

1. PUBLIC HEALTH STATEMENT

1.1 WHAT IS BIS(2-CHLOROETHYL) ETHER?

Bis(2-chloroethyl) ether (BCEE) is a colorless non-flammable liquid with a strong, unpleasant odor. It does not occur naturally, but is manufactured by humans for use in the production of pesticides and other chemicals. Limited amounts of BCEE will dissolve in water, and it also will slowly evaporate into air. In the environment, BCEE is broken down by bacteria in soil and water and by chemical reactions in the air, so it does not tend to persist for long periods. Further information on the properties and uses of BCEE, and how it behaves in the environment, is presented in Chapters 3, 4 and 5.

1.2 HOW MIGHT I BE EXPOSED TO BCEE?

Exposure to BCEE is most likely to occur in or near chemical plants where it is made or used, or near waste sites where it has been improperly disposed of. One way exposure might occur is through consumption of drinking water that contains BCEE. Low levels (0.01 to 0.5 parts per billion (ppb)) of BCEE have been detected in the drinking water supplies of several cities, and higher levels (840 ppb) have been detected in underground water near some chemical waste sites. Although BCEE evaporates relatively slowly, exposure might also occur through breathing BCEE vapors near areas where it is used or stored. However, no information exists on the levels of BCEE in outdoor air. Further discussion of how people may be exposed to BCEE is presented in Chapter 5.

1.3 HOW CAN BCEE ENTER AND LEAVE MY BODY?

BCEE enters the body easily after being swallowed in food or water, or after being inhaled in air. It may also enter by crossing the skin when dermal contact occurs. Once inside the body, BCEE is broken down to a number of different chemicals, and these are eliminated in the urine or the breath. Most BCEE which enters the body is removed in this way within two to three days, so BCEE does not tend to accumulate in the body. Further information on how BCEE enters and leaves the body is presented in Chapter 2.

1.4 HOW CAN BCEE AFFECT MY HEALTH?

People exposed to BCEE vapors report that it is highly irritating to the eyes and the nose. Animal studies show that BCEE vapors can cause severe injury to the lungs, and may lead to death. Mice given repeated doses of BCEE through the mouth developed liver tumors. This

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suggests that BCEE might cause cancer in humans, although no cases of cancer due to BCEE have been reported in people and BCEE was also not found to induce excess cancer after feeding to rats. Effects of BCEE on other organs and body functions have not been well studied, and it is not known if BCEE impairs reproduction or the development of fetuses. Further information on the possible health effects of BCEE is presented in Chapter 2.

1.5 IS THERE A MEDICAL TEST TO DETERMINE IF I HAVE BEEN EXPOSED TO BCEE?

Although there are chemical tests that can identify and measure BCEE, these have not been developed for measuring BCEE in humans. Further information on the methods used to measure BCEE is presented in Chapter 6.

1.6 WHAT LEVELS OF EXPOSURE HAVE RESULTED IN HARMFUL HEALTH EFFECTS?

Tables 1-1 through 1-4 show the relationship between exposure to BCEE and known health effects. A Minimal Risk Level (MRL) is also included in Table 1-1. This MRL was derived from animal data for longterm exposure, as described in Chapter 2 and in Table 2-1. This MRL provides a basis for comparison with levels that people might encounter in air. If a person is exposed to BCEE at an amount below the long-term MRL, it is not expected that harmful noncancer health effects will occur. Because this level is based only on information currently available, some uncertainty is always associated with it. Also, because the method for deriving MRLs does not use any information about cancer, a MRL does not imply anything about the presence, absence, or level of risk of cancer.

Based on studies in animals, if an amount of BCEE equal to 1 to 2 fluid ounces entered the body across the skin, death could result. Skin contact with even small amounts (less than a drop) of liquid BCEE will cause irritation to the skin.

Further information on the amounts of BCEE that cause health effects in humans and animals is presented in Chapter 2.

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TABLE 1-1. Human Health Effects from Breathing BCEE*

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>
35	Several hours***	Minimal eye and nose irritation.
100	Several minutes***	Moderate eye and nose irritation.
260	One minute***	Severe eye and nose irritation.
550	One minute***	Nauseating; intolerable.
Long-term Exposure (greater than 14 days)		
<u>Levels in Air (ppm)</u>	<u>Length of Exposure</u>	<u>Description of Effects</u>
0.02		Estimated Minimal Risk Level (based on studies in animals; see Section 1.6 for discussion).

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

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

*** Available information is not precise; these are estimated values.

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TABLE 1-2. Animal Health Effects from Breathing BCEE

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>
35	10 minutes	Nose irritation in guinea pigs.
105	13 hours	Lung injury, death in guinea pigs.
250	4 hours	Death in rats.
Long-term Exposure (greater than 14 days)		
<u>Levels in Air (ppm)</u>	<u>Length of Exposure</u>	<u>Description of Effects*</u>
69	18 weeks	Decreased weight in guinea pig and rats.

* 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 BCEE*

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 human exposure to food containing specific levels of BCEE are not known.
<u>Levels in Water (ppm)</u>		The health effects resulting from short-term human exposure to water containing specific levels of BCEE 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 human exposure to food containing specific levels of BCEE are not known.
<u>Levels in Water (ppm)</u>		The health effects resulting from long-term human exposure to water containing specific levels of BCEE 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 BCEE

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 animal exposure to food containing specific levels of BCEE are not known.
<u>Levels in Water (ppm)</u>		
530	1 day	Death in rats.
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 animal exposure to food containing specific levels of BCEE are not known.
<u>Levels in Water (ppm)</u>		
180	18 months	Weight loss in rats.
360	18 months	Increased death rate in rats.

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

1. PUBLIC HEALTH STATEMENT**1.7 WHAT RECOMMENDATIONS HAS THE FEDERAL GOVERNMENT MADE TO PROTECT HUMAN HEALTH ?**

The Federal government has taken a number of steps to reduce the possibility of human exposure to BCEE. The U.S. Environmental Protection Agency (EPA) has developed rules and regulations that limit the amount of BCEE that can be discharged into water or air from industrial sources as well as how it is to be disposed of at waste sites. Levels of BCEE exposure in the workplace are strictly regulated by the Occupational Safety and Health Administration (OSHA), since BCEE is considered a probable human carcinogen. Further information on regulations which apply to BCEE is presented in Chapter 7.

1.8 WHERE CAN I GET MORE INFORMATION?

If you have further questions or concerns, 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

