



PUBLIC HEALTH STATEMENT

TETRYL

CAS#: 479-45-8

Division of Toxicology

June 1995

This Public Health Statement is the summary chapter from the Toxicological Profile for Tetryl. It is one in a series of Public Health Statements about hazardous substances and their health effects. A shorter version, the ToxFAQs™, is also available. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present. For more information, call the ATSDR Information Center at 1-888-422-8737.

This statement was prepared to give you information about tetryl and to emphasize the human health effects that may result from exposure to it.

The Environmental Protection Agency (EPA) has identified 1,397 hazardous waste sites as the most serious in the nation. These sites make up the National Priorities List (NPL) and are the sites targeted for long-term federal clean-up activities. Tetryl has been found in at least 12 of the sites on the NPL. However, the number of NPL sites evaluated for tetryl is not known. As EPA evaluates more sites, the number of sites at which tetryl is found may increase. This information is important because exposure to tetryl may cause harmful health effects and because these sites are potential or actual sources of human exposure to tetryl.

When a substance 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. This release does not always lead to exposure. You can be exposed to a substance only when you come in

contact with it. You may be exposed by breathing, eating, or drinking substances containing the substance or by skin contact with it.

If you are exposed to a substance such as tetryl, many 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, lifestyle, and state of health.

1.1 WHAT IS TETRYL?

Tetryl is a synthetic substance that was used to make explosives, mostly during World War I and World War II. It is no longer manufactured or used in the United States. The chemical name for tetryl is N-methyl-N,2,4,6-tetranitroaniline. Other commonly used names are 2,4,6-trinitrophenyl-N-methylnitramine, nitramine, tetralite, and tetril. Stocks of tetryl are found in storage at military installations and are being destroyed by the Department of Defense. Tetryl was frequently manufactured as pellets or powder. Under certain manufacturing conditions, it could exist in the air as a dust. Tetryl is a yellow, crystal-like solid at room temperature. It dissolves slightly in water. It can also dissolve in other liquids, including benzene, alcohol, and acetone. At temperatures of 369°F (187°C) or higher, tetryl will explode. Tetryl has no odor, but some of its manufactured forms may have odors due to the presence of other chemicals. In addition, high concentrations of tetryl dust have an

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irritating effect on the nose that produces a sensation that might seem to be an odor.

1.2 WHAT HAPPENS TO TETRYL WHEN IT ENTERS THE ENVIRONMENT?

Tetryl may be released to the air, water, and soil when old stores of the explosive are destroyed by exploding or burning. However, tetryl has not been measured in air during any of these activities.

Tetryl that was manufactured or stored at military installations, or Army ammunition plants may still be present in the soil and water at or around these sites. Tetryl is not likely to evaporate into air from water or soil surfaces. However, tetryl may be present in air mixed with dust from these sites. Tetryl appears to break-down rapidly in some soils. Picric acid is one of the break down products of tetryl in soil. Tetryl probably does not easily travel from soil to groundwater. Erosion of soil from contaminated sites may release tetryl to nearby surface water. Once it is in the water, tetryl may dissolve or associate with small particles of suspended solids, sediments, or organic debris. Some of these particles will settle to the bottom. Tetryl breaks down rapidly in sunlit rivers and lakes, but much more slowly in groundwater. It is not known whether tetryl will build up in fish, plants, or land animals.

1.3 HOW MIGHT I BE EXPOSED TO TETRYL?

Most people are not exposed to tetryl because contamination is localized around military installations where it was manufactured, used, or stored. Tetryl can move through soil and enter underground water. If you live near one of these

installations with tetryl contamination, you may be exposed to tetryl by drinking contaminated well water. You may also be exposed to tetryl by skin contact with contaminated soil or water. Workers who were previously involved in the processes of making, using, packing, or loading tetryl were probably exposed to tetryl by breathing contaminated dust and through skin contact. Workers currently involved in the clean-up, disposal, and destruction of tetryl may also be exposed by these routes. We do not know how many workers are exposed to tetryl.

Tetryl has been found in soil and water at some military installations, such as Army ammunition plants, and in underground water at one site near a military installation.

