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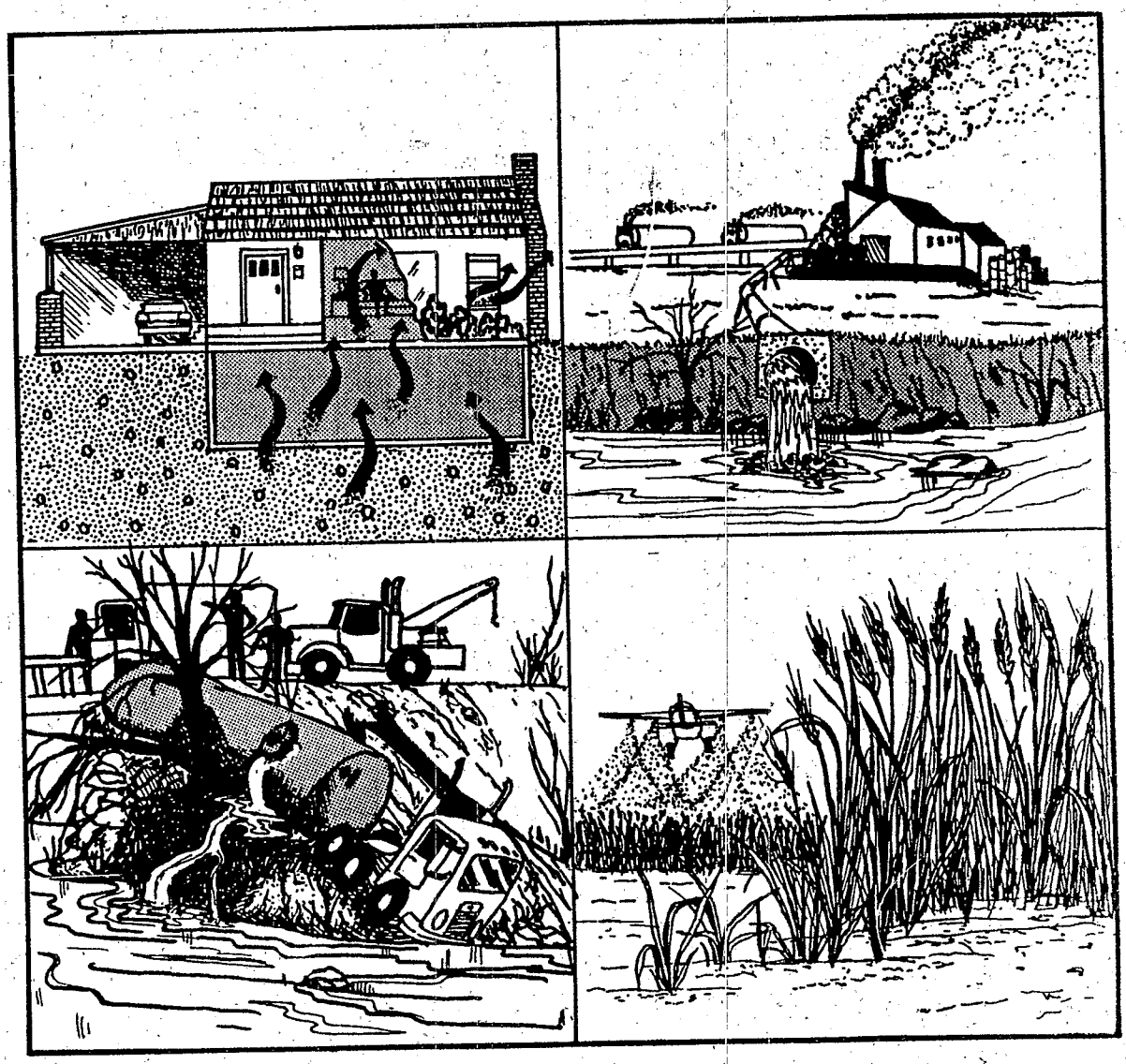
Hazardous Substances In Our Environment

A Citizen's Guide To Understanding Health Risks And Reducing Exposure



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September 1990

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INTRODUCTION

> ". . .NRDC [Natural Resources Defense Council] found industry is pumping more than 361 million pounds of cancer causing chemicals into the air yearly. . ." (*USA Today*, 6/20/89, 6A).
>
> "According to NRDC, between 5,500 to 6,200 of today's preschoolers are likely to develop cancer solely because of exposure to just eight pesticides" (*Philadelphia Inquirer*, 6/18/89, Weekend Magazine, p. 42).
>
> "The EPA [United States Environmental Protection Agency] estimates that 467,000 tons of tobacco are burned indoors each year. That smoke has 43 known carcinogens" (*USA Today*, 6/20/89, 1A).

Every day the news media publish statements like these as scientists gain more knowledge about hazardous substances in the environment. But for you as the reader such statements often raise more questions than they answer. You might ask some of these questions:

- What are the chances I will get cancer if I live near one of the industrial plants identified in the *USA Today* article? What about if I live on the other side of town from the plant?
- How was the number of cancer cases for preschoolers estimated? Are these cancer cases in addition to the cancers that preschoolers may get from other sources? Are they predicted to get cancer as children or later in life? How commonly used are the pesticides?
- How dangerous is the smoke from the 467,000 tons of tobacco containing 43 carcinogens? What are my chances of getting cancer from indoor tobacco smoke?

This guidebook can help answer questions you may have about health risks from hazardous substances after reading statements in newspapers, books, and government reports or hearing statements on television or radio or even from your neighbors. We use the term *hazardous substance* very broadly. It applies to any man-made or naturally occurring chemical or mineral substance found in air, water, soil, or food that can cause any type of human illness.

EPA's responsibilities for regulating hazardous substances cover both human health and the environment. This guidebook concerns only the human health risks from exposure to hazardous substances. Other EPA publications are available to citizens concerned about risks to the ecosystem.

We have tried to give you enough information about human health risks from exposure to hazardous substances to think critically about what you read and hear. Because some of the information is technical, you may want to skim the guidebook first and then use it as a reference for answering your questions. The information is as current and as accurate as possible. At the end of each chapter, we provide references for more information.

The guidebook is divided into two parts. Part I, *Understanding Your Health Risks from Hazardous Substances* (Chapters 1 through 4), describes different hazardous substances and how they get into your environment. It also explains the methods scientists use to estimate your health risks from hazardous substances. Specifically, Part I describes

- sources of hazardous substances in your environment,
- methods scientists use to measure your level of exposure to hazardous substances,
- methods scientists use to estimate your risk of illness from different exposures, and
- characteristics of risks that influence your judgment of their seriousness.

You may want to know what actions the government takes to reduce health risks and whether there are any actions you can take to reduce your personal risks even more. Part II of this guidebook, *Reducing Your Health Risks from Exposure to Hazardous Substances* (Chapters 5 through 8), describes

- government actions to reduce exposure to hazardous substances,
- community activities and organizations that work to reduce exposures to hazardous substances,
- personal actions you can take to reduce your exposures to hazardous substances, and
- additional sources of information about many different hazardous substances and the harmful health effects associated with them.

A glossary at the end of the guidebook defines common terms related to hazardous substances.

PART I

Understanding Your Health Risks from Hazardous Substances

1 IDENTIFYING HAZARDOUS SUBSTANCES IN YOUR ENVIRONMENT

HIGHLIGHTS:

- Hazardous substances are all chemicals or minerals that can harm you when present in air, water, soil, or food.
- Hazardous substances come from natural and man-made sources.
- Hazardous substances can get into the environment from both routine and accidental releases.
- Hazardous substances can travel a variety of routes to get to your environment.

Defining Hazardous Substances

Every day you probably hear or read about the harmful effects associated with substances in the environment. Scientists and the government use a variety of terms to describe different types of substances that have harmful health effects. For example, a factory in your city may be reported to be releasing a "toxic chemical" to the air, while a "hazardous material" may have been found in a river downstream from a large farm.

In this guidebook, the term "hazardous substance" refers to any substance that has potential to harm you when present in air, water, soil, or food. We include substances with harmful health effects that range from minor illnesses or minor injuries to death. We also include substances with health effects that occur right away and those with health effects delayed for 10 years or even longer. You can apply the information on hazardous substances in this guidebook to any substance you read or hear about that has harmful health effects.

A glossary at the end of the guidebook defines technical terms related to hazardous substances. You may want to consult the glossary when you encounter unfamiliar words in this guidebook or in other information sources.

Natural and Man-made Sources

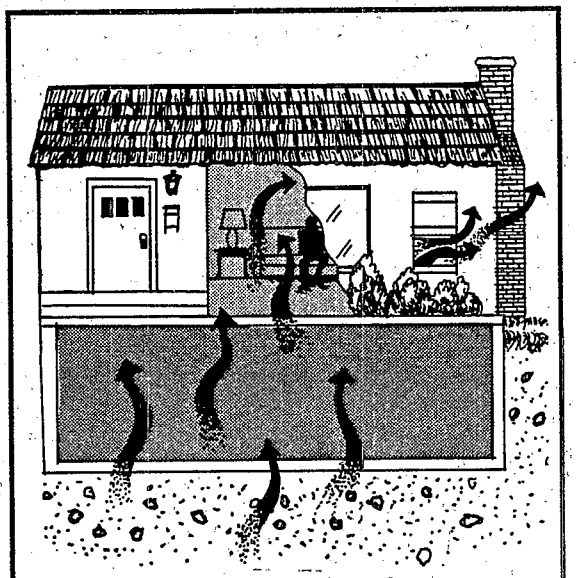
Many hazardous substances in the environment come from natural sources. Natural sources exist independent of human activities and include the following:

- naturally occurring minerals, metals, or gases such as coal, oil, lead, and radon that are found in certain geographic areas; and
- naturally occurring pesticides and contaminants found in plants used for food such as grains and nuts. Aflatoxin is a contaminant produced by a mold that grows on grains and nuts.

A Natural Source: Radon

Radon is an example of a naturally occurring gas. It is found in high concentrations in soils and rocks containing uranium, granite, shale, phosphate, and pitchblende. Radon from the soil and rock on which a house is built can leak into the house through dirt floors, cracks in concrete floors and walls, floor drains, sumps, joints, and tiny cracks or pores in hollow-block walls.

In outdoor air, radon is diluted to such low concentrations that it is usually nothing to worry about. Once inside an enclosed space (such as a home), however, radon can accumulate to dangerous levels. Scientists estimate that about 5,000 to 20,000 lung cancer deaths a year in the United States may be attributed to radon. Most homes in this country do not have a radon problem, but EPA recommends that all single-family detached houses and apartments and condominiums below the third floor be tested for radon. Chapter 7, page 69, of this guidebook contains information about how to test your home for radon.



Transport of radon to indoor air

Many hazardous substances in the environment come from man-made sources. Man-made sources are created by human activities and include the following:

- commercial facilities that make, treat, store, use, or dispose of hazardous substances;
- sewage and water treatment plants; and
- some consumer products such as gasoline, household cleaners, pesticides, and paints and solvents.

Man-made sources of hazardous substances; for example, consumer products

The extent of human health effects from a hazardous substance depends on the amount of human exposure and the substance's ability to cause harm, not on whether the source is natural or man-made.

Man-made Sources of Hazardous Substances: A Two-Edged Sword

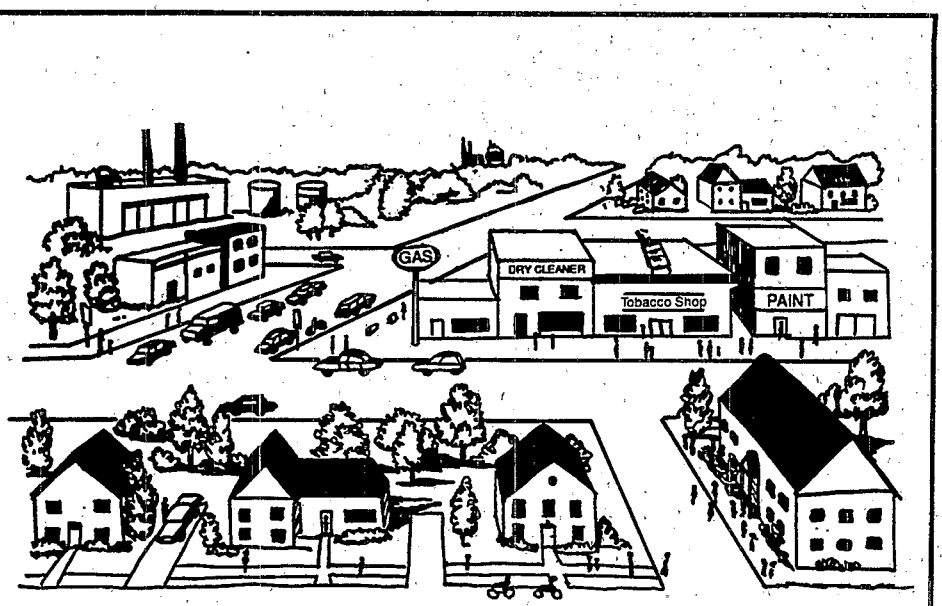
Man-made sources bring benefits to society as well as hazardous substances to our environment.

Our life expectancy has risen dramatically from 47 years in 1900 to 75 years in 1986. A safer water supply explains part of this increase. Surface water is now treated with pesticides to kill many microorganisms that could have extremely serious health consequences. Nevertheless, some of these treatments produce by-products such as chloroform. Chloroform has been shown to have adverse effects on fetal development.

Technical advances have given us a wide range of new and useful products including plastics, nylon, and other man-made fabrics; industrial solvents; chemical fertilizers; and pesticides. Such products have raised the standard of living of many people. Lightweight plastic has replaced heavier metal in various products including cars and furniture. We save energy by driving lighter cars, which use less energy. Pesticides and fertilizers allow farmers to produce more crops on less land, providing consumers with greater quantities of food at lower prices. Nevertheless, all these advances have increased the number and quantities of hazardous substances produced.

Routine and Accidental Releases

Hazardous substances can be released regularly from a source into the air, water, or soil or onto food. These routine releases sometimes occur repeatedly over many years.

