

# **RESPONDENT'S EXHIBIT 7**



# National Pesticide Survey

## Summary Results of EPA's National Survey of Pesticides in Drinking Water Wells

The U.S. Environmental Protection Agency (EPA) has completed its five-year National Survey of Pesticides in Drinking Water Wells (NPS). Between 1988 and 1990, EPA sampled approximately 1300 community water system (CWS) wells and rural domestic wells for the presence of 101 pesticides, 25 pesticide degradates, and nitrate (127 analytes). The Survey results statistically represent approximately 94,600 drinking water wells at 38,300 community water systems and over 10.5 million rural domestic wells throughout the United States. This fact sheet provides an overview of the initial findings of the Survey.

EPA designed the Survey with two principal objectives: (1) to determine the frequency and concentration of the presence of pesticides and nitrate in drinking water wells nationally; and (2) to improve EPA's understanding of how the presence of pesticides and nitrate in drinking water wells is associated with patterns of pesticide use and the vulnerability of ground water to contamination. The focus of the Survey was on the quality of drinking water in wells, rather than on the quality of ground water, surface water, or drinking water at the tap. The Survey was designed to yield valuable information on both the frequency and levels of pesticides, pesticide degradates, and nitrate present in rural domestic (private) wells and community (public) drinking water wells on a *nationwide* basis. The Survey, however, was *not* designed to provide an assessment of pesticide contamination in drinking water wells at the local, county, or State levels.

### **NPS Finds Low Levels of Nitrate Common, Pesticides Much Less Common**

Of the 127 analytes, nitrate was most frequently detected in NPS wells. EPA analyzed well water samples for the combined presence of nitrate and nitrite measured as nitrogen, which are reported as a single concentration of nitrate. Based on the results of the NPS, EPA estimates that nitrate is present, at or above the analytical minimum reporting limit of 0.15 mg/L used in the Survey, in about 49,300 (52.1%) CWS wells and 5,990,000 (57.0%) rural domestic wells nationwide. Considering the precision of the Survey, EPA estimates that the number of CWS wells containing nitrate at or above the minimum reporting limit could be as low as 45,300 or as high as 53,300, and the number of rural domestic wells could be as low as 5,280,000 or as high as 6,700,000 as indicated by the associated 95% confidence intervals. The confidence intervals represent ranges, specified by an upper and lower bound, in which EPA is reasonably confident that the national estimates fall. A major source of nitrate in cultivated soils is from inorganic fertilizers. Nitrate fertilizers are applied to enhance plant growth and nitrogen is necessary in the synthesis of plant proteins. Other sources of nitrate in soil and water include animal wastes, septic systems, plant residues, and fixation from the atmosphere.

The Survey detected pesticides and pesticide degradates in drinking water wells much less frequently than nitrate. (Pesticide degradates are compounds that result from the deterioration of pesticides in the environment.) Twelve of the 126 pesticides

and pesticide degradates included in the Survey were found in the sampled wells at levels above minimum reporting limits of the Survey. Estimates of the numbers of wells in the United States containing analytes detected in the Survey and 95% confidence intervals are presented in Exhibits 1 and 2, along with the analytes' associated minimum reporting (detection) limits.

EPA estimates that 9,850 (10.4%) CWS wells and 446,000 (4.2%) rural domestic wells in the United States contain at least one pesticide or pesticide degradate (Exhibit 3) at or above the minimum reporting limits used in the Survey. Considering the precision of the Survey, the number of CWS wells containing pesticides or pesticide degradates could be as low as 6,330 or as high as 13,400 and the number of rural domestic wells could be as low as 246,000 or as high as 647,000. The two pesticide analytes most frequently detected were DCPA acid metabolites and atrazine.

DCPA acid metabolites, a degradate of DCPA (dimethyl tetrachloroterephthalate), is the most commonly detected pesticide or pesticide degradate in the Survey. The estimated numbers of CWS wells and rural domestic wells containing DCPA acid metabolites, at or above the Survey minimum reporting limit of 0.10  $\mu\text{g/L}$ , are 6,010 (6.4%) and 264,000 (2.5%), respectively (Exhibit 3). Considering the precision of the Survey, the number of CWS wells containing DCPA acid metabolites could be as low as 3,170, or as high as 8,840, and the number of rural domestic wells could be as low as 129,000 or as high as 477,000. The parent compound, DCPA, is extensively used on home lawns, golf courses, and farms for control of many annual grasses and broadleaf weeds.

Atrazine is the second most commonly detected pesticide. EPA estimates that atrazine is present, at or above the Survey minimum reporting limit of 0.12  $\mu\text{g/L}$ , in about 1,570 (1.7%) CWS wells and 70,800 (0.7%) rural domestic wells nationwide (Exhibit 3). Considering the precision of the Survey, the number of CWS wells containing atrazine could be as low as 420 or as high as 2,710, and the number of rural domestic wells could be as low as 13,300, or as high as 214,000. Atrazine is known by the common names AAtrex, Atratol, Gesaprim, and Zeaphos, and is used to control many annual broadleaf weeds and certain grasses on cropped land. It is also used for general weed control on non-cropped industrial land, selective weed control in conifer restoration and Christmas tree plantations, and non-selective control of vegetation on fallow land.

