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Office of Water
Office of Pesticides and
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EPA

National Pesticide Survey

Glossary

The U.S. Environmental Protection Agency (EPA) has completed its five-year National Survey of Pesticides in Drinking Water Wells (NPS). A joint project of EPA's Office of Drinking Water (ODW) and Office of Pesticide Programs (OPP), the Survey was designed to assess the extent and severity of the presence of pesticides and nitrate in drinking water wells nationwide, and the relationship of pesticide use and ground-water vulnerability to the presence of pesticides and nitrate. This glossary defines terms relating to the Survey design, implementation, and results. The definitions apply specifically to the Survey and may have additional meanings when used in other circumstances.

Active Ingredient The specific chemical in a product that is biologically active against pest organisms.

Analyte One of 127 chemicals that the Survey analytical methods were chosen or designed to identify. The Survey analytes include 101 pesticides, 25 pesticide degradates, and nitrate. Analytes were selected on the basis of expected leaching potential, occurrence in ground water, volume of use, and other considerations.

Analyte Stability Study An analysis of a laboratory sample in which a known quantity of an analyte has been placed (a "spiked" sample). The sample is analyzed at a pre-determined time to assess the stability and recovery of the analyte.

Analytical Method One of the eight chemical testing methods used to analyze Survey water samples. Six of the analytic methods were specifically developed for the NPS.

Carcinogen A substance that is either known or suspected to cause cancer.

Community Water System (CWS) A system of piped drinking water that either has at least 15 connections or serves at least 25 permanent residents. To be eligible for the NPS, a system had to have at least one operable well (at the time of sampling) supplying drinking water.

Confidence Interval The upper and lower limits around an estimated value within which the actual population value is expected to fall. The confidence interval is stated as a specified level, such as 95%, of confidence. For the NPS, estimates for wells throughout the United States, based on analysis of results for the NPS sample of wells, are given with a 95% confidence interval, indicating the upper and lower limits that EPA is reasonably confident contain the actual detection rate.

Contaminant Any substance such as a chemical, ion, radionuclide, synthetic organic compound, microorganism, waste, or other substance that occurs in water causing it to be impure. Contaminated water does not necessarily pose a health risk if the concentration of the contaminant does not exceed acceptable drinking water standards.

Contamination The direct or indirect introduction of any contaminant into ground water caused in whole or in part by human activities.

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Contract Laboratory	One of the five laboratories hired to analyze Survey water samples. The laboratories performed different analytic methods. EPA laboratories performed referee and confirmation analyses to verify the results of the contract laboratories.
Cropped and Vulnerable	Sub-county areas specified for the rural domestic well survey that have high ground-water vulnerability and greater than 25 percent of the land area used for agricultural production or medium ground-water vulnerability and greater than 50 percent of the land area used for agricultural production.
Degradate	The product of the chemical or biological breakdown of a complex compound into simpler compounds. See Pesticide Degradate.
Domains of Interest	The seven subgroups of the entire population of drinking water wells about which the Survey was particularly interested in obtaining data. The seven domains of interest are (1) community water systems nationally; (2) community water systems in counties with the highest average ground-water vulnerability; (3) rural domestic wells nationally; (4) rural domestic wells in counties with the highest average pesticide use; (5) rural domestic wells in counties with the highest average ground-water vulnerability; (6) rural domestic wells in counties with the highest average pesticide use and ground-water vulnerability; and (7) rural domestic wells in "cropped and vulnerable" areas of counties.
DRASTIC	A classification system that attempts to provide a relative ranking of the vulnerability of ground-water to contamination. The letters in DRASTIC stand for features of the area around the well that may affect the movement of pesticides into ground water: (depth to water, recharge, aquifer media, soil media, topography, impact of the unsaturated aqueous zone between the soil media and water table, and conductivity of the aquifer). DRASTIC does not consider sources of the contamination or population affected. A DRASTIC score was computed for all of the counties in the United States as part of the Survey.
Drinking Water Well	A rural domestic well or a community water system well whose water is used primarily for human consumption (i.e., drinking, cooking, and bathing).
EPA Laboratory	One of two EPA laboratories that were chosen to manage contracts for the analytical laboratories, and perform referee analyses.
Estimated Detection Limit	The minimum concentration of an analyte that can be measured and reported with confidence that the analyte concentration is greater than zero.
Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)	Federal law first enacted in 1947 and administered by the EPA since 1970. Under FIFRA, EPA registers pesticide products and ensures that they will not present unreasonable risks to human health or the environment when used according to label directions.
Federal Reporting Data System (FRDS)	A data base maintained by EPA's Office of Drinking Water (ODW) that contains information on all public water supply systems in the United States. The FRDS was used as the sampling frame for selecting community water system wells for NPS water sampling and analysis.
Ground Water	Water found beneath the earth's surface contained in the interconnected pores and fractures of soils and geologic formations.