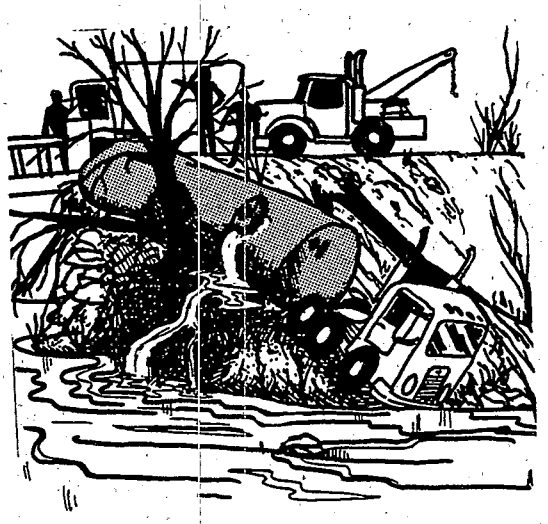


Sources of routine releases of hazardous substances

Routine releases come from both natural and man-made sources. Releases of radon gas from deposits of naturally occurring radioactive minerals near the earth's surface are an example of routine releases from natural sources. Common activities that cause routine releases of hazardous chemicals from man-made sources include

- using aerosol spray paint in the home,
- disinfecting surface water with the chemical chlorine,
- driving cars or trucks,
- operating sewage treatment plants,
- using solvents for dry cleaning,
- operating factories,
- smoking cigarettes, and
- using building materials that contain formaldehyde or asbestos.

Hazardous substances sometimes are released into the environment as a result of an accident. Accidental releases are unpredictable and can occur either for a very short time only or for longer time periods (especially if the releases go undetected).



Accidental releases of hazardous substances

Accidental releases of hazardous substances can come from both natural and man-made sources. A forest fire started by lightning results in accidental releases from natural sources. Here are some examples of accidental releases from man-made sources:

- The accidental explosion and release of methyl-isocyanate at an industrial plant in Bhopal, India; and
- The train wreck that released formaldehyde into the Russian River in California.

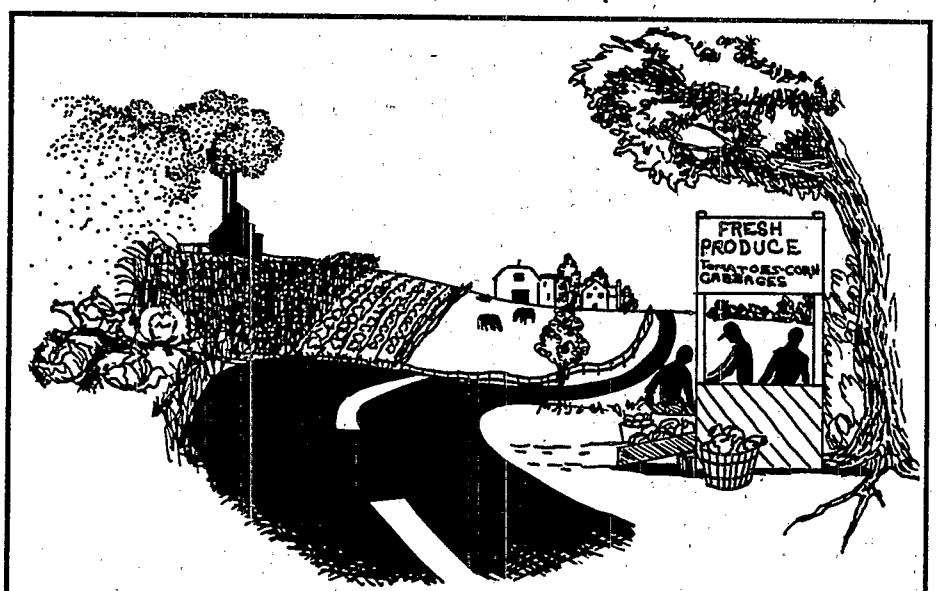
Pathways into Your Environment

Hazardous substances can be transported through many different pathways to get from their sources to your environment. Knowing all the possible pathways is an important factor in determining whether the hazardous substance will get into your environment. In general, the closer you are to the place where the hazardous substance is released the more likely it will be in your environment. The following pages list a few typical environmental pathways.

Chemical fertilizers and pesticides can run off fields during rainstorms into streams or rivers. If a farm does not have drainage ditches, these substances can be carried by rain water or by fish into estuaries, streams, or lakes where people fish or swim. Some farmers use organic farming methods that reduce the use of chemicals.

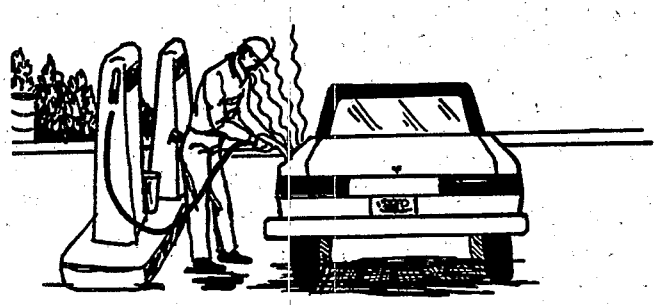
Transport of chemical fertilizer to water used for recreation

Some factory smokestacks release particles containing lead, a hazardous substance, into the air. Eventually some of these particles might be deposited onto vegetable crops that people eat. A smokestack with adequate controls or a smokestack on a factory that does not produce lead will not release lead into the air.



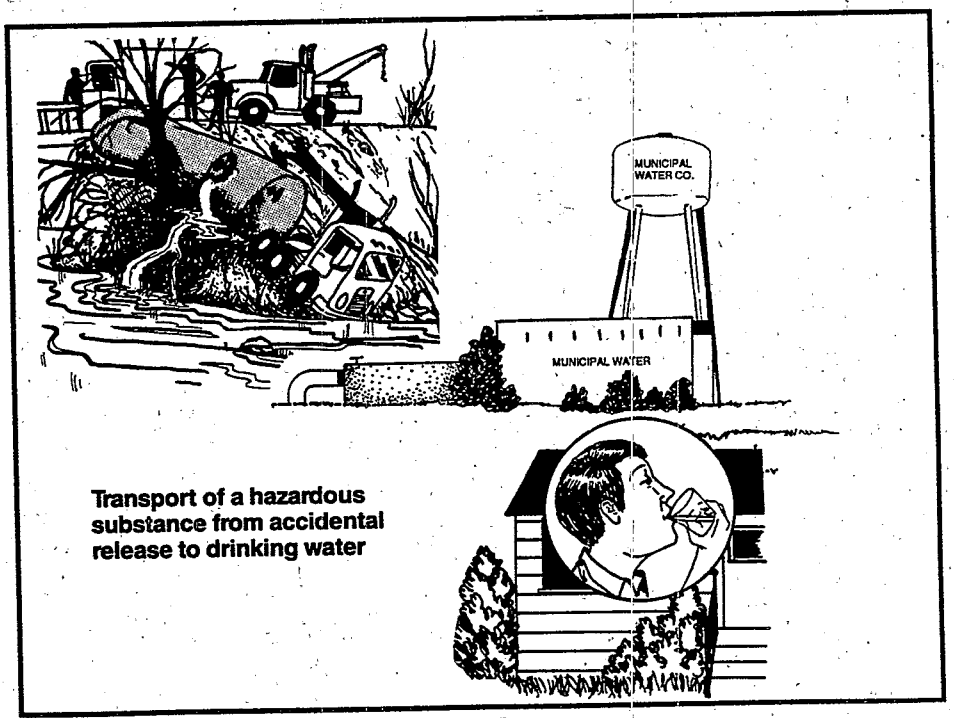
Transport of lead from factory to food supply

Benzene and other hazardous substances can be released to the air when gasoline is put in an automobile. People who pump the gasoline breathe in the air containing the hazardous substances or absorb them through their skin. In some states, such as California, gasoline pumps are designed to reduce the amounts of hazardous substances released into the air.



Transport of benzene from gasoline to air near gas pump

A truck carrying a liquid waste containing a hazardous substance to an incinerator could be involved in a wreck. The hazardous substance would be released into the soil. Later, a rainstorm could wash the hazardous substance into a nearby stream where it would flow until reaching the water treatment plant for a nearby town. If the treatment process did not remove the hazardous substance, it would end up in the town's drinking water.



Transport of a hazardous substance from accidental release to drinking water

Are There Hazardous Substances In Your Environment?

These three examples illustrate how you can determine whether a particular hazardous substance is likely to be in your environment. There must be a source, routine or accidental releases from the source must occur, and there must be a pathway to your environment from where the hazardous substance was released.

1. **Is tobacco smoke, which contains cancer-producing substances, in your environment?**

If you live with, work with, or spend your leisure time indoors around smokers, tobacco smoke will be in the air you breathe. Even if you are in another part of the building, natural air circulation patterns or heating/air-conditioning systems can bring the smoke into your air.

2. **Are substances suspected to cause cancer, such as methylene chloride, released from factories in your environment?**

If you live within a few miles downwind of a factory that uses methylene chloride in its manufacturing process and releases it into the air either routinely or accidentally, it might be in the air you breathe.

3. **Do you have hazardous substances in your household such as household cleaners, pesticides, paints, and solvents?**

If you use household cleaners, pesticides, paints, or solvents and don't take precautions, you may breathe in harmful fumes or take in hazardous substances through your skin.

More Information

This chapter has identified some common sources of hazardous substances and explained how these substances are released into the environment and how they get into your air, water, soil, or food. If you would like to know more about this topic, the publications listed below would be a good place to start.

Routes of Exposure to Environmental Chemicals

Write to: U.S. Environmental Protection Agency, Region II
26 Federal Plaza, Room 737
New York, NY 10278
Attn: Dr. Maria Pavlova
or call: (212) 264-7364

America's Wetlands—Our Vital Link Between Land and Water

Write to: Public Information Center PM-211B
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460
or call: (202) 382-2080

Environmental Progress and Challenges: EPA's Update

Write to: Public Information Center PM-211B
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460
or call: (202) 382-2080

Chemicals in Your Community—A Guide to the Emergency Planning and Community Right-to-Know Act

Write to: Public Information Center PM-211B
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460
or call: (202) 382-2080

2 ESTIMATING YOUR ENVIRONMENTAL EXPOSURE

HIGHLIGHTS:

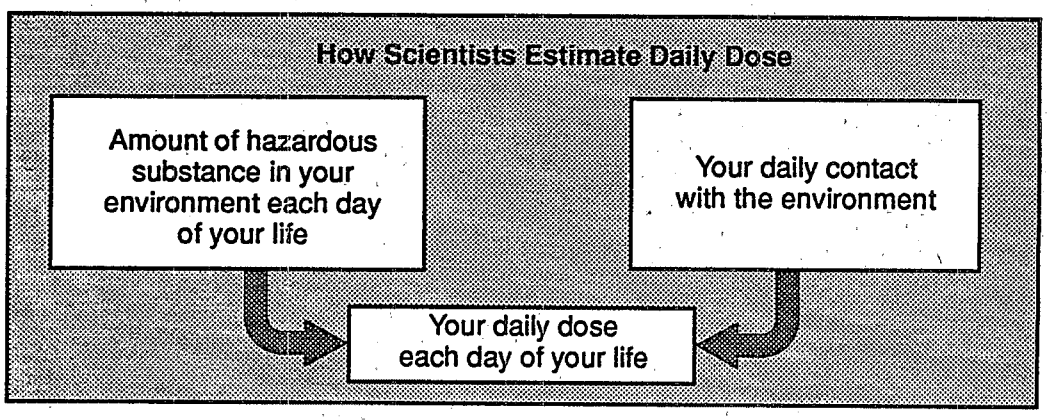
- Your level of exposure to a hazardous substance depends on the amount of the hazardous substance in the environment around you and how long it stays there.
- To determine the amount of a hazardous substance in the environment, EPA either measures the concentration of the hazardous substance directly or uses mathematical models to estimate it.
- Your daily dose of a hazardous substance is the amount taken into your body each day.
- Daily dose is an important determinant of whether the hazardous substance can make you sick.

Estimating Exposure: An Overview

Chapter 1 showed that natural and man-made hazardous substances are all around us. These substances will not necessarily make you sick. Whether you get an illness because of hazardous substances in your environment depends on your level of exposure. Your exposure determines the amount of the substance that actually gets taken into your body from the air you breathe, the liquids you drink, the food you eat, and the soil you touch.

EPA's first step in determining whether hazardous substances in the environment will make you sick is to estimate the daily intakes or doses of these substances over your lifetime.

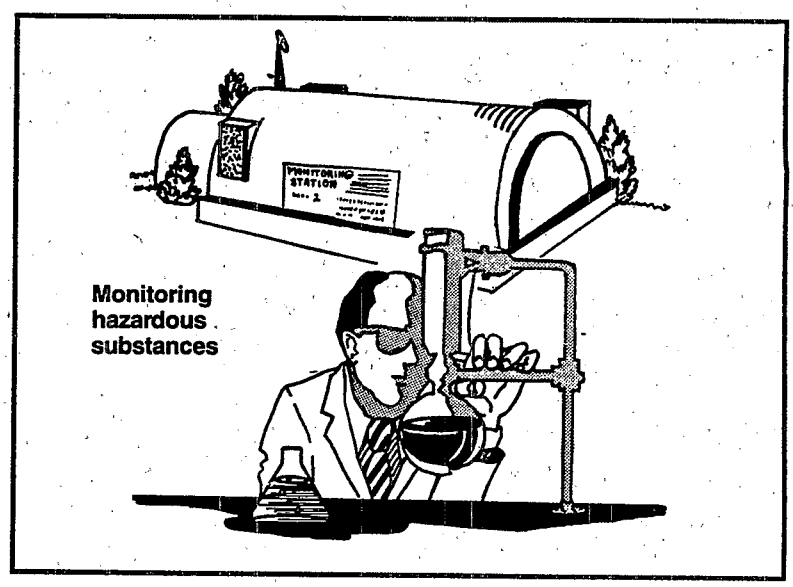
To estimate your daily dose of a hazardous substance scientists must know how much of the hazardous substance is in the air, water, food, and soil around you each day of your life. As shown in Table 1 on page 18, these amounts are multiplied by the amounts of air, water, food, and soil that you take into your body each day and added together to give your daily dose of the hazardous substance.



