	4	4	4
chloropicrin	0	0	31	32	31	32
chlorothalonil	0	0	7	7	7	7
chlorpropham	0	0	4	4	4	4
chlorpyrifos	0	0	16	16	16	16
chlorthal-dimethyl	2	5	1	1	3	6
coumaphos	0	0	2	2	2	2
dalapon	0	0	2	2	2	2
demeton	0	0	4	5	4	5
diazinon	0	0	46	47	46	47
dicamba	0	0	5	6	5	6

COUNTY: MONTEREY

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
dicofol	0	0	5	5	5	5
dieldrin	0	0	13	14	13	14
dimethoate	0	0	30	30	30	30
dinoseb	0	0	36	38	36	38
diphenamid	0	0	4	4	4	4
disulfoton	0	0	38	39	38	39
diuron	0	0	21	21	21	21
endosulfan	0	0	45	67	45	67
endosulfan sulfate	0	0	11	12	11	12
endothall	0	0	13	13	13	13
endrin	0	0	11	13	11	13
endrin aldehyde	0	0	9	10	9	10
ethion	0	0	2	3	2	3
ethoprop	0	0	2	2	2	2
ethylene dichloride	0	0	1	1	1	1
fenamiphos	0	0	10	10	10	10
fensulfothion	0	0	2	2	2	2
fenthion	0	0	2	2	2	2
fluometuron	0	0	4	4	4	4
fonofos	0	0	1	1	1	1
heptachlor	0	0	11	12	11	12
heptachlor epoxide	0	0	11	12	11	12
hexachlorobenzene	0	0	4	4	4	4
lindane (gamma-BHC)	0	0	12	15	12	15
linuron	0	0	3	3	3	3
malathion	0	0	2	3	2	3

COUNTY: MONTEREY

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
maneb	0	0	32	32	32	32
merphos	0	0	2	2	2	2
methamidophos	0	0	4	4	4	4
methidathion	0	0	5	5	5	5
methiocarb	0	0	3	3	3	3
methomyl	0	0	46	46	46	46
methoxychlor	0	0	5	5	5	5
methyl bromide	0	0	263	337	263	337
methyl parathion	0	0	8	9	8	9
methylene chloride	0	0	1	1	1	1
metribuzin	0	0	1	1	1	1
mevinphos	0	0	62	63	62	63
mexacarbate	0	0	3	3	3	3
monuron	0	0	3	3	3	3
naled	0	0	2	2	2	2
napropamide	0	0	1	1	1	1
neburon	0	0	3	3	3	3
nitrofen	0	0	2	2	2	2
orthodichlorobenzene	0	0	265	334	265	334
oryzalin	0	0	1	1	1	1
oxamyl	0	0	6	6	6	6
paradichlorobenzene	0	0	265	334	265	334
paraquat	0	0	1	1	1	1
parathion	0	0	17	18	17	18
phorate	0	0	2	2	2	2
prometon	0	0	1	1	1	1

COUNTY: MONTEREY

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
prometryn	0	0	3	3	3	3
propachlor	0	0	1	1	1	1
propazine	0	0	1	1	1	1
propham	0	0	4	4	4	4
propoxur	0	0	4	4	4	4
propyzamide	0	0	12	12	12	12
ronnel	0	0	1	2	1	2
secbumeton	0	0	1	1	1	1
siduron	0	0	4	4	4	4
silvex	0	0	7	8	7	8
simazine	0	0	17	17	17	17
simetryn	0	0	1	1	1	1
sulprofos	0	0	2	2	2	2
swep	0	0	1	1	1	1
terbuthylazine	0	0	1	1	1	1
terbutryn	0	0	1	1	1	1
tetrachlorvinphos	0	0	2	2	2	2
toxaphene	0	0	32	34	32	34
trichlorophon	0	0	3	3	3	3
xylene	1	2	262	328	263	330
ziram	0	0	1	1	1	1
TOTAL SAMPLE RESULTS		9		3636		3645

