1. PUBLIC HEALTH STATEMENT

This public health statement tells you about diazinon and the effects of exposure.

The Environmental Protection Agency (EPA) identifies the most serious hazardous waste sites in the nation. These sites make up the National Priorities List (NPL) and are the sites targeted for long-term federal clean-up. Diazinon has been found in at least 18 of the 1,430 current or former NPL sites. However, it's unknown how many NPL sites have been evaluated for this substance. As more sites are evaluated, the sites with diazinon may increase. This is important because exposure to this substance may harm you and because these sites may be sources of exposure.

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 are exposed to a substance only when you come in contact with it. You may be exposed by breathing, eating, or drinking the substance or by skin contact.

If you are exposed to diazinon, many factors determine whether you'll be harmed. These factors include the dose (how much), the duration (how long), and how you come in contact with it. You must also consider the other chemicals you're exposed to and your age, sex, diet, family traits, life-style, and state of health.

1.1 WHAT IS DIAZINON?

Diazinon is the common name of an organophosphorus insecticide used to control pest insects in soil, on ornamental plants, and on fruit and vegetable field crops. It is also used to control household pests such as flies, fleas, and cockroaches. This chemical is synthetic and does not occur naturally in the environment. Diazinon is sold under common trade names including Alfatox, Basudin, AG 500, Dazzel, Gardentox, and Knoxout.

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The pure chemical (100% diazinon) is a colorless and practically odorless oil. Preparations used in agriculture and by exterminators contain 85-90% diazinon and appear as a pale to dark-brown liquid. This form of diazinon is diluted with other chemicals before use. The diazinon available for home and garden use contains l-5% diazinon in a liquid or as solid granules. These preparations have a slight chemical odor but cannot be identified by smell. Most of the diazinon used is in liquid form, but it is possible to be exposed to the chemical in a solid form. Diazinon does not burn easily and does not dissolve easily in water. It will dissolve in alcohol or other organic solvents such as petroleum products. Its basic physical and chemical properties are summarized in Chapter 3; for more information on its production and use, see Chapter 4.

1.2 WHAT HAPPENS TO DIAZINON WHEN IT ENTERS THE ENVIRONMENT?

Diazinon may enter the environment during the manufacturing process, but most environmental contamination comes from agricultural and household application of the chemical to control insects. Diazinon is often sprayed on crops and plants, so small particles of the chemical may be carried away from the field or yard before falling to the ground. Studies have not shown harmful human health effects resulting from airborne contamination of areas surrounding fields where diazinon has been used. After diazinon has been applied, it may be present in the soil, surface waters (such as rivers and ponds), and on the surface of the plants. Diazinon on soil and plant surfaces may also be washed into surface waters by rain. Up to 25% of applied diazinon can return to the air from the surface where it was applied. In the environment, diazinon is rapidly broken down into a variety of other chemicals. Depending on the soil or water conditions, the time required for one-half of the diazinon to be broken down is between a few hours and 2 weeks. Diazinon can move through the soil and contaminate ground water (water below the surface such as well water). Diazinon is rapidly broken down by most animals that eat it. This means the chemical is not likely to build up to high or dangerous levels in animal or plant foods that you might eat. For more information on diazinon use and its fate in the environment, see Chapters 4 and 5.

1.3 HOW MIGHT I BE EXPOSED TO DIAZINON?

Diazinon can be bought at any home or garden supply store in the United States and is safe if used according to the directions printed on the container. Small amounts of diazinon have been detected in foods sold to consumers, but studies by the Food and Drug Administration (FDA) have found that the levels in food are far below the level that might cause any harmful health effects. Diazinon has been found in surface and ground water samples collected at many locations. Only a few of these samples contained high levels of diazinon contamination. These were associated with runoff from contaminated fields or single sources responsible for contamination such as illegal dumping. In areas surrounding hazardous waste disposal or treatment facilities, you could be exposed by contact with contaminated soils or contaminated runoff water or ground water that resulted from spills or leaks of material on the site. People who work in the manufacture and professional application of diazinon have the most significant exposure to this insecticide. Other than people who are exposed at work, those most likely to be exposed are people who use the chemical on lawns or gardens, or to control insects in the home. For more information on the ways people might be exposed to diazinon, see Chapter 5.

1.4 HOW CAN DIAZINON ENTER AND LEAVE MY BODY?

If you breathe air containing diazinon, you may absorb it into your body through your lungs. If you eat food or drink water containing diazinon, the chemical may be absorbed from your stomach and intestines. Diazinon may also enter your body across the skin. People living near hazardous waste sites are most likely to be exposed to diazinon through contact with contaminated soil or runoff water.