After determining your daily dose of a hazardous substance, scientists then estimate your risk, or chance, of getting an illness because of that exposure. Chapter 3 describes how scientists estimate your risk of illness.

How Scientists Estimate the Amount of Hazardous Substances in Your Environment

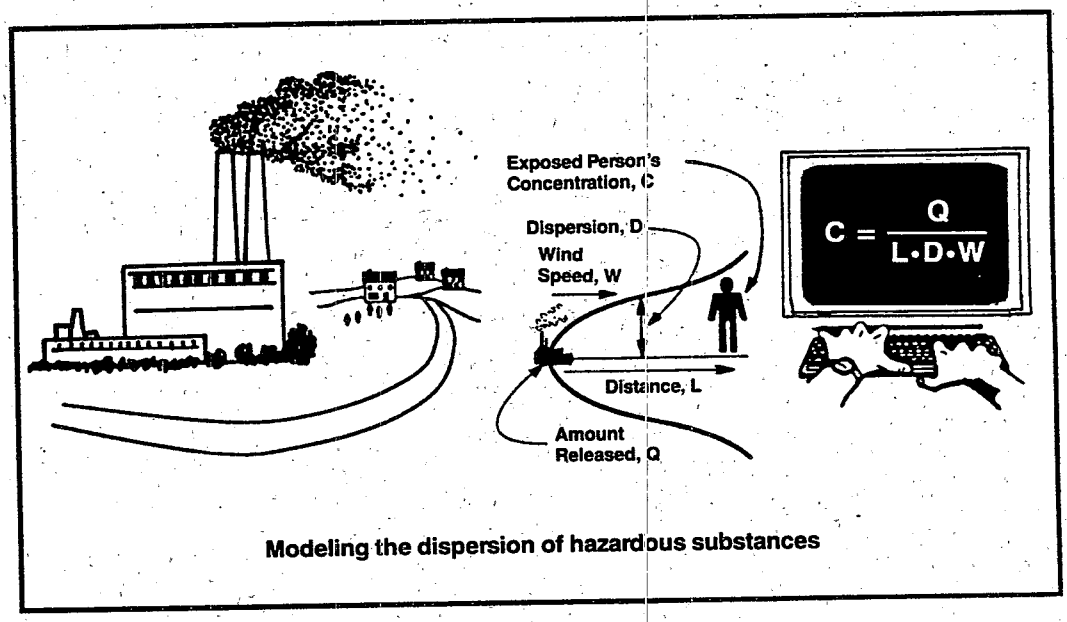
Direct monitoring is a way to measure the actual concentration of hazardous substances in the environment at different points in time. These measurements are obtained by taking samples of indoor or outdoor air, water, food, or soil and looking at their chemical composition in the laboratory.



Monitoring hazardous substances

For example, EPA operates air and water monitoring stations in most cities in the United States. The Food and Drug Administration regularly collects samples of fresh fruits and vegetables and tests them for illegal pesticide residues.

Mathematical modeling provides an alternative approach for estimating the concentrations of hazardous substances. These models use mathematical formulas to estimate the concentrations of a hazardous substance at different distances from the point of release. The formulas are different depending on whether the pathway to the exposed person is through air, surface water, or ground water. In all the formulas, the concentration at the point of exposure depends on the amount of the hazardous substance released to the environment as well as on other factors. These include distance from the point of release, climate, geological factors, and the chemistry of the hazardous substance. EPA routinely uses mathematical models to estimate the amounts of hazardous substances in air and water.



Modeling the dispersion of hazardous substances

Because both direct monitoring and modeling approaches have limitations for estimating environmental concentrations, it is best to combine them, if possible. EPA often compares modeling estimates with direct monitoring measurements for at least part of the geographic area and part of the time period under investigation.

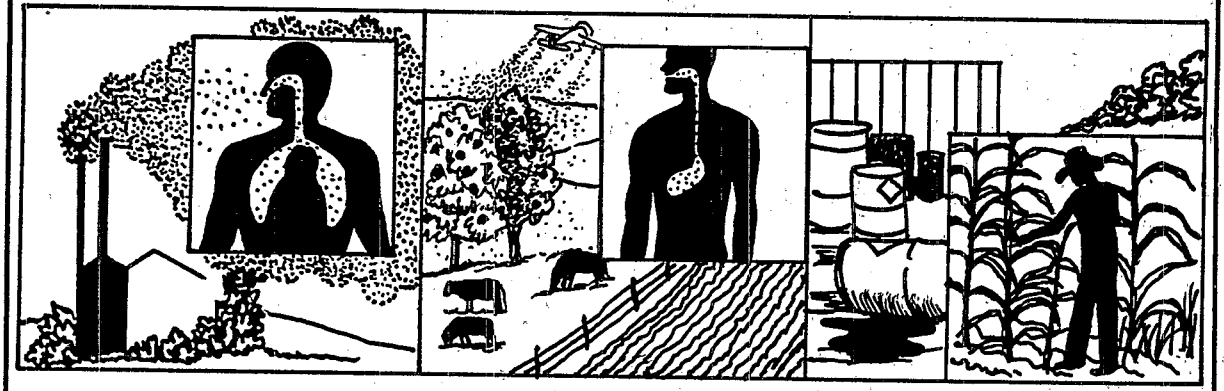
Comparing Monitoring and Modeling Estimates

EPA has estimated the concentrations of ten hazardous substances in the air at ten different locations in Philadelphia using both the monitoring and modeling approaches. EPA found that the modeling approach gave somewhat lower estimates of the concentration for all the hazardous substances. These results illustrate the difficulty that engineers have in identifying all sources and in accurately measuring releases. The main advantage of the modeling approach is that it can be used to derive concentration estimates for all locations in Philadelphia, whereas the monitoring estimates are restricted to the ten sites where the monitors are placed. The engineers can use the information gained by comparing the modeling and monitoring methods to improve the accuracy of the modeling estimates.

How Scientists Estimate Daily Dose

The three ways that hazardous substances can enter your body are through

- your lungs—from the air you breathe;
- your digestive tract—from the food you eat, liquids you drink, or particles from the soil or air that you swallow; and
- your skin—from the hazardous substances you touch or the water you wash in.



Pathways through which hazardous substances can enter the body

The amount of each hazardous substance actually taken in by each exposed person in one day is referred to as the daily dose. Several quantities affect how much of a hazardous substance in your environment is actually taken into your body each day. Some of these are how much you eat and drink and how much you breathe each day and how easily the hazardous substance can pass through your lungs, digestive tract, or skin into your blood stream.

To find out how much of a hazardous substance you take into your body through a particular exposure, EPA multiplies the concentration of the hazardous substance in your environment by appropriate conversion factors for that type of exposure. The following are examples of conversion factors that have been used in some EPA studies:

- Water drunk per day by adult = 2 liters (approximately eight 8-ounce glasses including the water in coffee, soda, etc.), by child = 1 liter
- Air breathed per day = 20 cubic meters (approximate volume of air in a small bedroom or den)
- Fish eaten per week (1 portion) = 224 grams (approximately 7 ounces)
- Soil consumed per day (by child) = 100 milligrams (0.004 ounces)
- Percentage of hazardous substance in contact with lungs or digestive tract taken into body (absorption rate) = 100 percent

These conversion factors are based on observations of human behavior. They are, in EPA's judgment, reasonable estimates. Your daily dose may vary over your lifetime for several reasons. For example, you may live near a factory for the first 20 years of your life and then move to a different neighborhood. Your daily dose also may depend on activity patterns that vary with age. For example, children may eat more of some foods containing pesticide residues than adults. Finally, your daily dose may vary over a lifetime because the amount of the hazardous substance in your environment varies over time.

In general, a short exposure is less dangerous than a longer exposure at the same daily dose level. In addition, if two people are exposed to the same total dose over a lifetime, but have different daily doses at different ages, they may experience different health effects. This is because people may be more susceptible to health effects at some ages than at others.

The health effects associated with a given daily dose also depend on body weight. In general, a child's daily dose is lower than an adult's because children eat less and have smaller lungs. But if a child and an adult have the same daily dose, the child will be more affected because of the difference in body weight.

Your Exposures to Some Hazardous Substances

If you want to know what your health risks are from a hazardous substance in your environment, you need to know your amount of exposure. Here are two examples of how researchers have estimated likely exposures for hazardous substances that have been in the news.

1. What is your exposure to tobacco smoke, which contains cancer-producing substances?

If you live or work with smokers, researchers estimate that your average daily dose of tobacco tar (from tobacco smoke) is 1.43 milligrams per day for your 50 adult years. To get this estimate, the amount of tar released to the air when one cigarette is smoked was measured and multiplied by the estimated number of cigarettes smoked per hour in the home and in the workplace. A mathematical model was used to convert these estimates of the hourly releases of tar into estimates of the concentration of tar in indoor air at home and at work. Finally, estimates of breathing rates and lengths of time spent at home and at work were used to convert the concentration of tar in the air into a daily dose. Your daily dose of tar may be higher or lower than average depending on whether your exposure factors are higher or lower than average.

2. What is your exposure to cancer-causing chemicals released from factories near your home, such as methylene chloride?

If you live and work within a mile downwind of a chemical factory that routinely releases 183,000 pounds of methylene chloride to the air each year, the concentration in your air may be as high as 0.12 milligrams per cubic meter if you live and work less than 250 yards from the factory according to mathematical modeling estimates. At these concentrations, your daily dose would be 2.4 milligrams per day, assuming a breathing rate of 20 cubic meters per day. On the other hand, if you live and work between 1 and 2 miles from the factory, modeling results indicate that your daily dose would be no higher than 0.011 milligrams per day. You can see that your exposure falls rapidly as your distance from the source increases. Also, if you only spend part of your day near the factory, your exposure will be even less.

Example Exposure Estimates

Table 1 presents EPA's estimates of actual exposure levels for ten hazardous substances that may be in your environment. All the exposures shown in the table assume the same daily dose for a person's lifetime. All the estimates are for a specific U.S. community. Your community may be exposed to lower, higher, or roughly the same amounts of these substances. For example, the methylene chloride exposure levels are for persons breathing the air close to a factory that releases 183,000 pounds of methylene chloride each year. Many factories release much smaller amounts of methylene chloride. If there are no factories using asbestos in your community, you will not be exposed to asbestos from that type of source. If your drinking water comes from a well, it is less likely to contain chloroform. And if you live in a very small town or rural area, your benzene exposure will be far below that of people who live in cities near busy intersections.

Table 1 shows that typical daily doses for some hazardous substances are higher than for others. But you cannot tell by looking at the daily doses in Table 1 whether such exposures are likely to harm your health. Chapter 3 describes the methods EPA, other government agencies, and other organizations use to convert exposure estimates, like those in Table 1, into estimates of health risks.

Table 1. Selected Daily Doses for Ten Hazardous Substances Found in Specific U.S. Communities

Hazardous substance	Source	Amount in environment	Daily dose per person
Asbestos	Cement-pipe factory	0.01 micrograms per cubic meter (mcg/m^3) estimated in air near factory	0.2 micrograms per day (mcg/day)
Benzene	Car exhaust	22.3 mcg/m^3 monitored in air at intersection	450 mcg/day
Carbon tetrachloride	Chemical factory	28 mcg/m^3 maximum concentration estimated in air near factory	560 mcg/day
Chloroform	Chemical factory	100 mcg/m^3 maximum concentration estimated in air near factory	2,000 mcg/day
Chloroform	Disinfection of drinking water	47.7 micrograms per liter (mcg/L) measured in drinking water	95 mcg/day
Formaldehyde	Chemical factory	1 mcg/m^3 estimated in air near factory	20 mcg/day
Methylene chloride	Chemical factory	120 mcg/m^3 estimated in air very near factory	2,400 mcg/day
Perchloro-ethylene	Dry cleaning	10.2 mcg/m^3 maximum concentration monitored in air in two cities	200 mcg/day
Perchloro-ethylene	Sewage treatment plant	36.5 mcg/m^3 maximum concentration monitored in air near sewage treatment plant	730 mcg/day
Radon	Underground deposits	800 picocuries/m^3 monitored in air in homes in two states	16,000 picocuries/day
Tobacco smoke	Cigarette smokers	71.5 mcg/m^3 estimated in indoor air where cigarette smokers are present	1,430 mcg/day
Xylene	Car exhaust	30.4 mcg/m^3 maximum concentration monitored in air in two cities	610 mcg/day

Notes: 1,000,000 micrograms (mcg) = 1,000 milligrams = 1 gram = 0.035 ounces; 1 cubic meter (m^3) = 35 cubic feet; 1 liter (L) = 1.06 quarts

Conversion factors for computing daily dose:
- 20 m^3/day = air breathed per day
- 2 L/day = water drunk per day
- 100% = absorption rate for lungs and digestive tract

These daily dose estimates are for a specific community. The daily doses for people in your community may be higher, lower, or the same as these depending on whether your community contains the same sources of hazardous substances as this community.

More Information

This chapter has provided the information you need to have a basic understanding of how the EPA and other organizations estimate your exposure to hazardous substances. If you would like to know more about this topic, the publications listed below would be a good place to start.

The Routes of Exposure to Environmental Chemicals

Write to: U.S. Environmental Protection Agency, Region II
26 Federal Plaza, Room 737
New York, NY 10278
Attn: Dr. Maria Pavlova
or call: (212) 264-7364

Toxic Chemicals: What They Are, How They Affect You

Write to: U.S. Environmental Protection Agency, Region II
26 Federal Plaza, Room 737
New York, NY 10278
Attn: Dr. Maria Pavlova
or call: (212) 264-7364

The Risk Assessment Manual: A Guide to Understanding and Using Health and Environmental Assessments by B. Brockbank, J. Cohrsson, and V. T. Covello, 1988

Write to: National Technological Information Service
5285 Port Royal Road
Springfield, VA 22161
or call: (703) 487-4650
Cost: $17.50

Chemical Risks: A Primer by Kathleen Ream

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Chemical Risks: Personal Decisions by Susan Turner

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3 ESTIMATING YOUR HEALTH RISKS

HIGHLIGHTS:

- The risk of illness from a particular exposure is estimated by combining the dose estimate and dose-response estimate.
- A dose-response estimate tells how the risk of illness changes with different doses.
- Because there is limited experimental information about human health effects and human exposure to hazardous substances, scientists may use animal studies to develop dose-response estimates.
- EPA describes the reliability of a risk estimate based on the type, quality, and quantity of information used to make the estimate.