COUNTY: NAPA

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
1,2-D	0	0	25	25	25	25
1,3-D	0	0	25	50	25	50
benomyl	0	0	3	3	3	3
captan	0	0	2	2	2	2
carbendazim	0	0	3	3	3	3
chlorpyrifos	0	0	1	1	1	1
diazinon	0	0	2	2	2	2
dicofol	0	0	2	2	2	2
dimethoate	0	0	5	5	5	5
diquat dibromide	0	0	1	1	1	1
diuron	0	0	7	7	7	7
ethylene thiourea	0	0	2	2	2	2
fenthion	0	0	3	3	3	3
glyphosate	0	0	16	16	16	16
maneb	0	0	2	2	2	2
methyl bromide	0	0	25	25	25	25
naled	0	0	1	1	1	1
orthodichlorobenzene	0	0	25	25	25	25
oryzalin	0	0	3	3	3	3
paradichlorobenzene	0	0	25	25	25	25
paraquat	0	0	2	2	2	2
simazine	0	0	13	13	13	13
xylene	0	0	25	25	25	25
TOTAL SAMPLE RESULTS		0		243		243

COUNTY: ORANGE

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
1,2-D	0	0	24	27	24	27
1,3-D	0	0	24	54	24	54
BHC (all isomers)	0	0	15	45	15	45
DDD	0	0	15	15	15	15
DDE	0	0	15	15	15	15
DDT	0	0	15	15	15	15
aldrin	0	0	15	15	15	15
atrazine	0	0	1	3	1	3
chlordane	0	0	15	15	15	15
cyanazine	0	0	1	3	1	3
dieldrin	0	0	15	15	15	15
endosulfan	0	0	15	30	15	30
endosulfan sulfate	0	0	15	15	15	15
endrin	0	0	15	15	15	15
endrin aldehyde	0	0	15	15	15	15
heptachlor	0	0	15	15	15	15
heptachlor epoxide	0	0	15	15	15	15
lindane (gamma-BHC)	0	0	15	15	15	15
methyl bromide	0	0	24	27	24	27
orthodichlorobenzene	0	0	24	27	24	27
paradichlorobenzene	0	0	24	27	24	27
prometryn	0	0	1	3	1	3
simazine	0	0	1	3	1	3
toxaphene	0	0	15	15	15	15
xylene	0	0	24	27	24	27
TOTAL SAMPLE RESULTS		0		471		471

COUNTY: PLUMAS

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
2,4-D	0	0	3	3	3	3
endrin	0	0	3	3	3	3
lindane (gamma-BHC)	0	0	3	3	3	3
methoxychlor	0	0	3	3	3	3
silvex	0	0	3	3	3	3
toxaphene	0	0	3	3	3	3
TOTAL SAMPLE RESULTS		0		18		18

COUNTY: RIVERSIDE

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
1,2-D	0	0	168	204	168	204
1,3-D	0	0	165	360	165	360
BHC (all isomers)	0	0	31	102	31	102
DBCP	0	0	34	34	34	34
DDD	0	0	31	34	31	34
DDE	0	0	31	34	31	34
DDT	0	0	31	34	31	34
DNOC	0	0	14	15	14	15
EPTC	0	0	1	1	1	1
PCNB	0	0	13	13	13	13
PCP	0	0	14	16	14	16
acenapthene	0	0	12	13	12	13

COUNTY: RIVERSIDE

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
acephate	0	0	14	15	14	15
alachlor	0	0	23	23	23	23
aldicarb	0	0	23	23	23	23
aldrin	0	0	31	35	31	35
atrazine	0	0	33	34	33	34
azinophos-methyl	0	0	1	1	1	1
benefin	0	0	1	1	1	1
benomyl	0	0	14	15	14	15
bromacil	0	0	14	15	14	15
captan	0	0	14	15	14	15
carbaryl	0	0	14	15	14	15
carbofuran	0	0	33	34	33	34
chlordane	0	0	31	34	31	34
chlordimeform	0	0	1	1	1	1
chloropicrin	0	0	14	15	14	15
chlorothalonil	0	0	14	15	14	15
chlorpropham	0	0	5	5	5	5
chlorpyrifos	0	0	14	15	14	15
chlorthal-dimethyl	0	0	11	11	11	11
cyanazine	0	0	14	15	14	15
demeton	0	0	1	1	1	1
diazinon	0	0	13	14	13	14
dicofol	0	0	13	14	13	14
dieldrin	0	0	31	34	31	34
dimethoate	0	0	14	15	14	15
dinoseb	0	0	33	34	33	34