In addition to DCPA acid metabolites and atrazine, ten other pesticides were detected above Survey reporting limits. With some exceptions, these analytes were detected at both CWS wells and rural domestic wells. The following list identifies all pesticides or pesticide degradates that were detected above minimum reporting limits and whether they were detected in a CWS well or rural domestic well:

- **CWS wells:** atrazine, DCPA acid metabolites, dibromochloropropane, dinoseb, hexachlorobenzene, prometon, and simazine; and
- **rural domestic wells:** alachlor, atrazine, bentazon, DCPA acid metabolites, dibromochloropropane, ethylene dibromide, ethylene thiourea, gamma-HCH (lindane), prometon, and simazine.

Exhibits 1 and 2 provide national estimates for the number of CWS wells and rural domestic wells containing individually detected pesticides and pesticide degradates, along with the associated 95% confidence intervals. In addition, three analytes (alpha-chlordane, gamma-chlordane, and beta-HCH) were detected by EPA laboratories at concentrations much lower than the respective minimum reporting levels used by the contract laboratories. The EPA laboratories did not analyze water samples from every

well, thus national estimates cannot be produced for these pesticides. A fourth analyte, 4-nitrophenol, was detected, but national estimates could not be produced due to limitations of the laboratory analytic method for this particular chemical.

A large number of Survey analytes were not detected in any of the sampled wells at levels above NPS reporting limits. Because only a relatively small group of wells in the population were sampled, wells containing specific pesticides might not have been selected for participation in the Survey. EPA estimates that the maximum number of wells nationally that are potentially contaminated by pesticides that were not detected in the Survey is 750 CWS wells (0.8%) and 83,100 rural domestic wells (0.8%), respectively. These estimates are the upper bounds corresponding to a 95% confidence interval.

For analytes with established or proposed EPA Lifetime Health Advisory Levels (HALs) or Maximum Contaminant Levels (MCLs), most observed detections of nitrate, pesticides, and pesticide degradates were at levels well below these standards. An MCL is an enforceable standard defining the maximum permissible level of a contaminant in water that is delivered to any user of a public water system. MCLs set achievable levels of drinking water quality to protect human health. Although the MCL is not legally applicable to rural domestic wells, it was used as a standard of quality for a source of drinking water. A Lifetime HAL represents the concentration of a contaminant in water that may be consumed over an average human lifetime without causing adverse health effects. Lifetime HALs are based on health effects that were found in animals given high doses of analytes in laboratory studies. These levels include a margin of safety. Well water containing an analyte at levels exceeding EPA's MCLs or HALs may not be safe to consume.

Based on the results of the Survey, EPA estimates that 1,130 (1.2%) CWS wells and 254,000 (2.4%) rural domestic wells nationwide contain nitrate exceeding EPA's HAL and MCL of 10 milligrams per liter (mg/L) (Exhibit 4). Considering the precision of the Survey, the number of CWS wells with detectable levels of nitrate above the standard could be as low as 370 or as high as 2,600, and the number of rural domestic wells could be as low as 122,000 or as high as 464,000.

Based on those pesticides and pesticide degradates with HALs or MCLs, EPA estimates that at most 750 (0.8%) CWS wells nationally have at least one pesticide detection above the respective HALs/MCLs (Exhibit 5). EPA estimates that 60,900 (0.6%) rural domestic wells nationally contain at least one pesticide detection above the MCL/HAL. This number could be as low as 9,430 or as high as 199,000.

**A Scientifically Selected, Representative Sample of Wells**

The NPS was designed to provide statistically reliable estimates of the presence of pesticides and nitrate in the nation's well water supply. EPA used survey research methods to select a sample of wells that was representative of the total population of CWS wells and rural domestic wells in the U.S. The Survey design ensured that water samples would be taken from wells located in areas with a wide range of levels of pesticide use and ground-water vulnerability. The Survey design also ensured that a known proportion of the wells selected were from areas where pesticides were more heavily used and also from areas that were the most vulnerable to ground-water contamination. This scientific sampling process was designed to achieve a high level of precision. The Survey had two distinct statistical design components: one for sampling CWS wells and another for sampling rural domestic wells.

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### **Community Water System (CWS) Wells**

CWS wells were defined for the NPS as wells in systems of piped drinking water that either have at least 15 connections or serve at least 25 permanent residents. To be eligible, a system must have had at least one operating well (at the time of sampling) that was being used to supply drinking water. EPA targeted two categories of CWS wells in the Survey:

1. Community water system wells nationally, which included all CWS wells in the continental United States plus Alaska and Hawaii; and
2. Community water system wells in counties with high ground-water vulnerability, which made up about 22% of all CWS wells.