Estimating Risk of Illness: An Overview

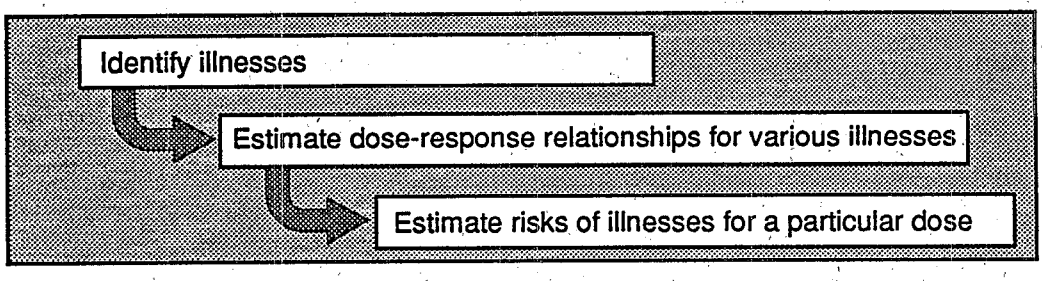
Your risk of illness is the likelihood that exposure to a hazardous substance will cause you to experience a harmful health effect or illness. In general, the greater your exposure to a hazardous substance, the greater your risk of illness. But your risk of illness is also determined by the *amount of the substance that is required* to harm your health. For example, small amounts of cyanide might increase your risk of death quite a lot, while the same amount of lead might not increase your risk of death at all.

Everyone who is exposed to a hazardous substance above some minimum level has an increased risk of illness, but only in very unusual circumstances will many people actually get sick. For example, all people exposed to *low levels* of a cancer-causing pesticide in their food have an increased risk of cancer, but the increased risk of cancer is very low—less than one person out of every one million exposed may be expected to get cancer. In contrast, most people breathing *high levels* of hydrogen cyanide will become very sick or die. Their increased risk of death is very high.

Individual risks of illness are measured by an expression of chance (for example, one chance in a million) that an individual is expected to get sick. For example, some workers in asbestos factories in the 1930's and 1940's had a risk of cancer as high as one chance in a hundred (that is, 1/100). But the risk of getting cancer from exposure to the lower levels of asbestos in the air near such a factory was much lower—one chance in ten thousand (that is, 1/10,000).

Sometimes scientists compare the severity of different risks by looking at the expected occurrences of the illness for the total exposed population. For example, in 100,000 workers exposed to high levels of asbestos, we would expect to observe 1,000 (that is, 100,000 x 1/100) extra cases of cancer. For 100,000 people exposed only to low levels of asbestos, we would expect to observe 10 (that is, 100,000 x 1/10,000) extra cases of cancer.

Chapter 2 described the methods for calculating people's daily doses of a hazardous substance from the amount of the hazardous substance in the environment. In this chapter we describe the process that researchers have developed to estimate the risk of illness from a particular environmental exposure. This process involves first identifying the illnesses likely to be caused by hazardous substances and then estimating the relationships between extra risks of illness and different daily doses. These relationships are used to convert estimates of people's daily doses into estimates of extra risks of illness.



Identifying Illnesses

Exposure to hazardous substances has been associated with an increased risk of many illnesses or other health effects such as the following:

- Premature death
- Kidney damage
- Birth defects
- Hyperactivity in children
- Cancers
- Anemia
- Liver damage
- Nervous system damage
- Impaired fertility
- Skin diseases

Hazardous Substances and Harmful Health Effects—Some Examples

Hydrogen cyanide, even in small amounts, can cause immediate death. Hydrogen cyanide can be released accidentally from a chemical factory.

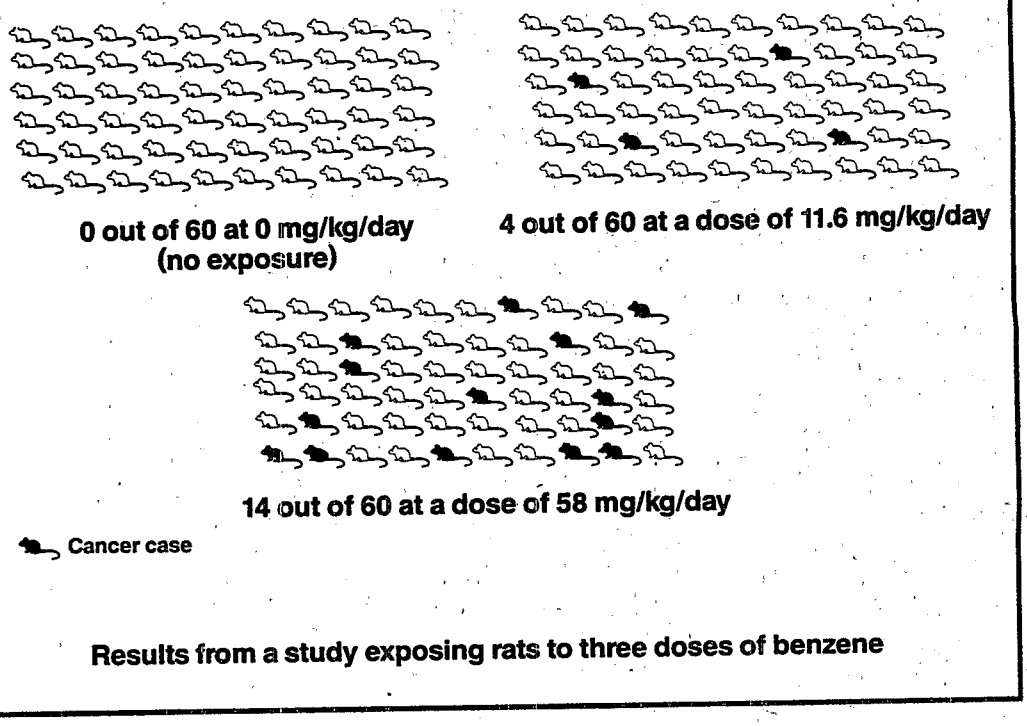
Lead can cause anemia, behavioral problems in children, and IQ deficits. At very high levels of exposure, lead can cause immediate death. Lead can be released into the air from factories, into groundwater from landfills holding old batteries, and into food from poorly glazed dishes.

Benzene can cause leukemia as well as other blood disorders. At very high levels of exposure, benzene can cause immediate death. Benzene can be released from gasoline pumps.

Radon, tobacco smoke, and asbestos can cause lung cancer. Radon can be released from underground deposits, and asbestos can be released from factories that use it or from asbestos insulation.

Information from human studies provides the most compelling evidence that hazardous substances cause particular illnesses. Some of this evidence comes from doctors reporting an unusual number of cases of a specific illness in exposed individuals, for example, finding several cases of leukemia in workers exposed to high levels of benzene. More formal human studies compare illnesses for people with different levels of exposure. For example, one study compared the number of cases of leukemia in rubber workers exposed to benzene on the job and the number of cases in a comparable group of nonexposed workers.

Human information is very limited for most hazardous substances and is often supplemented by information from animal studies.



Results from a study exposing rats to three doses of benzene

Animal studies usually include

- short-term tests to determine the dose levels that are immediately fatal;
- longer term studies to identify illnesses likely to occur at lower exposure levels and to identify exposure levels below which there are likely to be no health effects; and
- lifetime or special studies to determine whether prolonged low-level exposures to the hazardous substance are associated with increased risks of specific illnesses such as cancer or birth defects.

Information from animal studies offers several advantages over human information. Two advantages are that researchers can control the exposures and can determine cause-and-effect relationships.

Animal experiments are used to estimate risk of illness in humans because hazardous substances that cause harmful health effects in humans generally also cause harmful health effects in other animal species. For example, scientists have found that all hazardous substances shown to cause cancer in humans also cause cancer in at least one other animal species.

There are limits to relying only on animal studies, however. Most importantly, scientists have found some hazardous substances that cause cancer in one or more mammalian species but lack evidence of a similar effect in humans. In addition, both animals and humans have differing abilities to protect themselves against the *low* levels of hazardous substances generally found in the environment. Most animal experiments test the effects of high exposure levels only. So the effect of a hazardous substance on humans is uncertain when there is *only* information from animal experiments.

To describe the level of certainty about whether exposure to a specific hazardous substance causes or does not cause an illness in humans, EPA has set up a weight-of-evidence classification. This classification is based on the quality and availability of evidence from human and animal studies.

EPA's Weight-of-Evidence Classification for Cancer

For cancer-producing substances EPA's weight-of-evidence classification is as follows:

A – causes cancer in humans—good human evidence supported by animal evidence

B1 – probably causes cancer in humans—good animal evidence in more than one species and limited supporting human evidence

B2 – probably causes cancer in humans—good animal evidence in more than one species but no human evidence

C – possibly causes cancer in humans—good or limited animal evidence in only one species or suggestive animal evidence in several species and no human evidence

D – not known whether it causes cancer in humans—inadequate evidence or no evidence

E – unlikely to cause cancer in humans—human and animal evidence indicating that there is no relationship between exposure and excess risk of cancer

For example, benzene, a chemical released in car exhaust fumes, belongs to group A, while methylene chloride, a chemical often released from chemical factories, belongs to group B2. Of course, new scientific evidence can move a chemical to a different group.

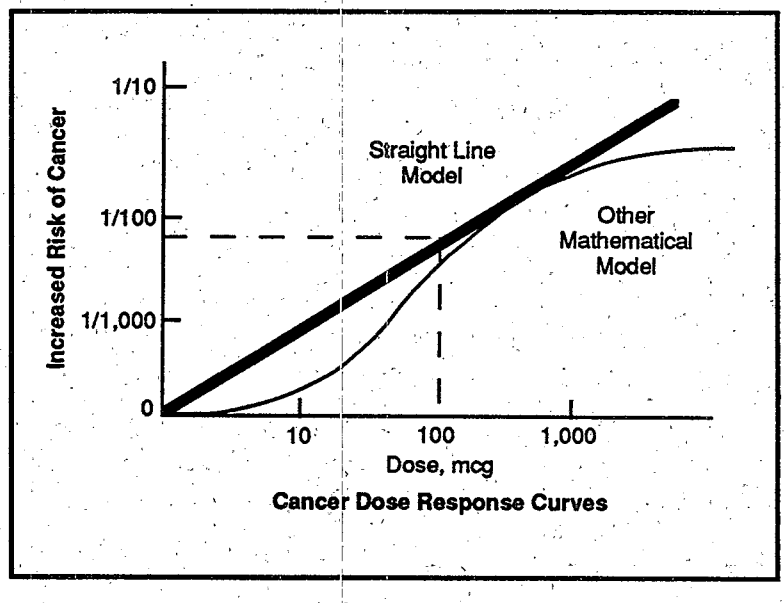
Estimating the Dose-Response Relationship

A dose-response relationship provides a mathematical formula or graph for estimating a person's risk of illness at each exposure level for a hazardous substance. Determining the general shape of the dose-response curve requires scientific knowledge about the action of hazardous substances on human cells. The specific shape of the curve is determined using information from either human studies or animal studies or from both. To estimate a dose-response relationship, measurements of health risks are needed for at least one dose level of the hazardous substance compared to a nonexposed group.

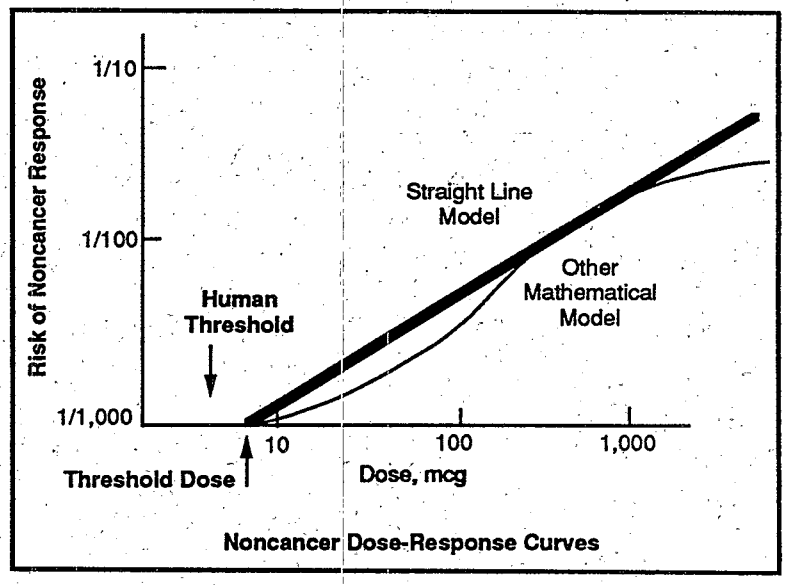
There is one important difference between the dose-response curve commonly used for estimating the risk of cancer and the ones used for estimating the risk of all other illnesses: the existence of a threshold dose—that is, the highest dose at which there is no risk of illness. Because a single cancerous cell may be sufficient to cause a clinical case of cancer, EPA's and many others' dose-response models for cancer assume that the threshold dose level for cancer is zero. In other words, people's risk of cancer is increased even at very low doses. However, the increased cancer risk at very low doses is likely to be very low.

On the other hand, scientists have observed that the human body is capable of adjusting to varying amounts of other types of cell damage without showing signs of illness. Therefore, dose-response models for noncancer illnesses include a threshold dose level that is greater than zero. In other words, at low doses, there may be no risk of noncancer health effects. For noncancer health effects, such as permanent liver or kidney damage, temporary skin rashes, or asthma attacks, information from human or animal studies is used to estimate the threshold dose levels.