COUNTY: RIVERSIDE

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
diphenamid	0	0	14	15	[illegible]	15
disulfoton	0	0	14	15	14	15
diuron	0	0	33	33	33	33
endosulfan	0	0	36	91	36	91
endosulfan sulfate	0	0	31	34	31	34
endothall	0	0	14	14	14	14
endrin	0	0	31	35	31	35
endrin aldehyde	0	0	31	34	31	34
ethion	0	0	1	1	1	1
ethylene thiourea	0	0	13	13	13	13
fenamiphos	0	0	14	14	14	14
fensulfothion	0	0	5	5	5	5
fenvalerate	0	0	5	5	5	5
fluchloralin	0	0	1	1	1	1
heptachlor	0	0	31	34	31	34
heptachlor epoxide	0	0	31	34	31	34
hexachlorobenzene	0	0	12	13	12	13
lindane (gamma-BHC)	0	0	31	35	31	35
malathion	0	0	1	1	1	1
maneb	0	0	13	13	13	13
merphos	0	0	1	1	1	1
methamidophos	0	0	14	14	14	14
methidathion	0	0	1	1	1	1
methomyl	0	0	19	19	19	19
methoxychlor	0	0	1	1	1	1
methyl bromide	0	0	165	191	165	191

COUNTY: RIVERSIDE

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
metribuzin	0	0	5	5	5	5
mevinphos	0	0	6	6	6	6
napropamide	0	0	1	1	1	1
orthodichlorobenzene	0	0	164	190	164	190
oryzalin	0	0	14	14	14	14
oxamyl	0	0	33	33	33	33
paradichlorobenzene	0	0	165	191	165	191
paraquat	0	0	13	13	13	13
parathion	0	0	14	14	14	14
permethrin (cis and trans)	0	0	1	1	1	1
phorate	0	0	14	14	14	14
prometon	0	0	10	11	10	11
prometryn	0	0	14	14	14	14
propargite	0	0	1	1	1	1
propham	0	0	1	1	1	1
propyzamide	0	0	1	1	1	1
screen (carbamate)	0	0	5	5	5	5
screen (chlorinated hydrocarbon)	0	0	5	5	5	5
screen (organophosphate)	0	0	5	5	5	5
simazine	0	0	33	33	33	33
thiophanate-methyl	0	0	5	5	5	5
toxaphene	0	0	31	35	31	35
trichlorophon	0	0	1	1	1	1
xylene	0	0	165	175	165	175
ziram	0	0	13	13	13	13
TOTAL SAMPLE RESULTS		0		2763		2763

COUNTY: SACRAMENTO

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
1,2-D	0	0	78	95	78	95
1,3-D	0	0	77	182	77	182
2,4-D	0	0	42	43	42	43
BHC (all isomers)	0	0	6	18	6	18
DDD	0	0	6	6	6	6
DDE	0	0	6	6	6	6
DDT	0	0	6	6	6	6
PCP	0	0	6	6	6	6
acenapthene	0	0	6	6	6	6
aldrin	0	0	6	6	6	6
atrazine	0	0	27	27	27	27
carbaryl	0	0	4	4	4	4
carbofuran	0	0	3	3	3	3
chlordane	0	0	6	6	6	6
chlorpropham	0	0	3	3	3	3
dieldrin	0	0	6	6	6	6
diuron	0	0	26	26	26	26
endosulfan	0	0	6	12	6	12
endosulfan sulfate	0	0	6	6	6	6
endrin	0	0	48	49	48	49
endrin aldehyde	0	0	6	6	6	6
fenamiphos	0	0	13	13	13	13
heptachlor	0	0	6	6	6	6
heptachlor epoxide	0	0	6	6	6	6
hexachlorobenzene	0	0	3	3	3	3
lindane (gamma-BHC)	0	0	48	49	48	49