Once in the body, diazinon is rapidly broken down and eliminated from the body in both the urine and feces. Diazinon has not been shown to accumulate in any tissues and almost all of the chemical is eliminated from the body in 12 days. For more information, see Chapter 2.

1.5 HOW CAN DIAZINON AFFECT MY HEALTH?

Most cases of unintentional diazinon poisoning in people have resulted from short exposures to very high concentrations of the material. Usually this occurs when workers who use the chemical do not properly protect themselves, and when they inhale, swallow, or contaminate their skin with a large amount of diazinon. Whether you have harmful effects to your health from diazinon exposure depends on how much you are exposed to and for how long you are exposed. Diazinon affects the nervous system. Some mild symptoms of exposure are headache, dizziness, weakness, feelings of anxiety, constriction of the pupils of the eye, and not being able to see clearly. If you experience these symptoms, you should seek medical attention immediately. Emergency rooms have drugs that stop the harmful effects of diazinon. More severe symptoms include nausea and vomiting, abdominal cramps, slow pulse, diarrhea, pinpoint pupils, difficulty in breathing, and passing out (coma). These signs and symptoms may start to develop within 30-60 minutes of the exposure and reach their maximum at about 6-8 hours. Very high exposure to diazinon has resulted in death in people accidentally exposed and in those who have swallowed large amounts of the chemical to commit suicide. Damage to the pancreas has developed in some people and in laboratory animals exposed to large amounts of diazinon. Longer exposure to lower levels of diazinon has also been reported to produce some of these symptoms in exposed workers and in people living in houses recently treated with the chemical to control pests. In almost all cases, complete recovery occurred when the exposure stopped. There is no evidence that long-term exposure to low levels of diazinon causes any harmful health effects in people. Diazinon has not been shown to cause birth defects or to prevent conception in humans. Diazinon has not been shown to cause cancer in people or animals. The International Agency for Research on Cancer (IARC), the Environmental Protection Agency (EPA), and the National Toxicology Program (NTP) have not officially classified diazinon as to its carcinogenicity.

In animal studies, high doses of diazinon produced effects on the nervous system similar to those seen in people. For more information on the health effects of diazinon, see Chapter 2.

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

Most of the signs and symptoms resulting from diazinon poisoning are due to the inhibition of an enzyme called acetylcholinesterase in the nervous system. This enzyme is also found in your red blood cells and a similar enzyme (serum cholinesterase) is found in blood plasma. The most common test for exposure to many organophosphorus insecticides, including diazinon, is to determine the level of cholinesterase activity in the red blood cells or plasma. This test requires only a small amount of blood and is routinely available in your doctor's office. It takes time for this enzyme to completely recover to normal levels following exposure. Therefore, a valid test may be conducted a number of days following the suspected exposure. This test indicates only exposure to an insecticide of this type. It does not specifically show exposure to diazinon. Other chemicals or disease states may also alter the activity of this enzyme. There is a wide range of normal cholinesterase activity in the general population. If you have not established your normal or baseline value through a previous test, you might have to repeat the test several times to determine if your enzyme activity is recovering.

Specific tests are available to determine the presence of diazinon or its breakdown products in blood, body tissue, and urine. These tests are not routinely available through your doctor's office and require special equipment and sample handling. If you need the specific test, your doctor can collect the sample and send it to a special laboratory for analysis. This test is only useful if done within a few hours or days of exposure. This is because diazinon is rapidly broken down and excreted from the body. For more information on how to determine if you have been exposed to diazinon, see Chapters 2 and 6.

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

The federal government has set standards and guidelines to protect people from the possible harmful health effects of diazinon. The Environmental Protection Agency (EPA) has

developed l- and l0-day health advisories (maximum recommended drinking water concentrations) for adults and children of 20 micrograms per liter of water. The lifetime health advisories determined for both children and adults are 0.6 micrograms per liter of drinking water. The EPA has also set tolerances for residues of diazinon in various raw food products of 0.1-60 parts of diazinon per million parts of food (ppm). The National Institute for Occupational Safety and Health (NIOSH) recommends an occupational exposure limit (time-weighted average [TWA]) of 0.1 milligram per cubic meter of air based on working 8 hours per day for 40 hours per week. For more information on regulations and guidelines to protect human health, see Chapter 7.

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, E-29
Atlanta, Georgia 30333
(404) 639-6000

This agency can also provide you with information on the location of occupational and environmental health clinics. These clinics specialize in the recognition, evaluation, and treatment of illness resulting from exposure to hazardous substances.