For substances suspected to cause cancer, EPA assumes a straight-line (linear) dose-response relationship. The straight-line model generally gives higher estimates of the risks of getting cancer at low dose levels than most other usable mathematical models. In the cancer dose-response curve pictured here, a dose of 100 micrograms per day causes an extra chance of cancer of about 1 in a 100 in study animals receiving the dose. With a straight-line model, the level of cancer risk increases at a constant rate as the dose level increases. This rate of increasing cancer risk is known as the slope factor for the hazardous substance.



For noncancer illness, because of the uncertainties when converting from animal to human data, and because individuals vary in their susceptibility to the harmful effects of hazardous substances, EPA adjusts the observed threshold dose downward by dividing by uncertainty factors that range from 1 to 10,000. We refer to this adjusted value as a human threshold. Below the human threshold, we expect no appreciable risk of harmful health effects for most of the general population.



Limitations of Risk-of-Illness Estimates

Scientists must make assumptions because they lack sufficient information on exposure and how hazardous substances actually harm human cells. EPA's mission is to protect human health and the environment. When information is missing or uncertain, or more than one alternative model is possible, EPA uses worst-case, or conservative, risk estimates. In other words, the true risks are *very unlikely* to be any higher than the EPA estimates. In particular, EPA generally

- uses a straight-line dose-response model for cancer-producing substances because this model is unlikely to underestimate the true cancer risks at low dose levels;
- uses uncertainty factors from 1 to 10,000 to adjust observed threshold dose levels downward to human thresholds (for noncancer effects) to make it unlikely that EPA will underestimate the true noncancer risks of low levels; and
- assumes lifetime exposures for cancer and certain noncancer effects when information on exposure duration is not available—this may overstate the number of years an individual is exposed to the hazardous substance.

When available evidence is incomplete, different groups may come up with different estimates of the health risks from a specific hazardous substance because of the use of information from different studies or the use of different methods to account for the uncertainty about exposure to hazardous substances and the effects of hazardous substances on the human body.

Different Risk Estimates for Alar: EPA and NRDC

Estimates of the risk of illness for a particular exposure depend on how different groups interpret the available evidence. This has happened in the case of estimates of the lifetime increased cancer risk from children eating apples treated with Alar, a pesticide that is now banned by EPA.

EPA's 1988 estimates of the extra lifetime cancer risks for people exposed to Alar as young children were 25 times lower than Natural Resources Defense Council's (NRDC's) estimates of 5,280 extra cancers because of

- differences in the assumed exposure duration—EPA assumed 1.5 years and NRDC assumed 6 years;
- differences in estimated daily dose levels—EPA used evidence from a 1977-1978 food consumption survey of 30,000 persons, while NRDC used information from a 1985-1986 survey of 2,000 persons; and
- differences in the estimated cancer slope factor—EPA derived its slope factor from an ongoing toxicity study judged by EPA's scientists to be a better study than a completed study used by NRDC.

Computing Risk of Illness

The estimated dose-response relationships for a hazardous substance can be combined with your estimated daily dose to estimate risk of illness associated with exposure to that hazardous substance. The methods used to combine dose-response relationships and daily doses range from very simple to quite complex. Each method makes different assumptions about the shapes of the dose-response relationships and about how daily dose varies over your lifetime.

The simplest method for cancer assumes your daily dose is the same for your entire lifetime and uses a straight-line dose-response relationship (see example on page 27). Your extra cancer risks from exposure to a hazardous substance are estimated by multiplying your estimated exposure by a cancer slope factor.

For noncancer effects, the simplest method assumes no risk below the human threshold and a positive but unknown risk above that dose. When more information is available, extra risks are estimated by multiplying your estimated exposure by a noncancer slope factor for exposures above the human threshold (see example on page 27).

Health Risks from Some Hazardous Substances

Here are two examples of estimates of your health risks for hazardous substances that have been in the news.

1. **What is your extra cancer risk from exposure to tobacco smoke containing substances suspected to cause cancer?**

There is human evidence that tobacco smoke causes cancer. If you are a nonsmoker who lives or works with smokers, researchers estimate that your extra cancer risk is 365/100,000. In other words, 365 extra cases of cancer are expected for every 100,000 persons exposed to an average daily dose of tobacco tar of 1.43 milligrams for their 50 adult years. These 365 extra cases are in addition to the 20,000 cases of cancer from other causes expected in this population of 100,000.

2. **What is your health risk from exposure to chemicals suspected to cause cancer that are released from factories near your home, such as methylene chloride?**

Animal studies have shown that methylene chloride can cause cancer. Using the results of animal studies, your extra cancer risk if you live and work within a mile downwind of a chemical factory releasing 183,000 pounds of methylene chloride each year is estimated to be 50/100,000 or 50 extra cases of cancer in every 100,000 people exposed at these levels during their lifetime. If you live between 1 and 2 miles from the factory, your extra risk falls to 5/100,000 or 5 cases per 100,000 people exposed. These cases are in addition to the 20,000 cases of cancer from other causes expected in this population of 100,000.

Examples of EPA's Estimates of Health Effects

For selected hazardous substances, this section presents EPA's estimates for three types of population health risks:

- cancer risks from prolonged exposures,
- noncancer risks from prolonged exposures, and
- health risks from accidental exposures.

As noted earlier, EPA's worst-case health risk estimates are likely to overstate the true risks when limited information is available.

Cancer Risks from Prolonged Exposures

Using the methods described in this chapter, EPA has estimated the cancer risks from exposure to some common hazardous substances. Table 2 shows the extra cancer cases estimated by multiplying EPA's estimates of the extra cancer cases expected at an exposure of 1 microgram per day (mcg/day), the cancer slope factor shown in column 2, by the daily dose shown in column 5.

The daily doses in Table 2 come from Table 1 in Chapter 2. Your daily doses may differ depending on whether you are exposed to these hazardous substances at the same level as the specific communities described in Table 1. All the estimates of cancer cases are in addition to the 20,000 cancers expected from all other causes in this group of 100,000 people.

Comparing the cancer slope factors in column 2 for the different hazardous substances, you can see that exposure of 100,000 people to asbestos at 1 mcg/day is estimated to result in 50 extra cases of cancer, while exposure to benzene at the same level is estimated to result in 0.04, or much less than one, extra case. Thus, asbestos appears to be a more potent cancer-causing agent than benzene.

This section provides only a few examples of risks from common hazardous substances. You may be exposed to many other hazardous substances in your environment. Once you understand how health risks are estimated, you should be able to better evaluate risks from hazardous substances in your environment. You also should be able to ask informed questions of officials and technical experts and to better understand risk information.

Table 2. An Illustration of How Scientists Estimate Your Extra Chance of Getting Cancer as a Result of Exposure to Hazardous Substances in the Environment

(1) Hazardous substance	(2) Estimated extra cases per 100,000 people at 1 mcg per day	(3) Weight-of-evidence classification (see page 25)	(4) Source	(5) Example daily dose from Table 1 (see page 18)	(6) Extra cancer cases per 100,000 people at example daily dose [(2) x (5)]
Asbestos	50	A	Cement-pipe factory	0.2 mcg per day in air	10
Benzene	0.04	A	Car exhaust	450 mcg per day in air	18
Carbon tetra-chloride	0.08	B2	Chemical factory	560 mcg per day in air	45
Chloroform	0.12	B2	Disinfec-tion of drinking water	95 mcg per day in drinking water	11
Formaldehyde	0.05	B1	Chemical factory	20 mcg per day in air	1
Methylene chloride	0.02	B2	Chemical factory	2,400 mcg per day in air	50
Perchloro-ethylene	0.002	B2	Sewage treatment plant	730 mcg per day in air	2
Radon	0.011 (at 1 picocuries per day)	A	Under-ground deposits	16,000 pico-curies per day in indoor air	180
Tobacco smoke	0.255	A	Cigarette smokers	1,430 mcg per day in indoor air	365

Notes: The daily doses and extra cancer cases shown here are just examples. Your extra chance of getting cancer from exposure to each of the hazardous substances may be lower or higher than the example, depending on whether your daily dose is lower or higher than the example daily dose.

Estimates assume a breathing rate of 20 cubic meters per day; water consumption of 2 liters per day; lifetime exposure (70 years), except 50 years for tobacco smoke; 154 pounds body weight; and 100% absorption of hazardous substance into body.

1 mcg per day = 1 microgram per day = 1 millionth of a gram per day.

1 gram = .035 ounces.

See page 25 for an explanation of the weight-of-evidence classification.

The extra cancer cases are in addition to the 20,000 cases of cancer expected for the 100,000 people from all other causes.

The third column of Table 2 gives EPA's weight-of-evidence classification (see box on page 25) for each substance. This classification indicates the level of certainty of the health effects estimates based on the type of information available to make these estimates. For both asbestos and benzene there is good human evidence (group A). But comparing benzene and chloroform shows that, although chloroform appears to be a more potent cancer-causing agent than benzene, only animal evidence of cancer is available for chloroform (group B2); however, both animal and human evidence are available for benzene (group A). So the health risk estimates for benzene are more likely to be accurate than the health risk estimates for chloroform.

Comparing the estimates of extra cancer cases for each 100,000 people exposed—given in the last column of Table 2—shows that the substances that appear to be the most potent cancer-causing agents, such as asbestos, are not necessarily the most dangerous because of their generally low daily doses (that is, they generally are found at very low environmental levels, as shown in Chapter 2, Table 1). Although tobacco smoke appears to be a less potent cancer-causing agent than other hazardous substances, the extra cancer cases estimated for tobacco smoke are significantly greater because people are generally exposed to higher environmental levels of tobacco smoke. Radon is also a significant health threat for the same reason.

You may know that you will be exposed to a particular hazardous substance for only part of your life—for example, 20 years. For the cancer-producing substances in Table 2, your extra cancer risk can be roughly approximated by scaling down the lifetime estimates. For example, if you are exposed for only 20 years of your average 70-year life, your estimated risk of cancer from exposure to 1 microgram per day is approximately 0.3 (that is, 20 years/70 years) times the value in column 2. Again, your extra cancer risk may be different than that shown in Table 2 depending on whether your exposure is higher, lower, or the same as the example community.

Noncancer Risks from Prolonged Exposures

Not all hazardous substances are associated with extra cancer risks. Lifetime exposure to hazardous substances can result in many other types of damage to your health. These health effects vary greatly in their seriousness, from increasing your risk of premature death or permanent damage to kidney, liver, and brain to increasing your risk of getting a mild skin rash or an asthma attack. Hazardous substances also can have harmful effects on unborn children, either reducing the chance of a live birth or increasing the risk of birth defects. Hazardous substances that can increase your risk of cancer also can increase your risks of these other harmful health effects.

For selected hazardous substances, column 2 of Table 3 presents EPA's estimates of human threshold levels in air (or in water for chloroform) for the noncancer health effects listed in column 3. These are the dose levels below which most people breathing the air (or drinking the water) have no appreciable risk of the specific harmful effect. Column 3 presents the body system that may be at risk above each threshold level.

Hazardous substances with lower human threshold levels (for example, carbon tetrachloride and chloroform) can be considered more dangerous. Scientists do not have enough information at this time to estimate how the risk and degree of seriousness of the health effects vary at different exposure levels above the threshold level for most hazardous substances. It is known that the extra risk and degree of seriousness will increase with increasing exposure levels and at different rates for different substances. For example, the risk of liver damage rises at a faster rate with increasing levels of carbon tetrachloride than it does for methylene chloride.

Columns 5 and 6 present example environmental exposures and estimated noncancer health risks, respectively. Of the examples given in Table 3, only chloroform and carbon tetrachloride are found at environmental levels above the human thresholds for some noncancer effects.

For less-than-lifetime, but prolonged, exposures to substances that cause noncancer health effects, unless specific information is available, EPA assumes that the human threshold levels for any exposure lasting more than 7 years are the same as those for lifetime exposures. Scientists do not know enough about the biology of these compounds to know whether the human body can tolerate higher doses for shorter exposure times. So they do not know whether the threshold level will increase with shorter exposures.

Health Risks from Accidental Exposures

Recently EPA identified approximately 400 chemicals as being extremely hazardous substances. The risks from *accidental* releases of these extremely hazardous chemicals may be severe and immediate and may affect many people in a single neighborhood. For each substance, EPA has determined an environmental concentration above which you may suffer serious health effects even if you are exposed for only a very short time. These concentrations are known as the level of concern (LOC). If the concentration of the chemical in the environment exceeded the LOC after an accidental release, people exposed would be at risk of death or other severe health consequences unless they left the area immediately.

Table 3. An Illustration of How Scientists Estimate Noncancer Health Effects: Effects from Selected Environmental Levels of Hazardous Substances

(1) Hazardous substance	(2) Human threshold levels (mcg per day)	(3) Noncancer health effects/organ damage	(4) Source	(5) Example daily dose from Table 1	(6) Estimated noncancer health effects
Benzene	820	Fetal development	Car exhaust	450 mcg per day from air	Environmental levels are lower than human threshold—health effects unlikely
Carbon tetrachloride	48 48 480	Liver Nerves/ behavior Fetal development	Chemical factory	560 mcg per day from air	Possible liver, nerves/ behavior, and fetal development effects
Chloroform	48 220	Fetal development Nerves/ behavior	Disinfection of drinking water	95 mcg per day from water	Possible fetal development effect
Methylene chloride	13,000 13,000	Liver Fetal development	Chemical factory	2,400 mcg per day from air	Environmental levels are lower than human threshold—health effects unlikely
Perchloroethylene	1,400 1,400	Kidney Liver	Dry cleaning	200 mcg per day from air	Environmental levels are lower than human threshold—health effects unlikely
Xylene	1,100 1,100	Fetal development Reproduction	Car exhaust	610 mcg per day from air	Environmental levels are lower than human threshold—health effects unlikely

Notes: 1 mcg per day = 1 microgram per day = 1 millionth of a gram per day.

1 gram = 0.035 ounces.