COUNTY: SACRAMENTO

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
methiocarb	0	0	3	3	3	3
methomyl	0	0	3	3	3	3
methoxychlor	0	0	45	46	45	46
methyl bromide	0	0	74	100	74	100
orthodichlorobenzene	0	0	77	97	77	97
oxamyl	0	0	3	3	3	3
paradichlorobenzene	0	0	77	97	77	97
parathion	0	0	2	2	2	2
pendimethalin	0	0	3	3	3	3
phorate	0	0	10	10	10	10
prometon	0	0	21	21	21	21
prometryn	0	0	1	1	1	1
propham	0	0	3	3	3	3
propoxur	0	0	3	3	3	3
silvex	0	0	42	43	42	43
simazine	0	0	26	26	26	26
toxaphene	0	0	47	48	47	48
xylene	0	0	77	90	77	90

TOTAL SAMPLE RESULTS 0 1198 1198

COUNTY: SAN BERNARDINO

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
1,2-D	0	0	296	383	296	383
1,3-D	0	0	296	763	296	763
2,4-D	0	0	59	60	59	60
BHC (all isomers)	0	0	6	15	6	15
DBCP	21	78	34	54	55	132
DDD	0	0	6	6	6	6
DDE	0	0	6	6	6	6
DDT	0	0	6	6	6	6
DNOC	0	0	1	1	1	1
MCPA, dimethylamine salt	0	0	1	1	1	1
PCP	0	0	4	4	4	4
acenapthene	0	0	3	3	3	3
aldrin	0	0	6	6	6	6
ametryn	0	0	5	5	5	5
atraton	0	0	6	6	6	6
atrazine	0	0	5	5	5	5
benefin	0	0	1	1	1	1
bromacil	0	0	4	4	4	4
captan	0	0	1	1	1	1
carbaryl	0	0	3	3	3	3
carbofuran	0	0	3	3	3	3
chlordane	0	0	6	6	6	6
chlordimeform	0	0	1	1	1	1
chloropicrin	0	0	1	1	1	1
chlorothalonil	0	0	1	1	1	1
chlorpropham	0	0	3	3	3	3

COUNTY: SAN BERNARDINO

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
chlorthal-dimethyl	0	0	1	1	1	1
dicofol	0	0	1	1	1	1
dieldrin	0	0	6	6	6	6
dinoseb	0	0	3	3	3	3
diphenamid	0	0	1	1	1	1
diuron	0	0	3	3	3	3
endosulfan	0	0	4	8	4	8
endosulfan sulfate	0	0	6	6	6	6
endothall	0	0	1	1	1	1
endrin	0	0	65	66	65	66
endrin aldehyde	0	0	6	6	6	6
fluometuron	0	0	3	3	3	3
heptachlor	0	0	6	6	6	6
heptachlor epoxide	0	0	6	6	6	6
hexachlorobenzene	0	0	3	3	3	3
lindane (gamma-BHC)	0	0	65	66	65	66
linuron	0	0	3	3	3	3
merphos	0	0	1	1	1	1
methiocarb	0	0	3	3	3	3
methomyl	0	0	3	3	3	3
methoxychlor	0	0	59	60	59	60
methyl bromide	0	0	296	384	296	384
methyl parathion	0	0	2	2	2	2
monuron	0	0	3	3	3	3
neburon	0	0	3	3	3	3
orthodichlorobenzene	0	0	294	386	294	386

COUNTY: SAN BERNARDINO

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
oxamyl	0	0	3	3	3	3
paradichlorobenzene	0	0	294	386	294	386
permethrin (cis and trans)	0	0	1	1	1	1
prometon	0	0	6	6	6	6
prometryn	0	0	6	6	6	6
propargite	0	0	1	1	1	1
propazine	0	0	6	6	6	6
propham	0	0	3	3	3	3
propoxur	0	0	3	3	3	3
propyzamide	0	0	1	1	1	1
secbumeton	0	0	5	5	5	5
siduron	0	0	3	3	3	3
silvex	0	0	59	60	59	60
simazine	0	0	6	6	6	6
simetryn	0	0	6	6	6	6
terbuthylazine	0	0	5	5	5	5
terbutryn	0	0	5	5	5	5
toxaphene	0	0	65	67	65	67
xylene	0	0	287	360	287	360
TOTAL SAMPLE RESULTS		78		3315		3393

