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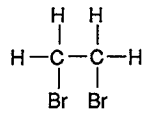
EPA

National Pesticide Survey

Ethylene Dibromide (EDB)



Ethylene Dibromide (EDB)

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. Ethylene Dibromide (EDB) was one of the pesticides detected in the Survey. This fact sheet provides a description of EDB, its potential health effects, and guidance on both treating and preventing well contamination.

What is EDB?

Ethylene dibromide (EDB) is the common name of an insecticide which has been sold under the discontinued trade names of Soilbrom, Dowfume, Bromofume, KopFume, and Nephis. EDB was registered for use in 1948, in 1984, EPA canceled all agricultural uses of the chemical. EDB was an insecticidal fumigant used for controlling pests in stored products, for the treatment of fruits and vegetables, for spot treatment of flour mills, and for soil treatment against certain insects and nematodes.

How Does EDB Behave in Soil and Ground Water?

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 EDB 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. EDB has a high potential to be transported, and a medium potential to be transformed.

How Does EDB Get into Ground Water?

EDB migration into ground water could result from the underground injection of EDB as a soil fumigant for agricultural applications. EDB could also reach ground water from direct entry into a well through accidental chemical spills or improper storage near a well. In addition, EDB was also used as an additive in leaded gasoline and may have reached ground water due to leaking gasoline storage tanks.

Findings of the National Pesticide Survey

Based on the results of the NPS, EPA estimates that EDB is present, at or above the analytical detection level of 0.010 μg/L used in the Survey, in about 19,200 (0.2%) rural domestic wells nationwide. Considering the precision of the Survey, EPA estimates that this number could be as low as 160 or as high as 131,000. EDB is measured in micrograms per liter (μg/L) which is equivalent to parts per billion (ppb). EDB was sometimes detected at concentrations above EPA's proposed Maximum Contaminant Level (MCL) of 0.05 μg/L. EPA notified any well owners and operators within 24 hours when detections were above the proposed MCL. EDB was not detected in any CWS wells.

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

Non-Cancer Effects: A Lifetime Health Advisory Level for EDB in drinking water has not been established by EPA. Consuming EDB, however, has been shown to result in adverse health effects in animal studies, including damage to the liver, kidneys, and testes (including effects on sperm), genetic mutations, and chromosomal damage.

Cancer Risk: EPA considers EDB a probable human carcinogen (cancer-causing agent) because high doses to laboratory animals over the course of their lifetime causes cancer. EPA estimates that if an individual consumes water containing EDB at 0.0004 μg/L over his or her entire lifetime, that person would theoretically have no more than a 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 MCLs. These regulatory standards set achievable levels of drinking water quality to protect human health. The proposed MCL for EDB is 0.05 μg/L (May 22, 1989).

How is Water Treated to Remove Contaminants?

EDB can be detected in drinking water by a laboratory using an EPA method such as #504. If EDB is detected at any level 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. If you receive your well water from a community water system, and have concerns about the quality of your well water, contact your State public water supply agency. 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 EDB from water include aeration, distillation (boiling), and activated carbon adsorption. However, these treatment techniques are not necessarily appropriate or available in every situation. Certain treatment methods are more suitable for large community water systems than for individual domestic wells. Your 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, drilling a new well, or modifying or reducing pesticide and fertilizer use.

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. Do not conduct any mixing activities near the well if you use well water to mix pesticides because a spill could lead to direct contamination of the well.

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.

Learn More about Pesticide Use

If you use pesticides, whether for agricultural or home lawn and garden purposes, you should consider attending training courses given by your State or County agricultural department on how to reduce activities that can contaminate ground water. You may find that you can eliminate or lessen the frequency or quantity of your pesticide usage by choosing alternative methods of pest control.

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 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 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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