

1. PUBLIC HEALTH STATEMENT

This Statement was prepared to give you information about 1,2-dibromoethane (ethylene dibromide, EDB) and to emphasize the human health effects that may result from exposure to it. The Environmental Protection Agency (EPA) has identified 1,177 sites on its National Priorities List (NPL). 1,2-Dibromoethane has been found at 9 of these sites. However, we do not know how many of the 1,177 NPL sites have been evaluated for 1,2-dibromoethane. As EPA evaluates more sites, the number of sites at which 1,2-dibromoethane is found may change. The information is important to you because 1,2-dibromoethane may cause harmful health effects and because these sites are potential or actual sources of human exposure to 1,2-dibromoethane.

When a chemical is released from a large area such as an industrial plant, or from a container, such as a drum or bottle, it enters the environment as a chemical emission. This emission, which is also called a release, does not always lead to exposure. You can be exposed to a chemical only when you come into contact with the chemical. You may be exposed to it in the environment by breathing, eating, or drinking substances containing the chemical or from skin contact with the chemical.

If you are exposed to a hazardous substance such as 1,2-dibromoethane, several factors will determine whether harmful health effects will occur and what the type and severity of those health effects will be. These factors include the dose (how much), the duration (how long), the route or pathway by which you are exposed (breathing, eating, drinking, or skin contact), the other chemicals to which you are exposed, and your individual characteristics such as age, sex, nutritional status, family traits, life style, and state of health.

1.1 WHAT IS 1,2-DIBROMOETHANE?

1,2-Dibromoethane is a pesticide and gasoline additive. It is mostly man-made, but it may occur naturally in the ocean in very small amounts. In the 1970s and early 1980s, it was used in soil to kill insects and worms that get on fruits, vegetables, and grain crops. It was also used in soil to protect grass, such as on golf courses. Another use was to kill fruit flies on citrus fruits, mangoes, and papayas after they were picked. EPA stopped most of these uses in 1984. 1,2-Dibromoethane is added to leaded gasoline to produce better fuel efficiency. Because use of leaded gasoline has fallen, less 1,2-dibromoethane is made for this use. The chemical is a colorless liquid with a mild, sweet odor. It evaporates easily and can dissolve in water. 1,2-Dibromoethane stays in groundwater and in soil for a long time but breaks down quickly in the air. More information on the chemical and physical properties of 1,2-dibromoethane can be found in Chapter 3 and on its occurrence and fate in the environment in Chapter 5.

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1.2 HOW MIGHT I BE EXPOSED TO 1,2-DIBROMOETHANE?

You can be exposed to low levels of 1,2-dibromoethane in drinking water (especially well water) and in air. Before EPA stopped the use of 1,2-dibromoethane as a pesticide, the most common way you would have been exposed was by eating food that had very small amounts of this chemical in it. You could still be exposed to low levels of 1,2-dibromoethane, particularly from groundwater (well water), in areas where the chemical was used in farming or from hazardous waste sites. Most of the 1,2-dibromoethane that enters the soil will get into the groundwater or evaporate into the air. Small amounts can remain in very tiny particles in soil near hazardous waste sites or in areas once used as farmland. The compound may be released from these particles slowly over time or if the soil is crushed or disturbed. You can be exposed to 1,2-dibromoethane in the air near production plants. Background levels in the environment are very low. The air most people breathe contains between 0.01-0.06 parts of 1,2-dibromoethane per billion parts of air (ppb). Because 1,2-dibromoethane easily evaporates, most surface waters do not contain detectable amounts. Groundwater is more likely to contain 1,2-dibromoethane with an average concentration of about 0.9 ppb. In foods, 1,2-dibromoethane has recently been found in 2 out of 549 samples at concentrations of 2 and 11 ppb. There is no information on background levels in surface water or soil. If you applied 1,2-dibromoethane on a farm or golf course, if you worked to pack fruits gassed with 1,2-dibromoethane, or if you worked in a factory that made 1,2-dibromoethane, you could be exposed to much higher than background levels. For more information on human exposure to 1,2-dibromoethane, see Chapter 5.