COUNTY: SAN DIEGO

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
1,2-D	1	10	3	3	4	13
1,3-D	0	0	3	6	3	6
2,4-D	0	0	4	4	4	4
methyl bromide	0	0	3	3	3	3
orthodichlorobenzene	0	0	3	3	3	3
paradichlorobenzene	0	0	3	3	3	3
silvex	0	0	4	4	4	4
xylene	0	0	3	3	3	3
TOTAL SAMPLE RESULTS		10		29		39

COUNTY: SAN JOAQUIN

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
1,2-D	1	2	162	178	163	180
1,3-D	0	0	165	326	165	326
DBCP	1	2	51	59	52	61
DDT	0	0	1	1	1	1
DNOC	0	0	1	1	1	1
EDB	0	0	16	23	16	23
PCNB	0	0	2	2	2	2
acephate	0	0	40	47	40	47
alachlor	0	0	3	3	3	3
aldicarb	0	0	2	2	2	2
atrazine	0	0	13	13	13	13

COUNTY: SAN JOAQUIN

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
benomyl	0	0	4	4	4	4
bromacil	0	0	1	1	1	1
captan	0	0	3	3	3	3
carbaryl	0	0	32	34	32	34
carbofuran	0	0	14	14	14	14
chloropicrin	0	0	37	46	37	46
chlorothalonil	0	0	1	1	1	1
chlorpyrifos	0	0	4	4	4	4
chlorthal-dimethyl	0	0	1	1	1	1
cyanazine	0	0	12	12	12	12
diazinon	0	0	26	26	26	26
dicofol	0	0	5	5	5	5
dimethoate	0	0	39	48	39	48
dinoseb	0	0	16	16	16	16
diphenamid	0	0	12	12	12	12
disulfoton	0	0	4	4	4	4
diuron	0	0	17	17	17	17
endosulfan	0	0	4	4	4	4
endothall	0	0	8	8	8	8
ethylene thiourea	0	0	25	25	25	25
fenamiphos	0	0	17	21	17	21
fenamiphos sulfone	0	0	12	16	12	16
fenamiphos sulfoxide	0	0	12	16	12	16
maneb	0	0	21	21	21	21
methamidophos	0	0	30	33	30	33
methomyl	0	0	28	28	28	28
methyl bromide	0	0	164	180	164	180

COUNTY: SAN JOAQUIN

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
orthodichlorobenzene	0	0	134	147	134	147
oryzalin	0	0	5	6	5	6
oxamyl	0	0	4	4	4	4
paradichlorobenzene	0	0	134	147	134	147
paraquat	0	0	2	2	2	2
parathion	0	0	5	5	5	5
phorate	0	0	20	20	20	20
prometon	0	0	1	1	1	1
prometryn	0	0	12	12	12	12
simazine	0	0	7	7	7	7
toxaphene	0	0	14	18	14	18
xylene	0	0	134	147	134	147
ziram	0	0	14	14	14	14
TOTAL SAMPLE RESULTS		4		1785		1789

COUNTY: SAN LUIS OBISPO

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
1,2-D	0	0	1	1	1	1
1,3-D	0	0	2	4	2	4
2,4-D	0	0	4	4	4	4
endrin	0	0	4	4	4	4
lindane (gamma-BHC)	0	0	4	4	4	4

COUNTY: SAN LUIS OBISPO

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
methoxychlor	0	0	4	4	4	4
methyl bromide	0	0	2	2	2	2
orthodichlorobenzene	0	0	2	2	2	2
paradichlorobenzene	0	0	2	2	2	2
silvex	0	0	4	4	4	4
toxaphene	0	0	4	4	4	4
xylene	0	0	2	2	2	2