EPA adapted and modified a classification system called the DRASTIC index to define vulnerability of ground water to contamination. The letters in DRASTIC stand for features of the area around the well that may cause sensitivity to contamination (depth to water, recharge (net), aaquifer media, soil media, topography, impact of vadose (unsaturated) zone, conductivity (hydraulic) of the aquifer). A DRASTIC score was computed for all of the counties in the nation. Counties were assigned high, moderate or low vulnerability according to their DRASTIC scores. Selected findings for CWS wells located in counties with high ground-water vulnerability are presented in Exhibit 6. As shown in Exhibit 6, EPA estimates that 7,630 (36.7%) CWS wells in counties with high ground-water vulnerability contain nitrate, and 1,930 (9.3%) contain at least one pesticide above the Survey minimum reporting limit. Considering the precision of the Survey, the number of nitrate detections could be as low as 6,590 or as high as 8,760, and the number of pesticide detections could be as low as 1,200 or as high as 2,700. As presented earlier, the estimated percent of CWS wells nationally that contain nitrate is 52.1%, and the estimated percent containing at least one pesticide is 10.4%. Comparisons between national estimates and estimates for CWS wells in counties with high ground-water vulnerability should be made with caution. The confidence intervals presented do not account for the relationship between these two groups.

### **Rural Domestic Wells**

Rural domestic wells were defined for the NPS as drinking water wells supplying occupied housing units located in rural areas of the United States, excluding government reservations. Rural households were defined as households outside of incorporated or unincorporated places with a population of 2,500 or more and outside of urban fringe areas as defined by the U.S. Bureau of the Census. EPA targeted five categories of domestic wells in the Survey:

1. Rural domestic wells nationally, which includes all rural domestic wells in the continental United States plus Alaska and Hawaii;
2. Rural domestic wells in counties with high pesticide use;
3. Rural domestic wells in counties with high ground-water vulnerability;
4. Rural domestic wells in the "cropped and vulnerable" areas of counties; and
5. Rural domestic wells in counties with high pesticide use and high ground-water vulnerability.

Pesticide use for the second and fifth categories was defined using county agricultural pesticide sales data and information about cropping activities for 28 crops. For the third and fifth categories, EPA used the DRASTIC index to define what it means for ground water to be highly vulnerable to contamination. For the fourth category, a DRASTIC score was computed for each county subregion in which the domestic wells were sampled. Areas within counties were assigned high, moderate or low vulnerability according to DRASTIC scores. Areas were defined as "cropped and vulnerable" if they had both a DRASTIC score for the county subregion and a cropping level exceeding certain specified limits. Exhibit 7 shows the estimated percent of rural domestic wells belonging to the four subgroups of interest. As shown in Exhibit 7, EPA estimates that approximately 11.0% of rural domestic wells are in counties with high pesticide use and 27.3% are in counties with high ground-water vulnerability. Approximately 3.3% of rural domestic wells fall into both of these categories. Also, approximately 35.1% of rural domestic wells are in "cropped and vulnerable" county subregions.

Selected findings for rural domestic wells belonging to the second, third, fourth, and fifth categories are provided in Exhibits 8 and 9, which show the estimated number and percent of rural domestic wells containing nitrate and at least one pesticide, respectively. As shown in Exhibit 8, EPA estimates that 1,950,000 (52.8%) rural domestic wells in "cropped and vulnerable" county subregions contain nitrate whereas 313,000 (27.0%) contain nitrate above the Survey minimum reporting limit in counties with high pesticide use. Considering the precision of the Survey, the number in "cropped and vulnerable" county subregions could be as low as 1,420,000 or as high as 2,480,000, and the number in counties with high pesticide use could be as low as 158,000 or as high as 467,000. As indicated earlier, the estimated percent of rural domestic wells nationally that contain nitrate is 57.0%.

Approximately 2.4% of rural domestic wells nationally contain detectable levels of nitrate above the HAL and MCL of 10 mg/L. For most of the subgroups EPA estimates that a greater percent of rural domestic wells contain levels of nitrate above 10 mg/L. For instance, 5.2% of rural domestic wells in counties with high pesticide use contain nitrate at concentration levels above 10 mg/L.

Exhibit 9 presents estimates for pesticide detections in each of the rural domestic well subgroups. This exhibit indicates that 202,000 (5.5%) rural domestic wells in "cropped and vulnerable" county subregions contain at least one pesticide above the Survey detection levels. In contrast, 4.2% of rural domestic wells nationally contain at least one pesticide.

### **Detailed Local Information**

EPA developed a set of questionnaires to collect additional detailed information regarding the sampled wells. Trained State officials and survey research contractors administered NPS questionnaires to well owners and operators, residents and farmers, and county agricultural extension agents to gather information about the well construction, farming practices, and pesticide use near the wells.

### **Proven Analytical Methods**

EPA combined proven aspects of existing analytical methods with new techniques developed expressly for the Survey to produce the analytical chemistry for the Survey. EPA used eight analytical methods to analyze the 127 analytes (pesticides, pesticide degradates, and nitrate) included for study in the NPS.

Contract laboratories were used by EPA to analyze well water samples. In addition, EPA laboratories analyzed duplicate samples (for about 10 percent of the field samples collected) to provide quality assurance oversight. In this way, EPA ensured the accuracy of results reported by the contract laboratories.