1.3 HOW CAN 1,2-DIBROMOETHANE ENTER AND LEAVE MY BODY?

1,2-Dibromoethane can enter your body after you eat or drink contaminated food and water. It can also enter your body through your skin when you bathe or swim in contaminated water. The 1,2-dibromoethane inside tiny soil particles may enter your body if you crush or eat contaminated soil. The chemical can enter your nose and lungs when you breathe air that contains 1,2-dibromoethane or when you shower with water that is contaminated. Near hazardous waste sites or near areas that once were farmed, the most likely way that you will be exposed is by drinking contaminated groundwater. 1,2-Dibromoethane will be rapidly taken into your bloodstream by any method of exposure. Most of it builds up in your liver and kidneys where it is rapidly broken down to different substances. These substances leave your body quickly in the urine, and smaller amounts are passed in liver bile into the stool. Small amounts of 1,2-dibromoethane that are not broken down can be breathed out of your lungs. Chapter 2 has more information on how 1,2-dibromoethane enters and leaves the body.

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1.4 HOW CAN 1,2-DIBROMOETHANE AFFECT MY HEALTH?

The effects of breathing high levels of 1,2-dibromoethane in humans are unknown. Studies in animals show that they can die from breathing high concentrations of 1,2-dibromoethane for a short time while lower concentrations can cause liver and kidney damage. You can die if you swallow or have skin contact with large quantities of 1,2-dibromoethane. A woman who drank 40 milliliters (mL) of pure liquid 1,2-dibromoethane died within a day. Changes in the liver and kidney are reported in humans that died of ingestion of 1,2-dibromoethane. People who tried to commit suicide by swallowing concentrated 1,2-dibromoethane got ulcers inside their mouth and stomach. Laboratory rats and mice fed less-concentrated 1,2-dibromoethane for as little as 2 weeks had damage to the lining of their stomach. If you spill liquid 1,2-dibromoethane on your skin, you can get blisters.

Breathing 1,2-dibromoethane for moderately long periods damages the lining of the nose in rats. This effect has not been seen in humans. Animals that breathed or ate food containing 1,2-dibromoethane for short or long periods were less fertile or had abnormal sperms. Changes in the brain and behavior have occurred in young rats whose male parents had breathed 1,2-dibromoethane.

A worker who breathed 1,2-dibromoethane for several years developed bronchitis, headache, and depression, but his health improved after he stopped breathing air contaminated with 1,2-dibromoethane. 1,2-Dibromoethane is not known to cause birth defects in people. It can impair reproduction in males by damaging sperms in testicles. This type of damage has been seen in workers exposed to 1,2-dibromoethane for several years. Pregnant animals that are sick from exposure to 1,2-dibromoethane have had pups with birth defects. There are no reports of cancer in workers or other people exposed to 1,2-dibromoethane for several years. Rats and mice that repeatedly breathed, swallowed, or had skin contact with 1,2-dibromoethane for long periods had cancer in many organs. The Department of Health and Human Services has determined that 1,2-dibromoethane may reasonably be anticipated to be a carcinogen.

1.5 IS THERE A MEDICAL TEST TO DETERMINE WHETHER I HAVE BEEN EXPOSED TO 1,2-DIBROMOETHANE?

There is no known reliable medical test to determine whether you have been exposed to 1,2-dibromoethane. For more information, see Chapters 2 and 6.

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1.6 WHAT RECOMMENDATIONS HAS THE FEDERAL GOVERNMENT MADE TO PROTECT HUMAN HEALTH?

The federal government has set standards and guidelines to protect people from the potential health effects of 1,2-dibromoethane in drinking water, food, and air. EPA recommends that no more than 0.008 ppm of 1,2-dibromoethane should be present in drinking water that is consumed for up to 10 days. EPA does not allow any 1,2-dibromoethane to be in food. Companies must report to EPA if they spill 1,000 pounds or more of 1,2-dibromoethane.

The Occupational Health and Safety Administration (OSHA) has limited workers' exposure to 1,2-dibromoethane in air to an average of 20 ppm for an 8-hour workday. According to OSHA, short-term exposure of 15 minutes to 1,2-dibromoethane should not be more than 0.5 ppm. The National Institute for Occupational Safety and Health (NIOSH) has set an average limit for 1,2-dibromoethane of 0.045 ppm in workroom air during an 8-hour day. According to NIOSH, short-term exposure of 15 minutes to 1,2-dibromoethane should not be more than 0.13 ppm.

For more information on guidelines and standards for 1,2-dibromoethane exposure, see Chapter 7.

1.7 WHERE CAN I GET MORE INFORMATION?

If you have any more questions or concerns not covered here, please contact your state health or environmental department or:

Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road, E-29
Atlanta, Georgia 30333

This agency can also provide you with information on the location of the nearest occupational and environmental health clinic. Such clinics specialize in recognizing, evaluating, and treating illness that result from exposure to hazardous substances.