TOTAL SAMPLE RESULTS 0 37 37

COUNTY: SAN MATEO

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
1,2-D	0	0	29	30	29	30
1,3-D	0	0	29	60	29	60
2,4-D	0	0	2	2	2	2
endrin	0	0	2	2	2	2
lindane (gamma-BHC)	0	0	2	2	2	2
methoxychlor	0	0	2	2	2	2
methyl bromide	0	0	29	30	29	30
orthodichlorobenzene	0	0	29	30	29	30
paradichlorobenzene	0	0	29	30	29	30
silvex	0	0	2	2	2	2
toxaphene	0	0	2	2	2	2
xylene	0	0	29	29	29	29

TOTAL SAMPLE RESULTS 0 221 221

COUNTY: SANTA BARBARA

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
1,1,1-trichloroethane	0	0	4	5	4	5
1,1,2-trichloroethane	0	0	4	5	4	5
1,2-D	0	0	6	12	6	12
1,3-D	0	0	6	11	6	11
2,4-dinitrophenol	0	0	4	4	4	4
BHC (all isomers)	0	0	4	4	4	4
DBCP	0	0	4	4	4	4
DDD	0	0	4	4	4	4
DDE	0	0	4	4	4	4
DDT	0	0	4	4	4	4
DNOC	0	0	4	4	4	4
EDB	0	0	4	4	4	4
PCNB	0	0	4	4	4	4
PCP	0	0	4	4	4	4
acenapthene	0	0	4	4	4	4
acephate	0	0	4	4	4	4
aldrin	0	0	4	4	4	4
atrazine	0	0	4	4	4	4
benomyl	0	0	4	4	4	4
bromacil	0	0	4	4	4	4
captan	0	0	4	4	4	4
carbaryl	0	0	4	4	4	4
carbofuran	0	0	4	4	4	4
chlordane	0	0	4	4	4	4
chloropicrin	0	0	4	4	4	4
chlorpyrifos	0	0	4	4	4	4

COUNTY: SANTA BARBARA

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
cyanazine	0	0	4	4	4	4
diazinon	0	0	4	4	4	4
dicofol	0	0	4	4	4	4
dieldrin	0	0	4	4	4	4
dimethoate	0	0	4	4	4	4
diuron	0	0	4	4	4	4
endosulfan	0	0	4	4	4	4
endosulfan sulfate	0	0	4	4	4	4
endrin	0	0	4	4	4	4
endrin aldehyde	0	0	4	4	4	4
heptachlor	0	0	4	4	4	4
heptachlor epoxide	0	0	4	4	4	4
hexachlorobenzene	0	0	4	4	4	4
lindane (gamma-BHC)	0	0	4	4	4	4
maneb	0	0	4	14	4	14
methamidophos	0	0	4	4	4	4
methomyl	0	0	4	4	4	4
methoxychlor	0	0	4	4	4	4
methyl bromide	0	0	6	7	6	7
methylene chloride	0	0	4	5	4	5
naphthalene	0	0	4	4	4	4
orthodichlorobenzene	0	0	6	12	6	12
oxamyl	0	0	4	4	4	4
parachlorometacresol	0	0	4	4	4	4
paradichlorobenzene	0	0	6	12	6	12
paraquat	0	0	4	4	4	4

COUNTY: SANTA BARBARA

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
parathion	0	0	4	4	4	4
prometryn	0	0	4	4	4	4
simazine	0	0	4	4	4	4
toxaphene	0	0	4	4	4	4
trichlorobenzene	0	0	4	4	4	4
trichlorophenol	0	0	4	4	4	4
xylene	0	0	5	6	5	6
ziram	0	0	4	14	4	14
TOTAL SAMPLE RESULTS		0		299		299

COUNTY: SANTA CLARA

PESTICIDE	POSITIVE		NEGATIVE		TOTAL	
	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES	NO. OF WELLS	NO. OF SAMPLES
1,2-D	0	0	307	562	307	562
1,3-D	0	0	307	1119	307	1119
2,4-D	0	0	13	15	13	15
BHC (all isomers)	0	0	26	87	26	87
DBCP	0	0	17	17	17	17
DDD	0	0	26	29	26	29
DDE	0	0	26	29	26	29
DDT	0	0	26	29	26	29
DNOC	0	0	11	11	11	11
EPTC	0	0	16	16	16	16