## **Limitations of NPS Findings**

The National Pesticide Survey was designed to estimate the extent of pesticide contamination of drinking water wells, nationally. The Survey provides statistically reliable estimates for the 94,600 community water systems wells and 10.5 million domestic wells in the U.S. The NPS results represent the condition of drinking water in wells at the time of sampling, on a *nationwide* basis. The Survey was *not* designed to provide this information at the State or local levels. It does not provide accurate information about ground water in general, or about domestic well water in non-rural areas.

## **Where to Go for More Information**

This fact sheet is part of a series of NPS outreach materials, fact sheets and reports. The following additional fact sheets are available through EPA's Public Information Center (401 M Street SW, Washington DC 20460, 202-382-2080):

<b>Survey Design</b>	<b>Analytical Methods</b>	<b>Glossary</b>
<b>Survey Analytes</b>	<b>Project Summary</b>	<b>How EPA Will Use The NPS Results</b>
<b>Quality Assurance/Quality Control</b>	<b>Fact Sheet for each detected analyte</b>	

Additional information on the Survey and on pesticides in general can be obtained from the following sources:

U.S. EPA Safe Drinking Water Hotline 1-800-426-4791 (In Washington, DC (202) 382-5533) Monday-Friday, 8:30 am to 4:30 pm Eastern Time	Information on regulation of pesticides in drinking water
National Pesticide Telecommunications Network 1-800-858-7378 24 hours a day	Information on health effects and safe handling of pesticides
U.S. EPA Office of Pesticide Programs (OPP) Docket 401 M Street, SW Room NEG004 Washington, DC 20460 (202) 382-3587	Background documents for Survey (available for review)
National Technical Information Service (NTIS) 5285 Port Royal Road Springfield, VA 22161 (703) 487-4650	Copies of the <u>NPS Phase I Report</u> (available 1991) and <u>NPS Phase II Report</u> (when available)

## **Well Water Quality Questions**

If you are concerned about the presence of pesticides and nitrate in your private water well, contact your local or State health department. Other experts in your State environmental agency or agriculture and health department may also be helpful to you. If you receive your drinking water from a community water system and have questions about your water quality, contact your local community water system owner/operator or the State water supply agency.

## U.S. EPA Regional Office Contacts

Region	Drinking Water	Pesticides	Ground Water
I (CT, ME, MA, NH, RI, VT)	Water Quality Branch (617) 565-3531	Office of Pesticides and Toxic Substances (617) 565-3273	Ground-Water Management and Water Supply Branch (617) 565-3610
II (NJ, NY, PR, VI)	Drinking/Ground-Water Protection Branch (212) 264-1800	Pesticides and Toxic Substances Branch (212) 340-6769	Drinking/Ground-Water Protection Branch (212) 264-5635
III (DE, DC, MD, PA, WV, VA)	Drinking Water/Ground-Water Protection Branch (215) 597-8227	Toxics and Pesticides Branch (215) 597-8598	Drinking Water/Ground-Water Protection Branch (215) 597-8227
IV (AL, FL, GA, KY, MS, NC, SC, TN)	Water Quality Management Branch (404) 347-2126	Pesticides and Toxics Substances Branch (404) 347-5201	Ground-Water Protection Branch (404) 347-3866
V (IL, IN, MI, MN, OH, WI)	Safe Drinking Water Branch (312) 353-2151	Pesticides and Toxic Substances Branch (312) 886-6006	Office of Ground Water (312) 886-1490
VI (AR, LA, NM, OK, TX)	Drinking Water Branch (214) 655-7150	Pesticides and Toxics Branch (214) 655-7235	Ground-Water Branch (214) 655-6446
VII (IA, KS, MO, NE)	Drinking Water Branch (913) 551-7032	Toxics and Pesticides Branch (913) 551-7400	Office of Ground-Water Protection (913) 551-7446
VIII (CO, MT, ND, SD, UT, WY)	Drinking Water Branch (303) 293-1430	Toxic Substances Branch (303) 293-1730	Ground-Water Branch (303) 293-1796
IX (AZ, CA, HI, NV)	Drinking Water Branch (415) 744-2250	Pesticides and Toxics Branch (415) 556-5268	Water Quality Planning and Standards Branch (415) 465-2181
X (AK, ID, WA, OR)	Drinking Water Branch (206) 442-4092	Pesticides and Toxic Substances Branch (206) 442-1198	Drinking Water Branch (206) 442-4092



## Exhibit 1

### Estimated Number and Percent of Community Water System Wells Containing NPS Analytes

Analyte	Estimated Number	95% Confidence Interval (lower - upper)	Estimated Percent	95% Confidence Interval (lower - upper) <sup>1</sup>	Minimum Reporting Limit <sup>2</sup>
Nitrate <sup>3</sup>	49,300	(45,300 - 53,300)	52.1	(50.0 - 56.3)	0.15 mg/L
DCPA acid metabolites	6,010	(3,170 - 8,840)	6.4	(3.4 - 9.3)	0.10 µg/L
Atrazine	1,570	(420 - 2,710)	1.7	(0.5 - 2.9)	0.12 µg/L
Simazine	1,080	(350 - 2,540)	1.1	(0.4 - 2.7)	0.38 µg/L
Prometon	520	(78 - 1,710)	0.5	(0.1 - 1.8)	0.15 µg/L
Hexachlorobenzene	470	(61 - 1,630)	0.5	(0.1 - 1.7)	0.060 µg/L
Dibromochloropropane (DBCP)	370	(33 - 1,480)	0.4	(<0.1 - 1.6)	0.010 µg/L
Dinoseb	25	(1 - 870)	<0.1	(<0.1 - 0.9)	1.3 µg/L

