

## 1. PUBLIC HEALTH STATEMENT

This Statement was prepared to give you information about 2-butanone (methyl ethyl ketone) 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). 2-butanone has been found at 137 of these sites. However, we do not know how many of the 1,177 NPL sites have been evaluated for 2-butanone. As EPA evaluates more sites, the number of sites at which 2-butanone is found may change. The information is important for you because 2-butanone may cause harmful health effects and because these sites are potential or actual sources of human exposure to 2-butanone.

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 are 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 2-butanone, 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 2-BUTANONE?

2-Butanone, also known as methyl ethyl ketone (MEK), is a colorless liquid with a sweet, but sharp odor. 2-Butanone is manufactured in large amounts for use in paints, glues, and other finishes because it rapidly evaporates and will dissolve many substances. It will quickly evaporate into the air. 2-Butanone is often found dissolved in water or as a gas in the air. 2-Butanone is also a natural product made by some trees and is found in some fruits and vegetables. The exhausts of cars and trucks release 2-butanone into the air. 2-Butanone is usually found in the air, water, and soil of landfills and hazardous waste sites.

In water, 2-butanone can be changed to a more simple chemical form by natural biological processes and will be broken down in about 2 weeks. It will not be deposited in the sediment of rivers or lakes, and it is not expected to concentrate in fish. In air, 2-butanone will break down under the influence of sunlight, although it does not react with sunlight directly. One-half of any given amount of 2-butanone in the air will break down in 1 day or less. It is not known if 2-butanone changes to a more simple form by

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natural biological processes in soil, but it is expected to do so because similar substances are broken down by these processes. 2-Butanone will not stick to soil, and if it is spilled onto soil, it will travel through the soil into underground water sources. Some of the 2-butanone found in soil or water will also evaporate to the air.

You will find more information on the chemical properties of 2-butanone in Chapter 3. The uses of 2-butanone are given in Chapter 4. More information on how 2-butanone behaves in the environment is found in Chapter 5.

### 1.2 HOW MIGHT I BE EXPOSED TO 2-BUTANONE?

2-Butanone can enter the environment in a number of different ways. It can enter the air or water from the waste of manufacturing plants. 2-Butanone is present in many different types of paints and glues used both in the home and in industry. As these products dry, 2-butanone will enter the air. 2-Butanone is also in air because it is released in the exhaust of cars and trucks. Some trees in the forest release 2-butanone to the air.

We do not know the background levels of 2-butanone in air, water, or soil. We know that 2-butanone is found naturally in some foods. We know it is found at hazardous waste sites, and it is also found occasionally in drinking water and often in the air of cities. You may also be exposed to 2-butanone by smoking cigarettes.

You may be exposed to higher levels of 2-butanone if you use glues of coatings containing it in a small enclosed area that does not have good air flow. People who use it at work have a good chance of being exposed to 2-butanone. 2-butanone is used in such industries as shoes factories, printing plants, plastics factories, and sporting goods manufacturers. People who live near a toxic waste site where 2-butanone is kept may breathe it if it evaporates into the air, or drink it if it gets into the water supply, especially when the water supply comes from wells.

You can find more information on how much 2-butanone is in the environment and how you can be exposed to it in Chapter 5.

### 1.3 HOW CAN 2-BUTANONE ENTER AND LEAVE MY BODY?

2-butanone can enter your body if you breathe air that contains it, through your skin if it touches you, or through your mouth if you eat food or drink water that has 2-butanone in it. Studies have shown that, if there is 2-butanone in the air you breathe, at least half of what you breathe in will enter your body. The other half will leave in the air you breathe out. We do not know how much 2-butanone will stay in your body if you drink it or if it touches your skin. The amount of 2-butanone that actually enters your body depends on how much is in the air you breathe, how much is in your food or

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water, or how much gets on your skin. The amount of 2-butanone that enters your body also depends on how long you breathe it or how long it is on your skin before you wash it off. Your body gets rid of 2-butanone in urine and in the air you breathe out. 2-Butanone is not a chemical that stays in your body for very long; it will be gone by the next day. For more information on how 2-butanone gets into and leaves your body, see Chapter 2.

### 1.4 HOW CAN 2-BUTANONE AFFECT MY HEALTH?

Some people who breathed air that contained 2-butanone first noticed its sweet, sharp odor at a concentration of 5-8 parts of 2-butanone per million parts of air (5-8 ppm). The main health effects that have been seen in humans who breathed higher concentrations of 2-butanone are mild irritation of the nose, throat, eyes, and skin.

Serious health effects in animals have been seen only at very high concentrations of 2-butanone. These high concentrations are not expected in the usual use of 2-butanone or in the vicinity of hazardous waste sites. Studies in animals have shown that 2-butanone does not cause serious damage to the nervous system or the liver, but mice that breathed low levels for a short time had temporary behavioral effects. 2-Butanone alone does not have serious effects on the liver or nervous system, but it can cause other chemicals to become more harmful to these systems.

Guinea pigs, rats, and mice that breathed high levels of 2-butanone for a short time became unconscious and died. Pregnant rats and mice that breathed air containing high levels of 2-butanone had underdeveloped fetuses. The rats that swallowed very high concentrations of 2-butanone in water also developed signs of nervous system effects such as inactivity, drooping eye lids, and uncoordinated muscle movement. Some rats and mice that swallowed water containing high concentrations of 2-butanone died. Rats that received water containing a lower concentration of 2-butanone had mild kidney damage. Skin irritation developed in rabbits and guinea pigs that had small amounts of 2-butanone dropped on their skin. Rabbits that had small amounts of 2-butanone dropped in their eyes had serious eye irritation. We do not know whether 2-butanone causes birth defects or affects reproduction in humans. Reproductive effects were not seen in animals exposed to 2-butanone. We have no information about whether 2-butanone causes cancer in humans or animals.

A more complete discussion of the health effects of 2-butanone in humans and animals can be found in Chapter 2.

### 1.5 IS THERE A MEDICAL TEST TO DETERMINE WHETHER I HAVE BEEN EXPOSED TO 2-BUTANONE?

No specific medical test is available to determine whether you have been exposed to 2-butanone. Studies in humans and animals have shown that it is possible to detect 2-butanone or its breakdown products in the blood, breath,

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and urine. The levels of 2-butanone found in the blood, breath, and urine are usually associated with the levels of exposure found in the workplace, but this is more useful for determining exposure of groups of people rather than individuals. Tests for 2-butanone in blood, urine, or breath are useful only for recent exposure because 2-butanone and its breakdown products leave the body rapidly. These considerations are discussed in more detail in Chapters 2 and 6.

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

The Occupational Safety and Health Administration (OSHA) has set an occupational exposure limit of 200 ppm of 2-butanone in the air. The National Institute for Occupational Safety and Health (NIOSH) has also recommended 200 ppm of 2-butanone as the limit for up to a 10-hour work shift in a 40-hour workweek. Because of its odor, you can smell 2-butanone before it harms you. Further information on governmental recommendations can be found in 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 illnesses that result from exposure to hazardous substances.