

## 1. PUBLIC HEALTH STATEMENT

This Statement was prepared to give you information about 1,1-dichloroethane 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). 1,1-Dichloroethane has been found at 189 of these sites. However, we do not know how many of the 1,177 NPL sites have been evaluated for 1,1-dichloroethane. As EPA evaluates more sites, the number of sites at which 1,1-dichloroethane is found may change. The information is important for you because 1,1-dichloroethane may cause harmful health effects and because these sites are potential or actual sources of human exposure to 1,1-dichloroethane.

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 it.

If you are exposed to a hazardous substance such as 1,1-dichloroethane 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 1,1-DICHLOROETHANE?**

1,1-Dichloroethane is a colorless, oily, man-made liquid. It evaporates quickly at room temperature and has an odor like ether. 1,1-Dichloroethane burns easily. When 1,1-dichloroethane is released to the environment, it usually exists as a vapor rather than a liquid. It is used primarily to make 1,1,1-trichloroethane and a number of other chemicals. It is also used to dissolve other substances such as paint, varnish and finish removers, and to remove grease. 1,1-Dichloroethane was used as a surgical anesthetic, but is no longer.

Almost all of the 1,1-dichloroethane from industrial sources that is released goes into the air. 1,1-Dichloroethane can also be found in the environment as a breakdown product of 1,1,1-trichloroethane in landfills where no air comes in contact with the 1,1,1-trichloroethane. 1,1-Dichloroethane does not dissolve easily in water. The small amounts released to water can

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evaporate easily into the air. 1,1-Dichloroethane remains as a vapor in the air for about 2 months and dissolved in water for about 5 days. The vapor in air can be washed out by rain or broken down by sunlight. 1,1-Dichloroethane in water will evaporate. Small amounts of 1,1-dichloroethane released to soil can also evaporate into the air or move through the soil to enter groundwater. It is not known how long 1,1-dichloroethane remains in the soil. Although it does not dissolve easily in water, low levels can be found in water.

More information on the chemical and physical properties of 1,1-dichloroethane can be found in Chapter 3, on its production and uses in Chapter 4, and on its occurrence and fate in the environment in Chapter 5.

### **1.2 HOW MIGHT I BE EXPOSED TO 1,1-DICHLOROETHANE?**

You can be exposed to 1,1-dichloroethane by breathing air containing its vapors in the outdoor air or in your workplace, or by drinking water contaminated with it. Releases from industrial processes are the main source of this chemical in the air. Some members of the general population may be exposed to low levels of 1,1-dichloroethane from this source (0.08-0.14 parts per billion [1 part 1,1-dichloroethane per 1 billion parts of air, or ppb]). Levels in this range have been measured around industrial plants in Magna, Utah (0.082 ppb); Iberville, Louisiana (0.12 ppb); Deer Park, Texas (0.14 ppb); and Baton Rouge (0.058 ppb) and Geismary, Louisiana (0.14 ppb). You may be part of a much smaller population of workers who could be exposed to higher levels of 1,1-dichloroethane in your workplace, if you are employed in the chemical, rubber and plastic, electrical, or oil and gas industries. However, since current levels of production and use are not known, it is difficult to predict how often exposure might occur from these sources of 1,1-dichloroethane. Exposure can also occur near sites where the chemical was improperly disposed of or spilled on the ground.

The average concentration of 1,1-dichloroethane in the air across the United States is reported to be 55 parts of 1,1-dichloroethane per one trillion parts of air (ppt). These ambient levels may be from chlorinated water or building materials. The air levels of 1,1-dichloroethane are usually lower in rural areas and higher in industrialized areas. Higher levels have been found in the air around some small sources of release, such as hazardous waste sites. 1,1-Dichloroethane has been found in drinking water (that is, water that has usually been treated and that comes out of your tap) in the United States at levels that range from trace amounts to 4.8 parts of 1,1-dichloroethane per one billion parts of water (ppb). 1,1-Dichloroethane has not been detected in any surface water samples from rivers, lakes, or ponds. No information is available on background levels of 1,1-dichloroethane in soil or food.

Additional information on the levels of 1,1-dichloroethane in the environment and human exposure to 1,1-dichloroethane can be found in Chapter 5.