- 1 Numbers between zero and 0.05 are reported as less than 0.1 (<0.1).
- 2 EPA established specific reporting limits for each analyte.
- 3 EPA analyzed samples for the combined presence of nitrate and nitrite measured as nitrogen, which is reported as a single concentration of nitrate in milligrams per liter (mg/L).

## Exhibit 2

### Estimated Number and Percent of Rural Domestic Wells Containing NPS Analytes

Analyte	Estimated Number	95% Confidence Interval (lower - upper)	Estimated Percent	95% Confidence Interval (lower - upper) <sup>1</sup>	Minimum Reporting Limit <sup>2</sup>
Nitrate <sup>3</sup>	5,990,000	(5,280,000 - 6,700,000)	57.0	(50.3 - 63.8)	0.15 mg/L
DCPA acid metabolites	264,000	(129,000 - 477,000)	2.5	(1.2 - 4.5)	0.10 µg/L
Atrazine	70,800	(13,300 - 214,000)	0.7	(0.1 - 2.0)	0.12 µg/L
Dibromochloropropane (DBCP)	38,400	(2,740 - 164,000)	0.4	(<0.1 - 1.6)	0.010 µg/L
Prometon	25,600	(640 - 142,000)	0.2	(<0.1 - 1.4)	0.15 µg/L
Simazine	25,100	(590 - 141,000)	0.2	(<0.1 - 1.3)	0.38 µg/L
Ethylene dibromide	19,200	(160 - 131,000)	0.2	(<0.1 - 1.2)	0.010 µg/L
Gamma-HCH (Lindane)	13,100	(14 - 120,000)	0.1	(<0.1 - 1.1)	0.043 µg/L
Ethylene thiourea	8,470	(1 - 111,000)	0.1	(<0.1 - 1.1)	4.5 µg/L
Bentazon	7,160	(1 - 109,000)	0.1	(<0.1 - 1.0)	0.25 µg/L
Alachlor	3,140	(1 - 101,000)	<0.1	(<0.1 - 1.0)	0.50 µg/L

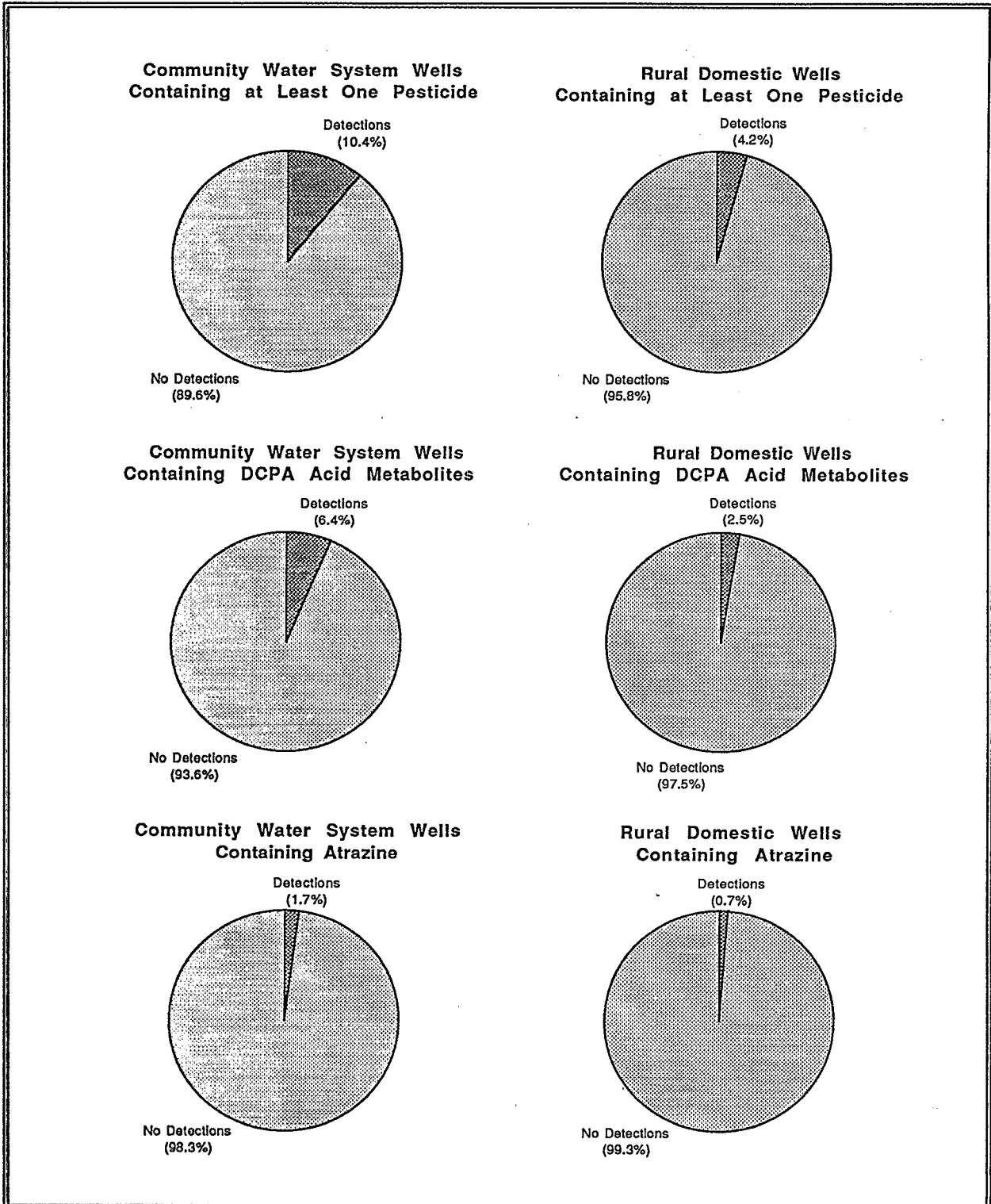
1 Numbers between zero and 0.05 are reported as less than 0.1 (<0.1).