Table 4 presents EPA's estimated LOC for a few extremely hazardous substances and gives examples of possible community sources. Comparing the LOC for formaldehyde (15,000 mcg/m^3) with typical environmental exposure levels shown in Table 1 (1 mcg/m^3) shows that the LOC is 15,000 times higher. Nevertheless, accidental releases, if large enough, can result in levels above the LOC. An example of such a release was the 1985 release of methyl-isocyanate in Bhopal, India, that killed 1,500 people.

Table 4. EPA's Level of Concern (LOC) for Accidental Releases of Selected Extremely Hazardous Chemicals

Chemical	Possible sources	LOC (mcg/m^3)
Parathion	Pesticides	2,000
Cadmium oxide	Batteries	4,000
Methyl-isocyanate	Pesticides	5,000
Chlorine	Water treatment	9,000
Formaldehyde	Permanent press textiles; embalming	15,000
Ammonia	Household and commercial cleaning agents	35,000
Chloroform	Industrial solvents	490,000

Notes: 1,000,000 mcg per m^3 = 1,000 milligram per cubic meter = 1 gram per cubic meter.

1 gram = 0.035 ounces; 1 cubic meter = 35 cubic feet = volume of cooking stove.

More Information

This chapter has provided the information you need to have a basic understanding of how EPA and other organizations estimate your health risks from exposure to hazardous substances. If you would like to know more about this topic, the publications listed below would be a good place to start.

Chemical Exposures: Effects on Health

Write to: U.S. Environmental Protection Agency, Region II
26 Federal Plaza, Room 737
New York, NY 10278
Attn: Dr. Maria Pavlova
or call: (212) 264-7364

Toxicology: A Primer on Toxicology Principles and Applications by M. A. Kamrin

Write to: Lewis Publishers
121 South Main Street
P.O. Drawer 519
Chelsea, MI 48118
or call: 1-800-525-7894

Toxicology for the Citizen by A. E. Marczewski, and M. Kamrin

Write to: Center for Environmental Toxicology
Michigan State University
C231 Holden Hall
East Lansing, MI 48824
or call: (517) 353-6469
Cost: $1.00

Technical Guidance for Hazards Analysis

Write to: Emergency Planning and Community Right-to-Know Information
U.S. Environmental Protection Agency
OS-120
401 M Street, SW
Washington, DC 20460
or call: 1-800-535-0202
In Washington, DC and Alaska
(202) 479-2449

The Risk Assessment Manual: A Guide to Understanding and Using Health and Environmental Assessments by B. Brockbank, J. Cohrsson, and V. T. Covello, 1988

Write to: National Technological Information Service
5285 Port Royal Road
Springfield, VA 22161
or call: (703) 487-4650
Cost: $17.50

4 JUDGING THE SERIOUSNESS OF HEALTH RISKS

HIGHLIGHTS:

- Many situations can make you aware that hazardous substances exist in your environment. The actions you take (or don't take) to reduce your exposure to those substances are influenced, in part, by your *perception* of the seriousness of the risk.
- Your *personal* concerns may differ from researchers' estimates of the risk perceptions of the public as a whole.
- Risk perceptions grow out of people's reactions to a number of characteristics of the health effects of the exposure as well as attributes of the risk itself.
- EPA uses research on people's risk perceptions as one consideration in developing actions under environmental laws.

Determining Your Personal Concerns About Risks

Do any of these situations sound familiar?

- You notice that the air in your place of work has an unusual smell.
- You see a notice at work, "Danger—Asbestos Removal in Progress."
- You notice a dreadful smell in the air about 4 miles from your house.
- You read in the paper that a cancer-causing pesticide is commonly used on fruits and vegetables.
- You read in the paper that 80 tons of a cancer-causing chemical are released to the environment from a factory 2 miles from your house.
- You hear on the local news that high levels of radon have been found in houses in your subdivision.

All the above situations can make you aware of the possibility that hazardous substances exist in your environment. Whenever you experience one of these

situations, you have to decide whether to seek more information and/or whether to try to reduce your exposures to the hazardous substances.

Consider the first example—an unusual smell in the air in your place of work. Ignoring it could be fatal, if the smell comes from a poisonous gas. Leaving the building immediately may save your life. On the other hand, the smell may not come from a hazardous substance.

People may react to any of these situations in different ways. In the case of a strange odor, some people may leave the building, while others may stay. You often have to make your own decisions on when to act and when not to act.

You may decide to get more information about your exposure and possible health effects. Or you may decide to take immediate steps to reduce your exposure. The actions you take or decide not to take are influenced by your perception of the seriousness of the risk.

Characteristics that Influence People's Perceptions of Risks

Though people judge the seriousness of a risk of illness partly with respect to the size of their exposure and the associated health risks, they also consider certain *characteristics* of the risk:

- Seriousness of illness—is it a temporary illness, or a permanent one, or death?
- Dread factor—is it cancer?
- Timing of illness—is there a long time gap between exposure and the illness?
- Scientific knowledge—how certain are scientists about the relationship between exposure to a hazardous substance and illness in humans?
- Social and political dynamics of the community—have community action groups made people aware of the risk?
- Catastrophic potential—could many people be killed at one time?
- Recent trend—is it a new and increasing risk?
- Equity—who bears the risk: rich or poor, black or white, children or adults?
- Control/voluntariness—how easily can people control the risk and do they have a choice about their exposure?
- Physical distance—do people live or work close to the source of exposure?

- Benefits—do the exposed people benefit from the source of exposure?
- Visual image—does the source of exposure conjure negative images?

The first two health characteristics, seriousness of illness and dread, are connected ideas. Seriousness of an illness can be measured both by the likelihood that it will result in death and by how long the illness lasts and whether or not there is likely to be a lot of pain and discomfort. Independent of the health effects, however, people dread some illnesses more than others. Cancer is one such illness.

Timing may also influence people's perception of seriousness. Risk of death or illness occurring immediately after exposure to the hazardous substances will, all else being equal, be less tolerable to most people than the same risk of death or illness delayed until 20 years after exposure. When the risk of illness is delayed, the effect may never be realized.

Ranking Health Risks with Different Health Characteristics

How do most people rank the following hypothetical health risks in order of their level of concern?

1. A risk of one chance in 1,000 of a mild case (upset stomach for 2 days) of *salmonellosis* immediately after eating contaminated food, with the additional risk of one chance in 100,000 of dying from the food poisoning.

2. A risk of one chance in 1,000 of eating fruit contaminated with enough cyanide to make you seriously ill or to kill you.

3. A risk of one chance in 1,000 of contracting cancer in 20 years' time as a result of eating a food containing an illegal pesticide residue.

Most people rank risk 3 as more serious than risk 2, probably because the dread factor of cancer is sufficient to outweigh the benefits of a 20-year delay. *Salmonellosis* is, for the most part, a nonfatal illness. This probably explains why people ranked it lowest.

Because scientific knowledge about the action of hazardous substances is incomplete, some people may choose to pay less attention to risks from hazardous substances than better understood risks such as the risk of illness from food contaminated with botulinum toxin (causing botulism, a very serious illness), while others may fear them more.

The catastrophic potential of the hazardous substance may increase people's perception of seriousness. People usually find it is worse to contemplate death if it is likely to be accompanied by the death of many other people, especially if these people are likely to include family members. People may be more willing to tolerate risks they have been living with for a long time and that are stable or even decreasing than risks that are new or increasing.

The fairness and distribution of risks also affect people's perceived seriousness of risks. People who are part of the group most at risk will probably perceive the risk to be more serious than if they are not part of that group, especially if it seems unfair that their group should be more at risk than other groups. Also, people's perception of the seriousness of a risk will probably vary depending on whether they bear the risk voluntarily and how easily they can reduce the risk if they should want to. Finally, the benefits that people receive from the same activity that produces the risk may influence their perception of its seriousness.

Comparing Different Types of Risk

How would you compare the seriousness of the following pairs of contrasting types of risk?

- The very uncertain estimates of the risks of cancer and other illnesses (because of lack of scientific knowledge) from living near a hazardous waste landfill compared with the better understood risks of illness from food contaminated with *Salmonella* or botulinum toxin.
- Risks of cancer and other illnesses from living near coal-fired power plants, which have been around a long time, compared with the same risks from nuclear power plants, which are newer and have some catastrophic potential.
- Risks of cancer and other illnesses from a nearby municipal incinerator that burns your neighborhood trash only, compared with risks from an incinerator that also burns trash from many other neighborhoods.
- Risks of injury or death from skydiving, a voluntary risk, compared with risks from living near a hazardous waste facility or chemical factory, involuntary risks.
- Risks of cancer and other illnesses from arsenic in the air from a copper smelter where you are employed, compared with the same risks from arsenic in the air when you work elsewhere.

There are no correct choices between these types of risk. Your choices indicate the relative importance of different risk characteristics for you. In general, people are more concerned about new, uncertain, catastrophic, and involuntary risks.

How the Government Uses Risk Perceptions to Help Develop Legislation

Traditionally, the government considered only the size of a risk in developing legislation to control hazardous substances—placing more stringent controls on hazardous substances posing greater risks. In recent years, however, pressure from environmental activist groups and the political system has led the government to consider the public's concerns about the seriousness of a risk as well as the actual size of the risk from scientific studies when developing legislation.

Unfortunately, government controls cannot completely reduce your exposure to hazardous substances. Whether you decide that you are willing to accept the remaining risks or you decide that these risks are serious enough to take further action depends on your own perception of the seriousness of those risks. You may also decide that you need more information.

Part II of this guidebook describes actions to reduce your health risks from exposure to hazardous substances. Chapter 5 describes government actions and Chapter 6 describes community actions to reduce your exposure to hazardous substances. Chapter 7 discusses personal actions that you can take if you want to reduce your risk even further, and Chapter 8 provides a list of sources for further information on your exposures and health risks.

More Information

This chapter has provided the information you need to have a basic understanding of how people judge the seriousness of risks. If you would like to know more about this topic, the publications listed below would be a good place to start.

Chemical Risk: A Primer

Write to: American Chemical Society
Department of Government Relations and Science Policy
1155 16th Street, NW
Washington, DC 20036
or call: (202) 872-4395, (202) 872-4391

Effective Risk Communication by V. T. Covello, D. B. McCallum, M. T. Pavlova, New York: Plenum

Contact your local library or book store to obtain a copy.

Understanding Sociometric Aspects of Risk Perception by E. B. Liebow, J. A. Fawcett-Long, and E. S. Terrill, November 1987. Prepared for U.S. Department of Energy

Write to:	Library Services Battelle Seattle Research P.O. Box C-5395 Seattle, WA 98105-5428
or call:	(206) 525-3130 Ask for Publication No. BHARC-800/87/023
Cost:	$20.00

Risk Communication: A Review of the Literature by V. T. Covello, P. Slovic, and D. Winterfeldt, an article in *Risk Abstracts*, Vol. 3, No. 4, pp. 171-182

Contact your local library to obtain a copy.

PART II

Reducing Your Health Risks from Exposure to Hazardous Substances

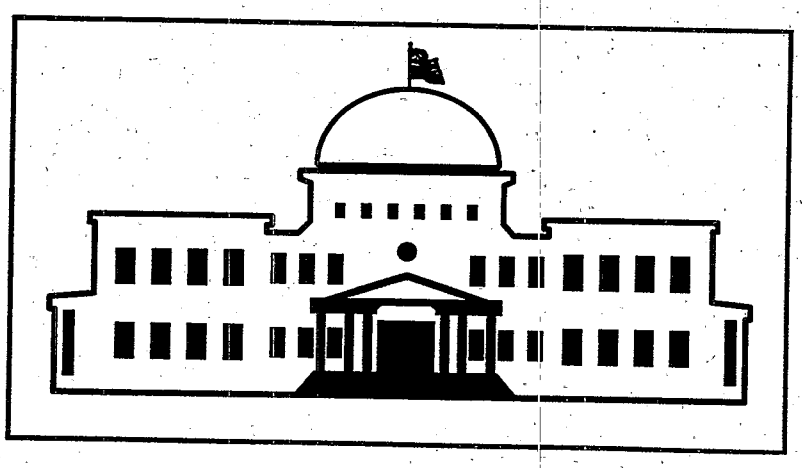
5 GOVERNMENT ACTIONS AIMED AT REDUCING YOUR EXPOSURE TO HAZARDOUS SUBSTANCES

HIGHLIGHTS:

- EPA has many responsibilities under federal environmental laws: setting and enforcing standards, developing pollution control and measurement methods, requiring the cleanup of polluted sites, working with and informing the public, and assisting Local Emergency Planning Committees in planning for emergencies.
- Government actions that improve human health impose costs on us as consumers and taxpayers. These costs may be counter-balanced by other benefits to the economy, the environment, and people.
- Government actions aimed at reducing people's exposure to hazardous substances cannot totally eliminate these exposures.

Environmental Legislation

In the past two decades, the U.S. Congress has passed many laws to restore the environment and to protect the environment and people from further exposure to hazardous substances. Each of these laws is geared toward reducing health risks and covers a specific area of the environment. For example, different laws cover pollution to the air, water, or land; pollution from products, such as pesticides or chemicals; and pollution in the workplace.



The environmental laws are carried out by several different federal, state, and local agencies.

- EPA administers most laws concerning pollution to the outdoor environment and provides information on pollutants in the indoor air of buildings. EPA also maintains a registry of substances that need additional research.
- The Occupational Safety and Health Administration (OSHA) regulates indoor air in the workplace.
- The Department of Transportation (DOT) regulates hazardous substances while they are in transit.
- The Consumer Product Safety Commission (CPSC) protects consumers through proper labeling of products.
- The Food and Drug Administration (FDA) monitors prescription drug advertising and labeling and also develops standards and regulations on the consumption, quality, and safety of cosmetics and foods, except meat and poultry products.
- The United States Department of Agriculture (USDA) inspects and provides safe handling and labeling guidelines for meat and poultry products.

Since the beginning of the nuclear age, safe management and disposal of the radioactive materials used by energy, defense, medicine, industry, and research have presented a tremendous challenge to society. Several federal agencies regulate various aspects of radioactive waste management.