Ground-Water Vulnerability The degree to which ground water in the area surrounding a well is sensitive to pesticide infiltration, based on an assessment of the hydrogeological makeup of an aquifer, such as depth of the water table, soil properties, and ground-water recharge rates.

Health Advisory A technical and scientific guidance document prepared by EPA for many of the analytes included in the Survey. Each Advisory contains information on the analyte's physicochemical properties, uses, chemical fate, health effects, treatment, and existing criteria and guidelines. EPA also prepared non-technical Health Advisory Summaries based on the Health Advisories.

Health Advisory Level (HAL) The maximum concentration of a contaminant in water that may safely be consumed over a specific time period. EPA sets HALs for short-term exposures, such as one day and ten days, and longer-term exposures of greater than ten days up to several years, and over a lifetime. A pesticide's HAL is based on health effects (other than cancer) that were found in humans or in animals given high doses of the pesticide in laboratory studies. For pesticides believed to cause cancer, EPA does not calculate a Lifetime HAL. Instead, EPA calculates the increased risks of cancer that are associated with different concentrations and exposures to the pesticide.

Health Advisory Summary A one-page summary prepared by EPA for many of the analytes included in the Survey. These summaries provide concise information on possible health effects of these chemicals and actions that may be taken to ensure a safe drinking water supply. EPA distributed these summaries to the owners, residents, and operators of sampled Survey wells in which analytes were detected.

Herbicide A pesticide used to limit or inhibit plant growth.

Human Health Risk The probability that a given exposure or series of exposures will damage the health of individuals experiencing the exposures.

Hydrology The science dealing with the properties, distribution, and circulation of water on the land surface, in the soil, and in underlying rock formations.

Insecticide A pesticide used to control insects.

Leaching The downward transport through the soil by percolating water of dissolved or suspended minerals, fertilizers, pesticides, and other substances. A chemical's solubility, the soil texture, and the amount and timing of water applied to the soil (as in irrigation, rainfall, or heavy runoff) all contribute to the rate of leaching.

Maximum Contaminant Level (MCL) The maximum permissible level of a contaminant in water that is delivered to any user of a public water system (established by the Safe Drinking Water Act (SDWA)).

Method Blank A portion of reagent water analyzed as if it were a sample.

Micrograms per Liter (µg/L) One-millionth of a gram of a substance per liter of water, commonly referred to as parts per billion. This unit of measurement was used for pesticides and pesticide degradates in water samples during the Survey.

Milligrams per Liter (mg/L) One-thousandth of a gram of a substance per liter of water, commonly referred to as parts per million. This unit of measurement was used for nitrate in water samples during the Survey.

Minimum Quantification Limit (MQL) The lowest concentration of an analyte in a sample that could be reliably measured and reported as a detection with a measured concentration.

Minimum Reporting Limit (MRL) The lowest concentration of an analyte that could reliably be reported as a detection of that analyte, established as one-half the MQL. Analytes detected at a concentration between one-half the MQL and the MQL were reported as detected, without a measured concentration.

National Pesticide Survey Pilot Study The preliminary study for the NPS conducted in 1987 in the States of California, Minnesota, and Mississippi. The pilot study determined whether any changes in the proposed Survey design were necessary or advisable prior to the implementation of the full-scale Survey. The pilot program sampled approximately 50 rural domestic and community water system wells.

National Pesticide Telecommunications Network A toll-free information service that answers inquiries on the health effects of pesticides and pesticide poisonings. This service operates 24 hours a day and can be reached at 1-800-858-7378.

Nitrate (NO_3^-) An oxidized form of nitrogen that is an important plant nutrient and inorganic fertilizer. The major sources of nitrate are septic systems, animal feed lots, agricultural fertilizers, manured fields, industrial waste waters, sanitary landfills, and garbage dumps. Nitrate also occurs naturally in ground water. The Survey analyzed water samples for the combined presence of nitrate and nitrite, measured as nitrogen (N).

Nitrite (NO_2^-) A form of nitrogen that is less oxidized than nitrate. Nitrite is a relatively unstable transitional form between nitrate and ammonium.

Office of Drinking Water (ODW) The EPA office, under the management of the Office of Water, that is primarily responsible for implementing the Safe Drinking Water Act (SDWA). The Office of Drinking Water jointly conducted the NPS with the Office of Pesticide Programs.

Office of Pesticide Programs (OPP) The EPA office, under the management of the Office of Pesticides and Toxic Substances, that is primarily responsible for implementing the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). The Office of Pesticide Programs jointly conducted the NPS with the Office of Drinking Water.

Organic Compound Natural or synthetic chemical containing carbon.

