

## **1. PUBLIC HEALTH STATEMENT**

This Statement was prepared to give you information about cresols 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). Cresols have been found at 25 of these sites. However, we do not know how many of the 1,177 NPL sites have been evaluated for cresols. As EPA evaluates more sites, the number of sites at which cresols are found may change. The information is important for you because cresols may cause harmful effects and because these sites are potential or actual sources of human exposure to cresols.

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 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 cresols, 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 ARE CRESOLS?**

Three types of closely related cresols exist: ortho-cresol (o-cresol), meta-cresol (m-cresol), and para-cresol (p-cresol). Pure cresols are colorless chemicals, but they may be found in brown mixtures such as creosote and cresylic acids (e.g., wood preservatives). Because these three types of cresols are manufactured separately and as mixtures, they can be found both separately and together. Cresols can be either solid or liquid, depending on how pure they are; pure cresols are solid, while mixtures tend to be liquid. Cresols have a medicinal smell (odor) and when dissolved in water, they give it a medicinal smell and taste. Cresols do not evaporate quickly from water, but in rivers and lakes, they can be removed quickly by bacteria. Dissolved cresols can pass through soil into underground water sources. This may be a problem at hazardous waste sites where cresols are buried. Once cresols are in the water table, they may stay there for months without changing. Cresols in air quickly change and break down into smaller chemicals, some of which irritate the eyes. Cresols can also irritate the eyes.

Cresols are natural products that are present in many foods and in animal and human urine. They are also present in wood and tobacco smoke,

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crude oil, and coal tar. In addition, cresols also are man-made and used as disinfectants and deodorizers, to dissolve substances, and as starting chemicals for making other chemicals.

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

### 1.2 HOW MIGHT I BE EXPOSED TO CRESOLS?

People are most likely to be exposed to cresols by breathing, eating, or drinking them. You can breathe cresols from the air. We do not have enough information to know the background levels of cresols in air, water, or soil, but we do know where they are released. Cresols in the air can come from car exhaust. People are likely to be exposed to cresols in cities and crowded neighborhoods where traffic is heavy. Houses that are heated with coal or wood also may send cresols into the air through chimneys. People who live near factories that burn trash and garbage may breathe cresols from the smokestacks. Smokestacks of factories, electrical power plants, and oil refineries may send cresols into the air, and people who live close to these places may breathe in cresols. People who work in places that use or make cresols may breathe cresols in the air or get cresols on their skin. Cigarette smoke contains cresols, so people who smoke cigarettes are likely to breathe in more cresols than people who do not smoke. Nonsmokers may also breathe in cresols from the cigarette smoke of nearby smokers.

You may eat cresols in your food. Some foods that contain cresols are tomatoes, tomato ketchup, asparagus, cheeses, butter, bacon, and smoked foods. Drinks can also contain cresols. Coffee, black tea, wine, Scotch whiskey, whiskey, brandy, and rum can contain small amounts of cresols. People who live near garbage dumps or places where chemicals are stored or were buried, including hazardous waste sites, may have large amounts of cresols in their well water. They may drink some cresols in the tap water. At work places where cresols are produced or used, people may be exposed to large amounts of cresols. You can find more information on how much cresol is in the environment and how you can be exposed to it in Chapter 5.

### 1.3 HOW CAN CRESOLS ENTER AND LEAVE MY BODY?

Cresols can enter your body tissues quickly if you breathe air containing cresol gas or mist (droplets of cresol-containing liquid in the air), drink water or eat food that contains cresols, or allow your skin to come into contact with substances that contain cresols. If you live near a hazardous waste site, you might come into contact with cresols by drinking water, touching substances, or breathing in air that contains cresols. Cresols may also be formed in your body from other compounds, such as toluene and the amino acid tyrosine, which is present in most proteins. Most of the cresols that enter your body are quickly changed to other substances and leave

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your body in the urine within 1 day. More information on how cresols enter and leave your body can be found in Chapter 2.

### 1.4 HOW CAN CRESOLS AFFECT MY HEALTH?

If you were to eat food or drink water contaminated with very high levels of cresols, you might feel a burning in the mouth and throat as well as stomach pains. If your skin were in contact with a substance containing high cresol levels, you might develop a rash or severe irritation. In some cases, a severe chemical burn might result. If you came into contact with high enough levels of cresols, for example, by drinking or spilling on your skin a substance containing large amounts of cresols, you might become anemic, experience kidney problems, become unconscious, or even die.

Studies in animals have not found any additional effects that would occur after long-term exposure to lower levels of cresols. It is possible that some of the effects in humans listed above, such as kidney problems and anemia, might occur at lower levels if exposure occurs over a longer time period. Effects on the nervous system, such as loss of coordination and twitching of muscles, are produced by low levels of cresols in animals, but we do not know whether low levels also cause such effects in humans. Cresols may enhance the ability of carcinogenic chemicals to produce tumors in animals, and they have some ability to interact with mammalian genetic material in the test tube, but they have not been shown to produce cancer in humans or animals. The EPA has determined that cresols are possible human carcinogens. Animal studies suggest that cresols probably would not produce birth defects or affect reproduction in humans.

### 1.5 IS THERE A MEDICAL TEST TO DETERMINE WHETHER I HAVE BEEN EXPOSED TO CRESOLS?

Samples of your urine can be tested for the presence of cresols, although this test is not routinely available in hospitals and clinics. This test will not tell you whether or not you will have any adverse health effects. The urine sample would have to be taken within 1 day of your exposure to be valid. Because cresols occur naturally in people, and at levels that vary from one individual to the next, results from tests for cresol exposure should be compared to values obtained from the same individual either before exposure or several days after exposure. Small changes might be caused by variation in daily diet. You should also be aware that an increased presence of cresols in the urine could indicate exposure to toluene, a related compound, rather than cresols. However, toluene exposure would also result in elevated urinary levels of hippuric acid; cresol exposure would not. See Chapters 2 and 6 for more information about tests for exposure to cresols.

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

The Occupational Safety and Health Administration (OSHA) sets rules for cresol levels in the workplace. The occupational exposure limit for 8-hour workdays over a 40-hour work week is 22 milligrams of cresols per cubic meter of air (22 mg/m<sup>3</sup>), which is equivalent to 5 ppm. See Chapter 7 for more information on regulations and guidelines for cresols.

### **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. These clinics specialize in recognizing, evaluating, and treating illnesses resulting from exposure to hazardous substances.