- The Nuclear Regulatory Commission (NRC) licenses and regulates radioactive materials users and low-level radioactive waste disposal facilities.
- EPA issues radiation emissions standards to protect the general public from radiation exposures from low-level radioactive waste management and disposal facilities.
- DOT regulates the shipment of radioactive materials.
- The Department of Energy (DOE) governs the interstate system of low-level radioactive waste facilities.

If you would like to know more about the major federal laws and the areas that they address, refer to Table 5 beginning on page 53.

EPA's Responsibilities

Once Congress enacts an environmental law, EPA must administer programs to support the legislation. EPA's responsibilities include

- setting and enforcing standards,
- developing pollution control and measurement methods,
- requiring the cleanup of polluted sites,
- working with and informing the public,
- assisting Local Emergency Planning Committees (LEPCs) in planning for emergencies, and
- coordinating efforts of local government groups.

Setting and Enforcing Standards

Often, EPA's first step in carrying out a law is to set standards for environmental quality based on the intent of the law. EPA follows specific criteria in developing standards for each environmental law. For example, under the Resource Conservation and Recovery Act (RCRA) a waste must exceed certain numerical threshold concentrations of toxic constituents before it falls under EPA jurisdiction. On the other hand, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) gives EPA jurisdiction to control any release of a hazardous substance, pollutant, or contaminant into the environment, regardless of the level.

EPA allows facilities to release low levels of hazardous substances into the air, water, or land that are not harmful to human health or the environment. EPA develops and issues permits to ensure that the facility does not violate the standard in the area. The permit usually limits the amounts and types of pollutants that the facility can release. For example, the permit may state the maximum amount of a substance that the facility can discharge over a certain time period. The permit may also state various steps the facility must take to lower emission levels, such as installing a filtering system. An environmental permit often requires the facility to monitor different pollutants. To ensure that a facility follows the requirements in its permit, EPA has the right to inspect a facility and can fine the facility for violations.

Environmental laws also allow EPA to limit the types of hazardous substances that can be contained in pesticides and synthetic chemicals and products. These laws require industry to test new products and submit information to EPA about the health and environmental effects of the contents of the products before marketing them. Based on the results of these tests, EPA can limit the use of the product, ban the product, or require that the product label contain information about the hazards of the product.

Lead in the Atmosphere

Most emissions of lead into the atmosphere are from one of three main sources: automobiles and other vehicles, nonferrous smelters, and battery plants. Historically, automotive emissions have been the primary source of atmospheric lead. In the 1970's, EPA began two pollution control programs that have significantly reduced the contribution of automotive emissions to lead pollution. Consequently, the overall concentrations of lead in the air have fallen dramatically.

One EPA program introduced unleaded gasoline in 1975. Since then, the percentage of unleaded gasoline in the gasoline market has grown—in 1987, unleaded gasoline accounted for 76 percent of all gasoline sales. EPA has issued regulations that require a gradual reduction of the lead content in gasoline. In July 1985, the lead content was reduced from 1.0 gram per gallon to 0.5 gram per gallon, and in January 1986 to 0.1 gram per gallon. As a result, the automotive contributions to lead pollution in the air fell from 73 percent of all lead emissions in 1985 to 37 percent in 1987.

In a study of 394 urban areas in 44 states, EPA found that total lead emissions had been reduced by 83 percent from 1983 to 1987. EPA credits the decrease in automotive emissions for 99 percent of this improvement in air quality.

EPA sets and enforces standards to the extent possible given the available resources for the federal and state governments. Often, EPA must make decisions on resource allocation to ensure that standards address the environmental problems that pose the most significant and serious risks. Focusing on less important, but popular, issues can take funds away from programs that cover the most serious environmental problems.

Promoting Waste Reduction and Pollution Prevention

EPA conducts research programs to develop and test new ways to reduce the effects of hazardous waste in the environment. For example, the Superfund law establishes a research budget to demonstrate site cleanup methods. The federal government and some state governments have set up programs to reduce the volume of hazardous waste shipped from plant sites.

Pollution prevention programs in many states help businesses reduce the amounts of hazardous waste they generate. One example is regional waste exchanges, which connect generators of hazardous by-products with potential users of those by-products. Regional waste exchanges remove hazardous by-products from the wastestream by promoting their reuse.

EPA's Pollution Prevention Office (PPO) develops and implements programs to reduce or eliminate the generation of waste. Among its activities are

programs to encourage industry to develop and implement technologies that prevent pollution. PPO provides grants to states for this purpose and also maintains the Pollution Prevention Information Clearinghouse (PPIC).

Through the PPIC, the PPO provides information on government and industry pollution prevention programs, grant and project funding opportunities, upcoming events, conferences, and seminars. PPIC contains the Electronic Information Exchange System (EIES) which is a computerized information network that anyone can access, either through a PC with appropriate communication software or through the RCRA/Superfund hotline (1-800-424-9346). The hotline answers or refers pollution prevention questions, provides access information in the PPIC, provides instruction on how to use the EIES databases, and assists in document searches and ordering.

Requiring the Cleanup of Polluted Sites

The Superfund and hazardous waste laws allow EPA to reduce the risks from hazardous wastes in the environment by requiring the cleanup of sites where the environment is already damaged by industrial activities. In some cases hazardous substances have been illegally dumped into the land or water and abandoned. In other cases, the methods used for legal disposal of the wastes did not adequately protect the environment. The chemicals or the runoff from the chemicals may have entered the water supply or may be contaminating the air or the soil.

Once a Superfund site is identified, EPA makes a concentrated effort to find and compel those responsible to fund necessary studies and to pay for the cleanup. If an immediate problem threatens human health and welfare or the environment, EPA takes action under the Superfund cleanup program and later tries to recover costs from those responsible.

EPA can initiate either removal actions or remedial actions. Removal actions are short-term actions to stabilize or clean up a hazardous site that poses an immediate threat to human health or the environment. Typical removal actions include removing tanks or drums of hazardous substances on the surface, installing fencing or other security measures, and providing temporary alternative sources of drinking water.

Remedial actions involve the study, design, and construction of longer term and usually more expensive actions aimed at permanent remedy. EPA can respond this way for sites that are on the National Priority List (NPL)—a list of the nation's most serious hazardous waste sites. Typical remedial responses include treating wastes at the site, installing clay caps over sites, constructing underground wells to control movement of groundwater, performing on-site

incineration or solidification of wastes, or providing permanent, alternative sources of drinking water.

For sites not on the NPL, EPA or the states can initiate removal or remedial actions or require the responsible parties to do so under the hazardous waste laws. The hazardous waste laws cover considerably more sites than the Superfund program. But the Superfund sites are considered the worst sites in terms of human health risk.

As of September 1989, EPA had completed long-term cleanup at 50 sites. In addition, removal actions had been undertaken at 300 sites on the National Priority List. Remedial action had been undertaken at 885 sites. EPA takes into account the number of people exposed at a given site and seriousness of the health risk to those exposed in deciding which sites to clean up first and what actions to take.

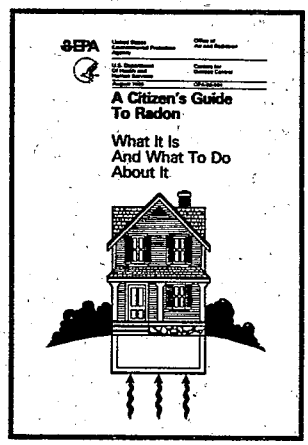
Working with and Informing the Public

EPA programs provide information to the public and businesses about regulatory requirements, environmental programs, procedures to reduce exposure to hazardous substances, and the health effects of certain hazardous substances. Several national information lines answer questions about rules and regulations under different laws. For example, the RCRA/Superfund hotline (1-800-424-9346) answers questions about solid and hazardous wastes. EPA also provides information through published materials, training programs, and certification courses.

EPA and state governments collect the information on chemical inventories and emissions that manufacturers must submit under the Emergency Planning and Community Right-to-Know Act. This information is intended for use by the public and by community planners. Chapter 8 provides information on various publications and services provided by EPA.

EPA's Information Program for Radon

EPA has developed the following materials and programs to educate the public about the health risks of radon and what to do about them:



- A booklet for the public, *A Citizen's Guide To Radon: What It Is And What To Do About It,* published in conjunction with the Department of Health and Human Services.
- A booklet for the public, *Radon Reduction Methods: A Homeowner's Guide.*
- A report, *Radon Measurement in Schools.*
- A program to evaluate the proficiency of radon testing procedures used by independent companies.
- Training and certification courses to teach independent building contractors radon-free building methods and mitigation methods. Three regional training centers are being set up.
- A program to encourage homeowners to test for radon and correct problem levels.
- Pilot programs to test new mitigation methods.
- A hotline, 1-800-SOS-RADON.

EPA works with state governments to distribute and disseminate these materials and implement the programs. Table 12 beginning on page 108 contains information on how to obtain the materials listed above. To find out more on the radon programs, contact one of the state radon contacts listed in Table 7, beginning on page 91.

Assisting Local Emergency Planning Committees in Planning for Emergencies

As required by the Emergency Planning and Community Right-to-Know Act, local communities and state governments must use information submitted by certain types of facilities to prepare for an emergency situation involving the unplanned release of a hazardous substance. The act calls for the formation of local groups called Local Emergency Planning Committees (LEPCs), which prepare the plan for responding to a chemical emergency. State Emergency Response Commissions (SERCs) are also set up to assist and coordinate activities of the local communities. (See Chapter 6 of this guidebook for more information on LEPCs and SERCs.) EPA assists other state and local organizations and publishes guidance documents on developing emergency plans.

Coordinating Efforts of Local Government Groups

EPA often works with local government groups on environmental initiatives. For example, in recent years Denver, Colorado, has been plagued by a visible air pollution problem. Because of Denver's unique geographic location and climate, warm air is trapped above the city, causing a buildup of carbon monoxide, nitrogen oxides, and particulates. These pollutants impair the blood's ability to carry oxygen and can lead to cardiovascular, pulmonary, respiratory, and nervous system problems.

The EPA and local government groups are working together to clean up Denver's air. The Metropolitan Air Quality Council has enacted a carbon monoxide reduction plan with stringent inspection and maintenance requirements for vehicles. In addition, the plan requires all vehicles to use high oxygen fuels to improve combustion and reduce emissions of carbon monoxide. Denver and four surrounding communities have adopted wood burning restrictions to reduce the concentration of particulates in the air. The Council is also considering ideas such as special pollution control devices for cars driven at high altitudes to further improve the city's air quality.

The Benefits and Costs of Government Action

When the government cleans up abandoned dump sites, places stricter controls on landfills or pesticide uses, or stops some very toxic wastes from being generated, these actions provide *benefits* for some people. These actions also can benefit the whole ecosystem. As consumers and as taxpayers, however, we pay for the *costs* of reducing exposure to hazardous substances. The strong support for the environment in most polls suggests that people believe these efforts are important. Even so, EPA must consider benefits and costs carefully when carrying out the responsibilities described above.

While discussion of most of these benefits and costs is beyond the scope of this guidebook, they are summarized on the next page to show the complexity of issues involved in environmental legislation.

One of the benefits of environmental legislation—improved human health—is the focus of this guidebook. By carrying out laws to reduce your risk of illness from exposure to hazardous substances, EPA works to improve human health. Part I of this guidebook described methods that scientists use to estimate the human health benefits from reduced exposures to hazardous substances.

Some Benefits and Costs of Environmental Programs

Benefits

- ***Improved human health.*** Reducing the amount and types of pollution improves human health. These improvements range from fewer acute illnesses such as asthma caused by poor air quality to reduced risk of chronic diseases such as cancer. Improved human health also reduces health care costs.
- ***Improved human welfare.*** Reducing pollution improves human well-being. For example, cleaner water means more fishable water bodies.
- ***Increased employment.*** Industries supporting pollution abatement efforts, such as air pollution control equipment manufacturers, experience increased employment.
- ***Increased tax revenues.*** Industries supporting pollution abatement efforts pay increased taxes as their profits increase.
- ***Species preservation.*** Reducing pollution lowers the likelihood that plant and animal species will be adversely affected.
- ***Improved aesthetics.*** Reducing pollution can prevent plants from losing leaves, spotting, or losing their flowers prematurely. Reducing pollution also may increase visibility (reduce smog).
- ***Reduced deterioration rates.*** Reducing air pollution lowers the rates of building deterioration caused by acid reactions.

Costs

- ***Increased prices of goods and services.*** Laws requiring an industry to use pollution control equipment often increase the industry's costs. These cost increases tend to be passed along in higher prices for products or services provided by that industry.
- ***Reduced availability of goods and services.*** Bans on products that are determined to be excessively harmful make these products unavailable.
- ***Reduced employment.*** If installing pollution controls adds to the costs of the plant so that a company in that industry can no longer make a sufficient profit, a company may shut down a particular plant or reduce the number of workers at a plant.
- ***Reduced tax revenues.*** If a facility closes down or reduces its production capabilities because of environmental laws, tax revenues paid by the facility to the city, county, state, or federal government will be lost.
- ***Reduced expenditures on other programs.*** Given a limited budget, the use of government monies for environmental programs may mean reducing expenditures on programs in other areas such as education or defense.

Many of the costs of environmental regulation become smaller over time. Local impacts such as reduced employment could be offset over the long term by the growth of employment in companies that produce pollution reduction equipment and services. Laws that require pollution controls may cause higher prices in the immediate future on goods produced by that industry. Eventually, entrepreneurs discover new methods of production or new pollution-control technologies that reduce pollution and are less costly. Laws that require bans on products may reduce the availability of those products. Eventually, new products may be developed that are less harmful than existing ones.

The DDT Ban and Bald Eagles

By the early 1970's, the toll of hunting, pesticide use, and disappearing habitat had diminished North America's bald eagle population almost to the point of extinction. At that time, scientists could only identify 800 breeding pairs of bald eagles still in existence. Pesticides, especially DDT, were particularly devastating to the species because they caused birds to lay eggs with shells so thin that they broke under the weight of nesting. As a result, few eaglets survived.

Since the EPA's ban on DDT in 1972, a remarkable resurgence in the bald eagle population has occurred. Today, wildlife researchers can identify more than 2,200 pairs that breed in the continental United States. Most of these seem to produce normal eggs. Although the bald eagle remains an endangered species, U.S. Fish and Wildlife officials are optimistic about the possibility of removing it from the endangered species list.