Parts per billion (PPB) A measure that corresponds to one part pesticide in one billion parts of water.

$$\text{PPB} = \frac{\text{Weight of material}}{\text{Total wt. of gas, liquid, or solid}} \times 1{,}000{,}000{,}000$$

Parts per million (PPM) A measure that corresponds to one part nitrate in one million parts of water.

$$\text{PPM} = \frac{\text{Weight of material}}{\text{Total wt. of gas, liquid, or solid}} \times 1{,}000{,}000$$

Pesticide Chemical substance used to destroy, control, or repel undesirable organisms which may include plants, insects, fungi, nematodes, rodents, predators, or microorganisms.

Pesticide Degradate A generic term that includes breakdown products of a pesticide active ingredient resulting from biological processes (i.e., metabolites) and chemical processes (i.e., hydrolysis, photolysis, photooxidation). See Degradate.

Pesticide Metabolite	A product of biological processes (e.g., metabolism, or the chemical changes in living cells) of a pesticide active ingredient by microorganisms, plants, or animals.
Public Water Supply Identification Number (PWSID)	The unique identifying number given to public water systems in the Federal Reporting Data System (FRDS) that was used when statistically selecting community water systems for the NPS.
Quality Assurance (QA)	Oversight activities performed by EPA and its contractors to maintain quality control standards and to ensure compliance with the standard operating procedures for conducting well sampling, laboratory analysis, and processing Survey questionnaires.
Quality Control (QC)	Monitoring activities performed by EPA and its contractors to ensure that sampling, data collection, and laboratory procedures are properly conducted and meet specified performance standards.
Random Sample	A method of statistical sampling that ensures each member of the population has the same chance of being chosen.
Rapid Reporting Level	A level of pesticide or nitrate presence detected by the Survey laboratories that warranted immediate contact with the well owner/operator. Rapid reporting occurred if the measured detection equalled or exceeded EPA's Lifetime Health Advisory Levels for the detected analyte.
Raw Water Sample	A water sample gathered prior to treatment of any kind.
Reagent Water	Water used in the laboratory quality assurance/quality control procedures that is treated to remove any contaminant so it will not be observed at or above the estimated detection limit of any analyte.
Relational Analysis	Any of the various types of statistical methods used to estimate the correlation or relationship between variables in a given population.
Rural Domestic Well	A drinking water well that supplies an occupied private household located in rural areas of the United States, except for wells located on government reservations. The Census Bureau defines rural areas as households outside of incorporated or unincorporated places with a population of 2,500 or more and outside of urban areas. To be eligible for the Survey, the NPS required that the well be used for human consumption (i.e., drinking, cooking, bathing).
Safe Drinking Water Act (SDWA)	A law passed in 1974 and administered by EPA that establishes national standards for drinking water to provide a safe and wholesome water supply from both surface and ground-water sources.
Safe Drinking Water Hotline	A toll-free hotline established by EPA in July 1987 to handle requests for information on drinking water issues, including the NPS. The hotline can be reached at 1-800-426-4791 (in Washington, D.C. at (202) 382-5533) and is operated Monday through Friday, 8:30 to 4:30 eastern standard time.
Sample Blank	Water samples that were shipped to analytical laboratories for analysis and compared to the analytical results of NPS well water samples to ensure that the analytical methods were accurate.

Scientific Advisory Panel (SAP)	A panel of scientists created under the authority of FIFRA to advise the EPA on scientific issues related to the assessment of risks posed by pesticides. A special subpanel of the SAP reviewed the NPS Survey design in 1985 and in 1987 reviewed technical issues such as data collection options, well selection methods, temporal variation, and analyte instability.
Septic System	A sewage system composed of both a septic tank and septic field. The septic tank is an underground watertight container made of durable material through which sewage flows very slowly and in which solids separate from the liquid to be decomposed or broken down by bacterial action. The septic field is the area through which the sewage liquid passes and in which it is cleaned through physical filtering by soils, biodegradation, and evaporation.
Spiked Sample	A water sample to which a known quantity of a pesticide has been added so that the accuracy of the laboratory analyses can be determined.
Surface Water	Water found on the land surface in streams, ponds, marshes, lakes, or other fresh water sources.
Synthetic Organic Compound (SOC)	Man-made organic compound, not naturally found in ground water.
Temporal Variability	Seasonal fluctuations in weather conditions and pesticide use that may affect the presence of pesticides in ground water and may potentially bias Survey sampling. This problem was minimized by randomly allocating selected wells to specified two-week periods within each strata across the two year sampling period.
Volatile Organic Compound (VOC)	An organic compound that evaporates (volatilizes) readily into the atmosphere and is highly mobile in ground water.
Water Table	The top of an unconfined (unpressurized) aquifer, below which the void spaces resulting from the granular texture or fractures of earthen material are saturated with water.
Well Casing	Materials such as concrete, piping, metal, and stone that line and support a well and prevent it from collapsing.

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):

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

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 -- 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 NPS Phase I Report (available 1991) and NPS Phase II Report (when available)

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.