1.4 HOW CAN TETRYL ENTER AND LEAVE MY BODY?

Tetryl can enter your body if you breathe it in the air, drink it in water, or get it on your skin. We do not know the extent to which tetryl enters your body by these routes. Based on limited information from animal studies, tetryl probably leaves your body in urine after being broken down to other substances.

1.5 HOW CAN TETRYL AFFECT MY HEALTH?

Most of the information on the health effects of tetryl is from studies on workers in military facilities during World War I and World War II. These workers were involved in the production, use, packing, or loading of tetryl. The levels of tetryl in air at these facilities were often not measured. Many workers who breathed tetryl-laden dust

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complained of coughs, fatigue, headaches, eye irritation, lack of appetite, nosebleeds, nausea, and/or vomiting. Most workers who routinely handled tetryl powder and pellets in munitions factories developed a distinct yellow staining of the hands, neck, and hair. Workers with this staining were sometimes referred to as "canaries." Many workers who had skin contact with tetryl dust or compounds containing tetryl also developed skin rashes (dermatitis). The rashes ranged from mild to severe and symptoms often included reddening, itching, swelling, and peeling of skin. Most of these health effects usually developed within a few days to a few weeks after exposure to tetryl. Some workers were more sensitive to tetryl exposure and developed allergies to tetryl. These often included severe asthma-like reactions that sometimes required medical attention or hospitalization. Workers who developed allergies to tetryl had reactions within a few hours after being exposed again to tetryl. Many of these workers were moved to work areas where there was no tetryl. Little is known about the longer term health effects in workers exposed to tetryl.

There is no information on health effects in people exposed to drinking water contaminated with tetryl. Rabbits fed high doses of tetryl every day for 6 to 9 months developed degenerative lesions of the liver and kidney. Decreased blood-clotting capability and changes in the spleen were also noted. We do not know if tetryl causes cancer or birth defects, or if it affects reproduction in people or animals. The Department of Health and Human Services, the International Agency for Research on Cancer, and the Environmental Protection Agency have not classified the carcinogenicity of tetryl.

1.6 IS THERE A MEDICAL TEST TO DETERMINE WHETHER I HAVE BEEN EXPOSED TO TETRYL?

During World War I and World War II, most workers who routinely handled tetryl powder and pellets in munitions factories developed a distinct yellow staining of the skin. Many workers also developed skin rashes. These workers were exposed to high concentrations of tetryl dust in the air and by direct contact with the explosives. There are no medical tests to show if you have been specifically exposed to tetryl. However, if the breakdown products of tetryl found in the urine of animals exposed to tetryl were also present in the urine of exposed people, these breakdown products could be used to indicate exposure to tetryl or similar substances. The symptoms caused by exposure to tetryl can also occur for many other reasons; therefore, they cannot be used as proof of tetryl exposure.

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

The federal government has developed standards and guidelines to protect people from the health effects of tetryl. The Department of Transportation has many regulations for the transportation of explosives such as tetryl. Although tetryl is no longer being manufactured or used, the Occupational Safety and Health Administration (OSHA) has set a regulatory level for tetryl in the workplace. The maximum allowable amount of tetryl in workroom air during an 8-hour workday, 40-hour workweek, is 1.5 milligrams of tetryl per cubic meter of air (mg/m³). This level may apply to

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workers engaged in destruction of tetryl explosives and those who work in locations where tetryl is stored. The National Institute for Occupational Safety and Health recommends that workers not be exposed to air containing more than 1.5 mg/m³ during a 10-hour workday.

1.8 WHERE CAN I GET MORE INFORMATION?

If you have any more questions or concerns, please contact your community or state health or environmental quality department or:

Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road NE, Mailstop F-32
Atlanta, GA 30333

Information line and technical assistance:

Phone: 888-422-8737
FAX: (770)-488-4178

ATSDR can also tell you the location of occupational and environmental health clinics. These clinics specialize in recognizing, evaluating, and treating illnesses resulting from exposure to hazardous substances.

To order toxicological profiles, contact:

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
Phone: 800-553-6847 or 703-605-6000

Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for tetryl. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

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