2 EPA established specific reporting limits for each analyte.

3 EPA analyzed samples for the combined presence of nitrate and nitrite measured as nitrogen, which is reported as a single concentration of nitrate in milligrams per liter (mg/L).

### Exhibit 3

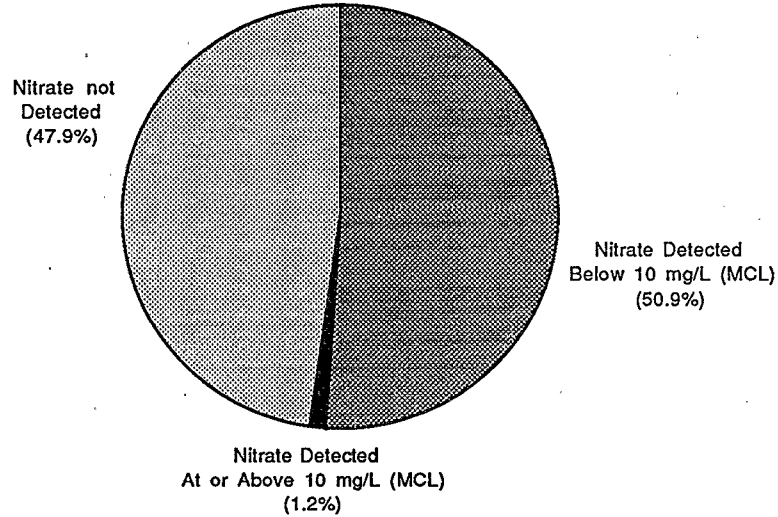
## Estimated Percent of Community Water System Wells and Rural Domestic Wells Containing at Least One Pesticide, and Containing DCPA Acid Metabolites and Atrazine



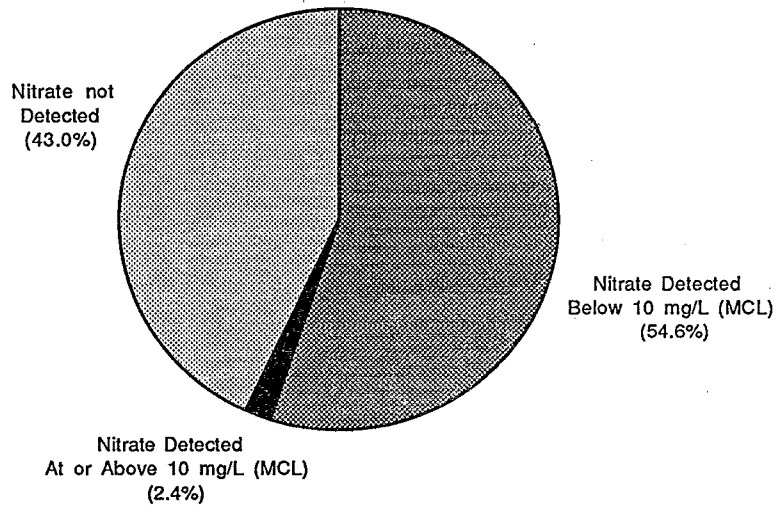
**Exhibit 4**

**Estimated Percent of Community Water System Wells and Rural Domestic Wells Containing Nitrate**

**Community Water System Wells**



**Rural Domestic Wells**



## Exhibit 5

### Estimated Number and Percent of Community Water System Wells and Rural Domestic Wells with at Least One Pesticide Detection above Health Based Standard

Description	Estimated Number	95% Confidence Interval (lower - upper)	Estimated Percent	95% Confidence Interval (lower - upper)
CWS wells above MCL <sup>1</sup> /HAL <sup>2</sup>	0	(0 - 750)	0.0	(0.0 - 0.8)
Rural domestic wells above MCL/HAL	60,900	(9,430 - 199,000)	0.6	(0.1 - 1.9)

- 1 Maximum Contaminant Level (MCL) is the maximum permissible level of a contaminant in water that is delivered to any user of a public water system. MCLs are enforceable standards.
- 2 EPA sets Lifetime Health Advisory Levels (HALs) for chemicals in drinking water. An HAL is the concentration of a contaminant in water that may be consumed over a person's lifetime without harmful effects. Lifetime HALs are based on health effects that were found in humans or animals given high doses of chemicals in laboratory studies. This level includes a margin of safety.

