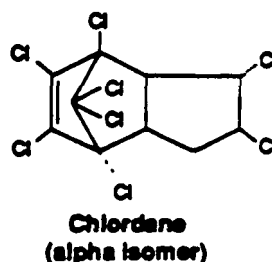




Chlordane



The U.S. Environmental Protection Agency (EPA) has completed its five-year National Survey of Pesticides in Drinking Water Wells (NPS), a study of the presence of 127 pesticides, pesticide degradates, and nitrate in community water system (CWS) wells and rural domestic drinking water wells. EPA analyzed for the two most persistent isomers of chlordane – alpha and gamma chlordane. Isomers are compounds that have the same molecular composition but different spatial arrangements. This fact sheet provides a description of chlordane, its potential health effects, and guidance on both treating and preventing well contamination.

Chlordane (Chloridan) is the common name of an insecticide which is a member of the chemical family of chlorinated cyclodienes. Chlordane was registered in 1948. It has been sold under the trade name of Gold Crest C-100. Chlordane is no longer distributed in the United States, but is still registered. Chlordane is used to control fire ants around underground cables. Chlordane was formerly used to control termites in homes and to control other insects such as ants, cutworms, and grasshoppers on a variety of food crops.

The behavior of a pesticide after it is released to the environment is dependent upon its movement in air, water, and soil as well as the rate at which it is transformed, or broken down. Pesticides applied to crops or the soil surface may volatilize (vaporize) to the atmosphere, be carried off by surface runoff, be carried to ground water through leaching, or remain in the soil through adsorption (adherence) to soil particles and undergo little movement in air or water. Pesticides may be transformed by reaction with water, microorganisms, and exposure to sunlight. The likelihood that chlordane will migrate into ground water is influenced by its tendency to be transported (move) from soil to air and water and to be transformed by these various processes, as well as by the characteristics of the site, such as soil type, moisture, temperature, and depth to ground water. Chlordane has a low potential to be transported, and a low potential to be transformed.

Chlordane migration into ground water could result from the presence of chlordane in the soil due to agricultural and other applications of chlordane, such as underground injection to control termites, on cropped and non-cropped land. Chlordane could also reach ground water from direct entry into a well through accidental chemical spills or improper storage near a well.

Findings of the National Pesticide Survey

Chlordane was not found in any official samples from CWS wells or rural domestic drinking water wells at or above analytical detection levels used in the Survey by EPA's contract laboratory. Chlordane was, however, detected by EPA's quality assurance laboratory at much lower levels than the detection limit established by the contract laboratory. Because EPA's quality assurance laboratory did not analyze water samples collected from all wells, the results do not represent a statistically valid sample of wells in the nation. A national estimate of CWS wells and rural domestic wells containing chlordane consequently cannot be prepared.

What Health Effects Might be Caused by Chlordane in Drinking Water?

Non-Cancer Effects: A Lifetime Health Advisory Level for chlordane in drinking water has not been established by EPA. However, animal studies have indicated consuming chlordane results in liver damage and affects the central nervous system.

Cancer Risk: Chlordane is considered by EPA to be a probable human carcinogen (cancer-causing agent). Chlordane causes cancer in laboratory animals that are given high doses of the pesticide over the course of their lifetimes. EPA estimates that if an individual consumes water containing chlordane at 0.03 µg/L over his or her entire lifetime, that person would theoretically have about one-in-a million chance of developing cancer as a direct result of drinking water containing this pesticide.

Standard: 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. The proposed MCL for chlordane is 2 µg/L (proposed as of May 22, 1989).

How is Water Treated to Remove Contaminants?

Chlordane can be detected in drinking water by a laboratory using an EPA method such as #508. If chlordane is detected in well water and confirmed by retesting, State or County health officials should be consulted. They may advise periodic retesting to get an accurate overall picture of the water quality because changes in seasonal precipitation and changes in pesticide use can cause variations in the amount of chemicals found in water wells. They also may advise using an alternative drinking water supply (bottled water is an example of a temporary alternative), treating the water, or drilling a new or deeper well. Public water suppliers are required to notify customers if the drinking water that they deliver contains a contaminant that exceeds its MCL.

You may also be able to treat your well water to remove pesticides and other contaminants. Treatment technologies that can remove chlordane from water include granular and powder activated carbon adsorption and possibly aeration. However, these treatment technologies are not necessarily appropriate or available for every situation. Certain treatment methods are more suitable for large community water systems than for individual domestic wells. State or County health officials should be able to provide advice on the best approach to follow.

How Can Water Contamination be Prevented?

Several steps may be taken to prevent pesticides or nitrate from entering wells, such as eliminating direct entry through the well wall or drilling a new well.

Eliminate Direct Entry Through the Well Wall

If pesticides or nitrate are present in well water, they may be entering the ground water through the well itself rather than through the soil. If the well is old or poorly constructed, or if there are visible cracks in the well casing, obtain expert advice on whether or not improvements can be made to the well. In addition, investigate simple methods of capping the well or sealing it at the surface to prevent entry.

Drill a New Well

If the soil surrounding the well is the source of contamination, drilling a new or deeper well may make sense if water can be drawn from a deeper, uncontaminated aquifer. Unfortunately, it often is difficult to know the quality of the ground water without drilling or extensive testing. Seek expert advice before you drill.

Why was the National Pesticide Survey Conducted?

EPA conducted this Survey to determine the frequency and concentration of pesticides, pesticide degradates, and nitrate in drinking water wells nationwide and to examine the relationship between the presence of pesticides in drinking water wells and patterns of pesticide use and ground-water vulnerability. The Survey sampled 566 community water system wells and 783 rural domestic wells for 127 pesticides, pesticide degradates, and nitrate. The wells were selected as a representative statistical sample to provide nationwide estimates of the presence of pesticides and nitrate in drinking water wells, and are not meant to provide an assessment of pesticide contamination at the local, County, or State level.

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	Glossary
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 (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 Public Information Branch (H7506C) 401 M Street, SW Washington, DC 20460 Telephone: (703) 557-2805 National Technical Information Service (NTIS) 5285 Port Royal Road Springfield, VA 22161 (703) 487-4650	Background documents for Survey (available for review) Copies of the <u>NPS Phase I Report</u> (available 1991) and <u>NPS Phase II Report</u> (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 departments 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.

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