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### 1.3 HOW CAN 1,1-DICHLOROETHANE ENTER AND LEAVE MY BODY?

1,1-Dichloroethane can enter your body if you breathe contaminated air or drink contaminated water. 1,1-Dichloroethane is believed to rapidly enter your body when it is breathed or swallowed. It is not known what factors affect how quickly 1,1-dichloroethane enters your body. Studies in animals show that it is likely that 1,1-dichloroethane can also enter your body through your skin.

The most common way you could be exposed to 1,1-dichloroethane released from hazardous waste sites would be by breathing contaminated air around the site. Soil and water in and around hazardous waste sites are not likely to contain high concentrations of 1,1-dichloroethane because it escapes quickly into the air. Therefore, though this route of exposure cannot be ruled out completely, exposure of the skin from soil or water contaminated with 1,1-dichloroethane is much less likely.

Experiments in animals indicate that the 1,1-dichloroethane that is inhaled or swallowed may go to many organs of the body, depending on the amount taken in. However, most of the 1,1-dichloroethane taken in is usually removed unchanged from the body in the breath within 2 days. A small part of the 1,1-dichloroethane taken in is broken down, and these breakdown products are quickly removed in the breath or urine.

Additional information on how 1,1-dichloroethane can enter and leave the body is presented in Chapter 2.

### 1.4 HOW CAN 1,1-DICHLOROETHANE AFFECT MY HEALTH?

Reliable information on how 1,1-dichloroethane affects the health of humans is not available. Because brief exposures to 1,1-dichloroethane in the air at very high levels have caused death in animals (16,000 ppm), it is likely that exposure to such high levels of 1,1-dichloroethane in the air can also cause death in humans. Some studies in animals have shown that 1,1-dichloroethane can cause kidney disease after long-term, high-level exposure in the air. 1,1-Dichloroethane caused cancer in animals given very high doses (over 3,000 mg/kg/day) by mouth for a lifetime. Delayed growth was observed in the offspring of animals who breathed high concentrations of 1,1-dichloroethane during pregnancy. The severity of these effects may increase when people or animals are exposed to increased levels of 1,1-dichloroethane. Since these effects were seen in animals at high doses, it is also possible that they could occur in humans exposed to high levels of 1,1-dichloroethane. However, we have no information to indicate that these effects do occur in humans. More information on health effects associated with exposure to 1,1-dichloroethane can be found in Chapter 2.

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### 1.5 WHAT LEVELS OF EXPOSURE HAVE RESULTED IN HARMFUL HEALTH EFFECTS?

There is no reliable information on what levels of exposure to 1,1-dichloroethane have resulted in harmful health effects in humans. 1,1-Dichloroethane is deadly to animals if large enough quantities are breathed or swallowed. Tables 1-1 through 1-4 show the relationship between exposure to 1,1-dichloroethane and known health effects in humans and animals. 1,1-Dichloroethane can be smelled when it is present in the air at levels of 120 to 200 parts of 1,1-dichloroethane per one million parts of air (ppm).

### 1.6 IS THERE A MEDICAL TEST TO DETERMINE WHETHER I HAVE BEEN EXPOSED TO 1,1-DICHLOROETHANE?

Tests are available that measure 1,1-dichloroethane in urine, blood, breath and body tissues. Because urine, blood, and breath samples are easily obtained, these samples are examined to determine if a person has been exposed to 1,1-dichloroethane. These tests are not routinely available at a doctor's office and would require special equipment for sampling and detection of the compound. Since most of the 1,1-dichloroethane that is taken into the body leaves within two days, these tests must be done soon after exposure occurs. Although these tests can confirm that a person has been exposed to 1,1-dichloroethane, it is not yet possible to use the test results to predict the type or severity of any health effects that might occur or the level of exposure that may have occurred. Because exposure to 1,1-dichloroethane at hazardous waste sites is likely to include exposure to other similar chemicals at the same time, levels of 1,1-dichloroethane measured through these types of medical tests may not reflect exposure to 1,1-dichloroethane alone. Information regarding tests for the detection of 1,1-dichloroethane in the body is presented in Chapters 2 and 6.

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

There are no regulatory standards or advisories for 1,1-dichloroethane in drinking water and food. The Environmental Protection Agency (EPA) has determined that any release to the environment in excess of 1,000 pounds should be reported.