## Exhibit 6

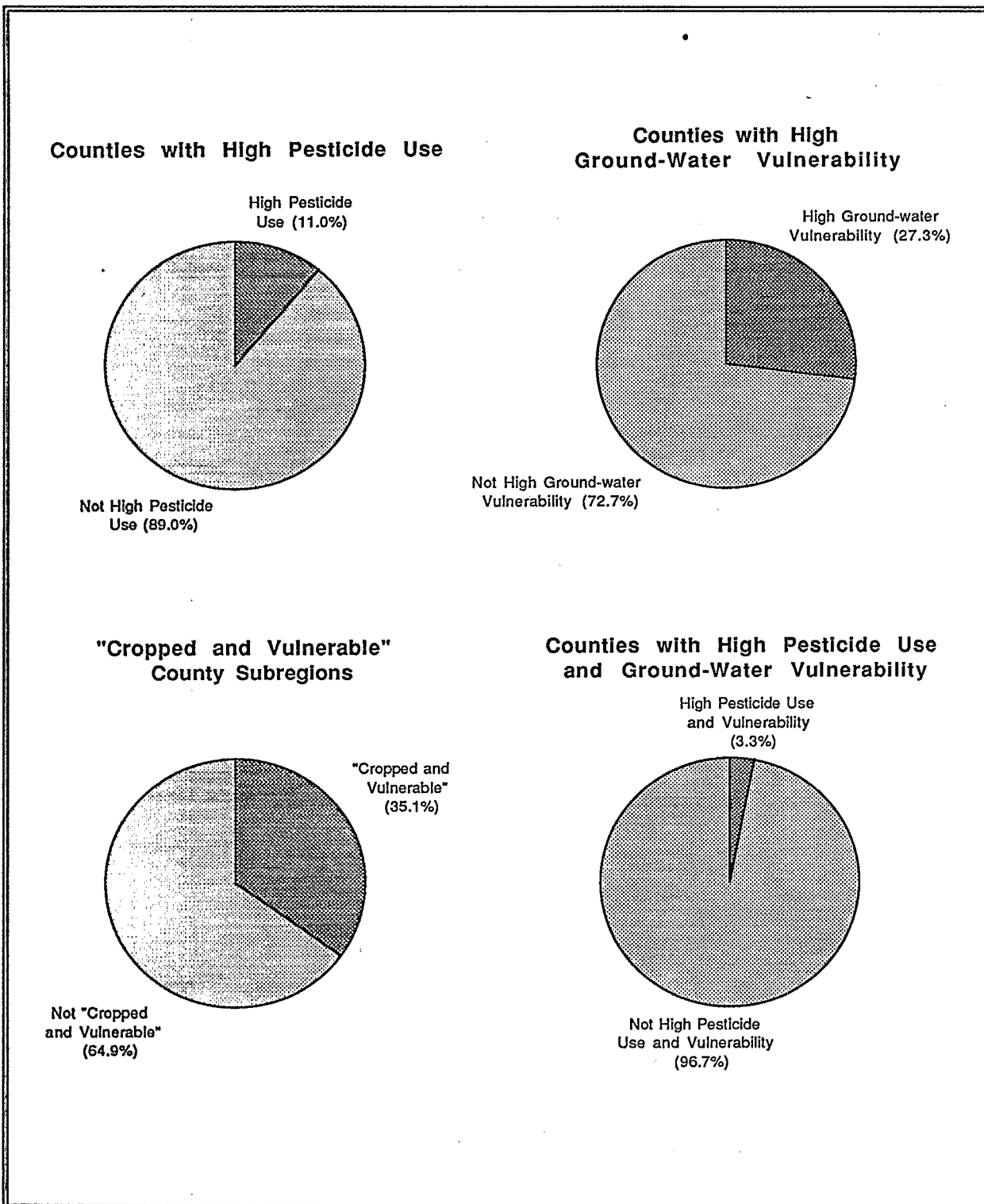
### Estimated Number and Percent of Community Water System Wells in Counties with High Ground-Water Vulnerability Containing NPS Analytes

Analyte	Estimated Number	95% Confidence Interval (lower - upper)	Estimated Percent	95% Confidence Interval (lower - upper)
Nitrate <sup>1</sup> above NPS detection limit	7,630	(6,590 - 8,670)	36.7	(32.1 - 41.3)
Nitrate concentrations above MCL <sup>2</sup> /HAL <sup>3</sup> of 10 mg/L	0	(0 - 430)	0.0	(0.0 - 2.0)
At least one pesticide above NPS detection limits	1,930	(1,200 - 2, 700)	9.3	(5.8 - 12.9)
At least one pesticide above MCL/HAL	0	(0 - 430)	0.0	(0.0 - 2.1)

