1. PUBLIC HEALTH STATEMENT

This statement was prepared to give you information about propylene glycol and to emphasize the human health effects that may result from exposure to it. The Environmental Protection Agency (EPA) has identified 1,416 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. Propylene glycol has been identified in at least 5 of the 1,416 NPL sites.

When a chemical is released from a large source, 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 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 chemical such as ethylene glycol, 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, lifestyle, and state of health.

1.1 WHAT IS PROPYLENE GLYCOL?

Propylene glycol is a synthetic liquid substance that absorbs water. Propylene glycol is also used to make polyester compounds, and as a base for de-icing solutions. Propylene glycol is used by the chemical, food, and pharmaceutical industries as an antifreeze when leakage might lead to contact with food. The Food and Drug Administration (FDA) has classified propylene glycol as an additive that is “generally recognized as safe” for use in food. It is used to absorb extra water and maintain moisture in certain medicines, cosmetics, or food products. It is a solvent for food

colors and flavors, and in the paint and plastics industries. Propylene glycol is also used to create artificial smoke or fog used in fire-fighting training and in theatrical productions. Other names for propylene glycol are 1,2-dihydroxypropane, 1,2-propanediol, methyl glycol, and trimethyl glycol.

Propylene glycol is clear, colorless, slightly syrupy liquid at room temperature. It may exist in air in the vapor form, although propylene glycol must be heated or briskly shaken to produce a vapor. Propylene glycol is practically odorless and tasteless.

For more information on the sources, properties, and uses of propylene glycol, see Chapters 3 and 4.

1.2 WHAT HAPPENS TO PROPYLENE GLYCOL WHEN IT ENTERS THE ENVIRONMENT

Waste streams from the manufacture of propylene glycol are primarily responsible for the releases into the air, water, and soil. Propylene glycol can enter the environment when it is used as a runway and aircraft de-icing agent. Propylene glycol can also enter the environment through the disposal of products that contains it. It is not likely to exist in large amounts in the air. We have little information about what happens to propylene glycol in the air. The small amounts that may enter the air are likely to break down quickly. If it escapes into the air, it will take between 24 and 50 hours for half the amount released to break down. Propylene glycol can mix completely with water and can soak into soil. It can break down relatively quickly (within several days to a week) in surface water and in soil. Propylene glycol can also travel from certain types of food packages into the food in the package. See Chapters 4 and 5 for more information on propylene glycol in the environment.

1.3 HOW MIGHT I BE EXPOSED TO PROPYLENE GLYCOL?

Propylene glycol has been approved for use at certain levels in food, cosmetics, and pharmaceutical products. If you eat food products, use cosmetics, or take medicines that contain it, you will be exposed to propylene glycol, but these amounts are not generally considered

harmful. People who work in industries that use propylene glycol may be exposed by touching these products or inhaling mists from spraying them. These exposures tend to be at low levels, however. Propylene glycol is used to make artificial smoke and mists for fire safety training, theatrical performances, and rock concerts. These artificial smoke products may also be used by private citizens. These products are frequently used in enclosed spaces, where exposure may be more intense.

See Chapter 5 for more information on exposure to propylene glycol.

1.4 HOW CAN PROPYLENE GLYCOL ENTER AND LEAVE MY BODY?

Propylene glycol can enter your bloodstream if you breathe air containing mists or vapors from either compound. It can also enter your bloodstream through your skin if you come in direct contact with it and do not wash it off. If you eat products that contain propylene glycol, it may enter your bloodstream. Exposure of the general population to propylene glycol is likely since many foods, drugs, and cosmetics contain it.

Propylene glycol breaks down in the body in about 48 hours. However, studies of people and animals show that if you have repeated eye, skin, nasal, or oral exposures to propylene glycol for a short time, you may develop some irritation.

1.5 HOW CAN PROPYLENE GLYCOL AFFECT MY HEALTH?

Propylene glycol breaks down at the same rate as ethylene glycol, although it does not form harmful crystals when it breaks down. Frequent skin exposure to propylene glycol can sometimes irritate the skin.

1.6 ARE THERE MEDICAL TESTS TO DETERMINE WHETHER I HAVE BEEN EXPOSED TO PROPYLENE GLYCOL?

Propylene glycol is generally considered to be a safe chemical, and is not routinely tested for, unless specific exposure, such as to a medicine or cosmetic, can be linked with the observed bad

symptoms. Since propylene glycol breaks down very quickly in the body, it is very difficult to detect. Refer to Chapters 2 and 6 for more information on these tests.

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

The government has developed regulations and guidelines for propylene glycol. These are designed to protect the public from potential adverse health effects.

The Food and Drug Administration (FDA) has classified propylene glycol as "generally recognized as safe," which means that it is acceptable for use in flavorings, drugs, and cosmetics, and as a direct food additive. According to the World Health Organization, the acceptable dietary intake of propylene glycol is 25 mg of propylene glycol for every kilogram (kg) of body weight. For more information on the regulations and guidelines that apply to propylene glycol, 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 contact ATSDR at the address and phone number below.

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

Toxicological profiles are also available on-line at www.atsdr.cdc.gov and on CD-ROM. You may request a copy of the ATSDR ToxProfilesTM CD-ROM by calling the toll-free information

and technical assistance number at 1-800-CDCINFO (1-800-232-4636), by e-mail at cdcinfo@cdc.gov, or by writing to:

Agency for Toxic Substances and Disease Registry
Division of Toxicology and Environmental Medicine
1600 Clifton Road NE
Mailstop F-32
Atlanta, GA 30333
Fax: 1-770-488-4178

Organizations for-profit may request copies of final Toxicological Profiles from the following:

National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22161
Phone: 1-800-553-6847 or 1-703-605-6000
Web site: http://www.ntis.gov/