Rules and regulations have been developed to protect individuals from the potential health effects of 1,1-dichloroethane in air. The American Conference of Governmental Industrial Hygienists (ACGIH) has set a threshold limit value (TLV) of 810 mg/m<sup>3</sup> (200 ppm) 1,1-dichloroethane in workroom air to protect workers during an 8-hour shift over a 40-hour work week. The Occupational Safety and Health Administration (OSHA) has issued a permissible exposure limit (PEL) of 400 mg/m<sup>3</sup> (98.9 ppm).

For more information on criteria and standards for 1,1-dichloroethane exposure, see Chapter 7.

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TABLE 1-1. Human Health Effects from Breathing 1,1-Dichloroethane\*

Short-term Exposure (less than or equal to 14 days)		
<u>Levels in Air (ppm)</u>	<u>Length of Exposure</u>	<u>Description of Effects</u>
		The health effects resulting from short-term exposure of humans to air containing specific levels of 1,1-dichloroethane are not known.
Long-term Exposure (greater than 14 days)		
<u>Levels in Air (ppm)</u>	<u>Length of Exposure</u>	<u>Description of Effects</u>
		The health effects resulting from long-term exposure of humans to air containing specific levels of 1,1-dichloroethane are not known.

\*See Section 1.2 for a discussion of exposures encountered in daily life.

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TABLE 1-2. Animal Health Effects from Breathing 1,1-Dichloroethane

Short-term Exposure (less than or equal to 14 days)		
<u>Levels in Air (ppm)</u>	<u>Length of Exposure</u>	<u>Description of Effects*</u>
1,750	10 days	Birth defects in rats.
Long-term Exposure (greater than 14 days)		
<u>Levels in Air (ppm)</u>	<u>Length of Exposure</u>	<u>Exposure of Effects*</u>
		The health effects resulting from long-term exposure of animals to air containing specific levels of 1,1-dichloroethane are not known.

\*These effects are listed at the lowest level at which they were first observed. They may also be seen at higher levels.

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TABLE 1-3. Human Health Effects from Eating or Drinking 1,1-Dichloroethane\*

Short-term Exposure (less than or equal to 14 days)		
<u>Levels in Food (ppm)</u>	<u>Length of Exposure</u>	<u>Description of Effects</u>
		The health effects resulting from short-term exposure of humans to food containing specific levels of 1,1-dichloroethane are not known.
<u>Levels in Water (ppm)</u>		The health effects resulting from short-term exposure of humans to water containing specific levels of 1,1-dichloroethane are not known.
Long-term Exposure (greater than 14 days)		
<u>Levels in Food (ppm)</u>	<u>Length of Exposure</u>	<u>Description of Effects</u>
		The health effects resulting from long-term exposure of humans to food containing specific levels of 1,1-dichloroethane are not known.
<u>Levels in Water (ppm)</u>		The health effects resulting long-term exposure of humans to water containing specific levels of 1,1-dichloroethane are not known.

\*See Section 1.2 for a discussion of exposures encountered in daily life.

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TABLE 1-4. Animal Health Effects from Eating or Drinking 1,1-Dichloroethane

Short-term Exposure (less than or equal to 14 days)		
<u>Levels in Food (ppm)</u>	<u>Length of Exposure</u>	<u>Description of Effects</u>
		The health effects resulting from short-term exposure of animals to food containing specific levels of 1,1-dichloroethane are not known.
<u>Levels in Water (ppm)</u>		The health effects resulting from short-term exposure of animals to water containing specific levels of 1,1-dichloroethane are not known.
Long-term Exposure (greater than 14 days)		
<u>Levels in Food (ppm)</u>	<u>Length of Exposure</u>	<u>Description of Effects*</u>
7,640	2 years	Death in rats.
9,500	2 years	Cancer in rats.
<u>Levels in Water (ppm)</u>		The health effects resulting from long-term exposure of animals to water containing specific levels of 1,1-dichloroethane are not known.

\*These effects are listed at the lowest level at which they were first observed. They may also be seen at higher levels.



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### **1.8 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 give you information on the location of the nearest occupational and environmental health clinics. Such clinics specialize in the recognizing, evaluating, and treating illnesses that result from exposure to hazardous substances.