- 1 EPA analyzed samples for the combined presence of nitrate and nitrite measured as nitrogen, which is reported as a single concentration of nitrate in milligrams per liter (mg/L).
- 2 Maximum Contaminant Level (MCL) is the maximum permissible level of a contaminant in water that is delivered to any user of a public water system. MCLs are enforceable standards.
- 3 EPA sets Lifetime Health Advisory Levels (HALs) for chemicals in drinking water. An HAL is the concentration of a contaminant in water that may be consumed over a person's lifetime without harmful effects. Lifetime HALs are based on health effects that were found in humans or animals given high doses of chemicals in laboratory studies. This level includes a margin of safety.

## Exhibit 7

### Estimated Percent of Rural Domestic Wells Belonging to Four Subgroups of Interest



## Exhibit 8

### Estimated Number and Percent of Subgroups of Rural Domestic Wells Containing Nitrate<sup>1</sup>

Description	Estimated Number	95% Confidence Interval (lower - upper)	Estimated Percent	95% Confidence Interval (lower - upper)
Nitrate above NPS detection limit				
In counties with high pesticide use	313,000	(158,000 - 467,000)	27.0	(14.9 - 39.2)
In counties with high ground-water vulnerability	1,350,000	(738,000 - 1,950,000)	46.8	(30.0 - 63.6)
In "cropped and vulnerable" county subregions	1,950,000	(1,420,000 - 2,480,000)	52.8	(45.0 - 60.6)
In counties with high pesticide use and high ground-water vulnerability	136,000	(19,000 - 253,000)	39.7	(12.8 - 66.7)
Nitrate concentrations above MCL <sup>2</sup> /HAL <sup>3</sup> of 10 mg/L				
In counties with high pesticide use	60,100	(23,200 - 124,000)	5.2	(2.0 - 10.7)
In counties with high ground-water vulnerability	60,400	(12,100 - 176,000)	2.1	(0.4 - 6.1)
In "cropped and vulnerable" county subregions	147,000	(58,000 - 302,000)	4.0	(1.6 - 8.2)
In counties with high pesticide use and high ground-water vulnerability	26,400	(8,000 - 61,100)	7.7	(2.3 - 7.9)

- 1 EPA analyzed samples for combined presence of nitrate and nitrite measured as nitrogen, which is reported as a single concentration of nitrate in milligrams per liter (mg/L).
- 2 Maximum Contaminant Level (MCL) is the maximum permissible level of a contaminant in water that is delivered to any user of a public water system. MCLs are enforceable standards.
- 3 EPA sets Lifetime Health Advisory Levels (HALs) for chemicals in drinking water. An HAL is the concentration of a contaminant in water that may be consumed over a person's lifetime without harmful effects. Lifetime HALs are based on health effects that were found in humans or animals given high doses of chemicals in laboratory studies. This level includes a margin of safety.



## Exhibit 9

### Estimated Number and Percent of Subgroups of Rural Domestic Wells Containing at Least One Pesticide

Categories of Interest	Estimated Number	95% Confidence Interval (Lower - Upper)	Estimated Percent	95% Confidence Interval (Lower - Upper)
<b>At least one pesticide detected:</b>				
In counties with high pesticide use	41,100	(2,980 - 79,200)	3.6	(0.2 - 6.9)
In counties with high ground-water vulnerability	79,700	(9,260 - 150,000)	2.8	(0.4 - 5.1)
In "cropped and vulnerable" county subregions	202,000	(37,600 - 367,000)	5.5	(0.9 - 10.1)
In counties with high pesticide use and high ground-water vulnerability	4,820	(59 - 29,900)	1.4	(<0.1 - 8.8)
<b>At least one pesticide detected above MCL<sup>1</sup>/HAL<sup>2</sup>:</b>				
In counties with high pesticide use	3,140	(1 - 40,400)	0.3	(<0.1 - 3.5)
In counties with high ground-water vulnerability	6,280	(1 - 88,100)	0.2	(<0.1 - 3.1)
In "cropped and vulnerable" county subregions	3,140	(1 - 87,300)	0.1	(<0.1 - 2.4)
In counties with high pesticide use and high ground-water vulnerability	0	(0 - 21,600)	0.0	(0.0 - 6.3)

- 1 EPA sets enforceable standards for public water systems, called Maximum Contaminant Levels (MCLs). These regulatory standards set achievable levels of drinking water quality to protect human health.
- 2 EPA sets Lifetime Health Advisory Levels (HALs) for chemicals in drinking water. EPA believes that water containing a chemical at or below its Lifetime HAL is acceptable for drinking every day over the course of one's lifetime, and does not pose health concerns. Lifetime HALs are based on health effects that were found in humans or animals given high doses of chemicals in laboratory studies. This level includes a margin of safety.