Effectiveness of Government Actions

Although the government has developed a wide variety of programs to reduce environmental risks, there are limits to the effectiveness of these programs.

- Enforcement can be a difficult, expensive, and lengthy process.
- The government cannot eliminate accidental releases of substances by industry; however, facilities that routinely have accidental releases may come under increased scrutiny especially because of the new reporting requirements under the Emergency Planning and Community Right-to-Know Act.
- Pollution control devices, such as catalytic converters on automobiles, are only effective for controlling air pollution if they are maintained properly.
- The government cannot control improper use of pesticides or other consumer products by citizens in their homes.

EPA has responded to these limitations by setting up programs for local governments. The next chapter explains what these local government groups do to reduce your community's exposure to hazardous substances. You also may want to know what actions you can take on your own to reduce your exposure to hazardous substances; Chapter 7 describes these personal actions. Chapter 8 lists many helpful publications, hotlines, and organizations that provide information to citizens about hazardous substances in the environment.

Table 5. Areas Addressed Under Major Federal Environmental Laws

Area	Law	Description of Law	Responsible Party(ies)
Air	Clean Air Act	Sets and monitors ambient air quality standards in order to protect public health and environmental quality. Limits pollution (including radioactive emissions into the outdoor air) from factories, power plants, cars, and other major sources of air pollution.	EPA, state governments
Drinking water	Safe Drinking Water Act	Establishes national standards for maximum contaminant levels in public drinking water systems. Bans lead in water coolers and in new water supply solder and piping. Regulates discharge of pollutants into groundwater.	EPA, state governments
Water	Clean Water Act	Enforces quality standards for all interstate and coastal waters by requiring discharge permits for factories, sewage treatment plants, and storm runoff. Sets minimum national effluent standards for each industry.	EPA, state governments
	Marine Protection, Research, and Sanctuaries Act	Limits the dumping of all types of material in U.S. ocean waters unless authorized by permit.	EPA, Coast Guard, Army

(continued)

Table 5. Areas Addressed Under Major Federal Environmental Laws (continued)

Area	Law	Description of Law	Responsible Party(ies)
Waste treatment, storage, and disposal	Resource Conservation and Recovery Act (including Hazardous and Solid Waste Amendments)	Places a "cradle-to-grave" management requirement on generators and transporters of hazardous wastes as well as on owners and operators of treatment, storage, and disposal (TSD) facilities. Regulates disposal of solid and hazardous wastes to the land and also regulates groundwater contamination around TSD facilities.	EPA
	Comprehensive Environmental Response, Compensation, and Liability Act (or Superfund)	Requires the cleanup of hazardous substances released into the air, soil, surface water, and groundwater. Imposes liability requirements on parties responsible for hazardous waste sites created in the past and establishes a fund for cleaning up abandoned sites. Provides authority and funding for responding to hazardous substance spills.	EPA
Food	Federal Insecticide, Fungicide, and Rodenticide Act	Sets maximum legal limits for pesticide residues on all food marketed in the U.S.	EPA
	Food, Drug, and Cosmetic Act	Limits the contamination or adulteration of food to tolerance levels that will protect human health.	USDA, FDA
Products	The Federal Insecticide, Fungicide, and Rodenticide Act	Sets safety standards for pesticide products and allows EPA to restrict or ban substances that do not meet human health or environmental standards. Limits the manufacture and importation of pesticides to those compounds that have been registered by the EPA.	EPA

(continued)

Table 5. Areas Addressed Under Major Federal Environmental Laws (continued)

Area	Law	Description of Law	Responsible Party(ies)
Products (cont.)	Toxic Substances Control Act	Requires testing of chemical substances, both new and old, theoretically even before human or environmental exposure occurs. Regulates the production, use, distribution, and disposal of potentially hazardous substances. Regulates the development of biotechnology and genetic engineering.	EPA
	Hazardous Substances Labeling Act	Establishes information requirements for the labels of consumer products such as soaps, detergents, cleansers, bleaches, polishes, paints, hobby products, oils, automotive products, and solvents.	CPSC
Workplace	Occupational Safety and Health Act	Sets health and safety standards for workplace environments.	OSHA, state governments, OSHRC
	Federal Insecticide, Fungicide, and Rodenticide Act	Limits worker exposure to pesticides.	EPA
	Toxic Substances Control Act	Requires manufacturers of toxic substances to provide notification that identifies any potential workplace hazards.	EPA
Transportation	Hazardous Materials Transportation Act	Sets standards for the shipment of hazardous materials.	DOT
Information	Emergency Planning and Community Right-to-Know Act—Title III of the Superfund Amendment and Reauthorization Act	Requires many factories and businesses to report information to the government about chemical inventories and the environmental release of certain chemicals.	EPA, state and local governments, citizens

Agency key:

CPSC	Consumer Product Safety Commission
DOT	Department of Transportation
EPA	U.S. Environmental Protection Agency
FDA	Food and Drug Administration
OSHA	Occupational Safety and Health Administration
OSHRC	Occupational Safety and Health Review Commission
USDA	U.S. Department of Agriculture

More Information

This chapter has provided the information you need to have a basic understanding of government actions to reduce your exposure to hazardous substances. If you would like to know more about this topic, the sources listed below would be a good place to start.

Environmental Progress and Challenges: EPA's Update

Write to: Public Information Center PM-211B
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460
or call: (202) 382-2080

Trends in the Quality of the Nation's Air

Write to: Public Information Center PM-211B
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460
or call: (202) 382-2080

Waste Minimization: Environmental Quality with Economic Benefits

Write to: RCRA/Superfund Hotline
OSW/OPMS Hotline
U.S. Environmental Protection Agency
401 M Street, SW
OS-305
Washington, DC 20460
or call: 1-800-424-9346
In Washington, DC: (202) 382-3000

Superfund: Looking Ahead, Looking Back

Write to: Public Information Center PM-211B
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460
or call: (202) 382-2080

6 COMMUNITY ACTIONS AIMED AT REDUCING YOUR EXPOSURE TO HAZARDOUS SUBSTANCES

HIGHLIGHTS:

- Your Local Emergency Planning Committee (LEPC) collects information about hazardous substances in your community and develops a plan for emergency actions that will be taken if an accident occurs. You can get this information from your LEPC.
- You can help organize programs with your state or local government to reduce sources of environmental problems.

Your Local Emergency Planning Committee

The Local Emergency Planning Committee (LEPC) is the local group charged with developing an emergency plan for evacuation or emergency response to an accident involving hazardous substances. LEPCs are designated by the State Emergency Response Commission (SERC) for each state. SERCs coordinate and supervise LEPC activities. SERCs were established as part of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA), also known as the Emergency Planning and Community Right-to-Know Act of 1986. There are more than 4,000 LEPCs nationwide. The easiest way to find a contact person for the nearest LEPC is to call your local government or SERC representative listed in Table 6, beginning on page 84.

Your LEPC has the following mission:

- To develop a comprehensive emergency plan for your community and keep the plan up to date. To be effective, planning must be an ongoing activity.
- To receive and maintain information about accidental chemical releases.
- To collect, manage, and provide public access to information on hazardous substances in your area.

- To educate the public about risks from accidental and routine releases of hazardous substances and to work with facilities to minimize the risks.

These LEPC activities ultimately can reduce your community's risks from hazardous substances.

Your LEPC includes representatives from all parts of your community, including elected state and local officials; law enforcement, civil defense, firefighting, health, environmental, hospital, and transportation professionals; owners and operators of facilities covered by Title III of SARA; broadcast and print media; and community groups. Your LEPC also welcomes volunteer citizen representatives. As a citizen representative, you can review and comment on your community's emergency response plan and ask questions about how the procedures affect you, your family, and your place of business.

Members of a typical LEPC

The Emergency Plan

By October of 1988, each LEPC was to have developed an emergency plan, which the LEPC must review and update annually. The LEPC also recommends a budget to the local government for developing, implementing, and carrying out the emergency plan. Each emergency plan must include the following information:

- names of facilities using or producing specific chemicals;
- transportation routes used by the facilities;

- emergency response procedures for facilities and for local emergency and medical personnel;
- names of community and facility emergency coordinators;
- procedures for notifying officials and the public in the event of a release of a hazardous substance;
- methods for detecting a release and identifying areas and populations at risk;
- a description of emergency equipment and facilities in the community and at specified facilities;
- evacuation plans;
- training programs; and
- schedules for exercising the emergency plan.

Information Available from Your LEPC

You can get several types of information from the LEPC about the hazardous substances in your community:

1. ***A list of the facilities in the planning area that store certain hazardous substances and the amounts and types of extremely hazardous chemicals they use or store.*** Many LEPCs already have made this information available to the public by putting a copy in the local library. (You may want to get EPA's *Title III List of Lists,* which lists hazardous substances, and a booklet that explains the Emergency Planning and Community Right-to-Know Act. The Act requires different reporting requirements for different substances. See Table 12, beginning on page 108, for printed materials and Table 13, on page 117, for computerized materials.)

2. ***A list of facilities that have reported accidental releases to the LEPC in the past.*** As part of the law, companies must report to the government releases that exceed a specified quantity. This information may be useful to you to determine if facilities in your area have had a history of accidents and to find out the type and amounts of hazardous substances that have been released in these accidents.

3. ***Information on the releases of hazardous substances to the air, to water, or through land disposal from manufacturing facilities.*** This information may or may not be available from the LEPC because companies do not have to submit this information directly to the LEPC. Nevertheless, the LEPC may request any information it needs to develop the plan—some LEPCs have used the release information in their plans. If release information is not available from the LEPC, you can obtain it from the Toxics Release Inventory (TRI) Database or from your state's

Section 313 contact (see Table 6 beginning on page 84, for the name of the Section 313 contact in your state). Table 13 on page 117 tells you how to access the TRI database by computer and how to make written requests.

4. ***Material Safety Data Sheets.*** Material safety data sheets (MSDSs) are one-page documents that show results of analyses done on chemicals. The Occupational Safety and Health Administration's (OSHA's) hazard communications regulations require businesses at which hazardous substances are present to prepare MSDSs and provide a list of the MSDS titles to the SERC, the LEPC, and the local fire department with jurisdiction over the facility.

5. ***The Hazards Identification and Analysis that the LEPC is required to prepare as part of the emergency plan.*** A hazards identification and analysis is a critical component of the LEPC's emergency plan. The information developed in this analysis provides both the factual basis to set priorities for planning and also the necessary documentation for supporting the LEPC's planning and response efforts.

   Three different types of analysis make up the hazards identification and analysis:

   - ***Hazards Identification.*** Determines which situations have the potential for causing injury to life or damage to property and the environment.
   - ***Vulnerability Analysis.*** Determines the susceptibility of life, property, and the environment to injury or damage if a hazard manifests its potential.
   - ***Risk Analysis.*** Estimates the probability that injury to life or damage to property and the environment will occur.

In practice, your LEPC may not have completed a hazards identification and analysis for the hazardous substances in your community. This is because the LEPC is partly a volunteer organization and many LEPCs have only begun the complex task of assembling and interpreting the technical information they receive. Nevertheless, the LEPC may be able to show you a map of the facilities in your area and the types of substances they use or store (see items 1-4 above). This will give you a general idea of the sources in your area.

The hazards identification provides information on the facility and transportation situations that have the potential to cause injury to life or damage to property and the environment due to a spill or release of a hazardous substance. The hazards identification should include the following information:

- the types and quantities of hazardous substances located in or transported through a community;
- the location of hazardous substances facilities and routes; and
- the nature of the hazard (e.g., fire, explosions) most likely to accompany hazardous substances spills or releases.

The vulnerability analysis identifies areas in the community that are susceptible to damage should a hazardous substances release occur. The vulnerability analysis should provide the following information:

- the extent of the vulnerable zone (i.e., the significantly affected area) for a spill or release and the conditions that influence the zone of impact (e.g., size of release, wind direction);
- the population, in terms of size and types (e.g., residents, employees, sensitive populations—hospitals, schools, nursing homes, day care centers) that could be expected to be within the vulnerable zone;
- the private and public property (e.g., homes, businesses, offices) that may be damaged, including essential support systems (e.g., water, food, power, medical), and transportation corridors; and
- the environment that may be affected and the impact on sensitive natural areas and endangered species.

Vulnerability Analysis

A vulnerability analysis is a required component of the emergency plan. It determines the segment or segments of the community that are vulnerable to injury or damage if the worst-case scenario of an accident were to occur at a facility using a hazardous substance or on a transportation route. As part of the analysis, a "vulnerable zone" is estimated for each hazardous substance present at a facility. Vulnerable zones are the areas that may be exposed to concentrations of an airborne hazardous substance at unsafe levels following an accidental release; they are based on

- the size and rate of release;
- the physical characteristics of the chemical such as its physical state (solid, liquid, gas), its toxicity, its ability to react with other chemicals, its corrosivity or flammability, and its ability to disperse in the environment;
- the airborne concentration at which the chemical causes irreversible damage to the public health and environment;
- the wind speed and direction at the time of the accident; and
- the surrounding topography and landscape features.

The risk analysis assesses the probability of damage (or injury) taking place in the community due to a hazardous materials release and the actual damage (or injury) that might occur, in light of the vulnerability analysis. Some planners may choose to analyze worst-case scenarios. The risk analysis may provide the following information:

- the probability that a release will occur and any unusual environmental conditions, such as areas in flood plains, or the possibility of simultaneous emergency incidents (e.g., flooding or fire hazards resulting in release of hazardous materials);
- the type of harm to people (acute, delayed, chronic) and the associated high-risk groups;
- the type of damage to property (temporary, repairable, permanent); and
- the type of damage to the environment (recoverable, permanent).

You should be aware that any information you receive from your LEPC will not include releases from Superfund or other priority abandoned disposal sites, municipal land disposal facilities or incinerators, nonpoint sources such as run-off from agricultural fields, facilities that do not meet the minimum reporting requirements of Title III of SARA, and other facilities that are not covered or have not yet reported under Title III of SARA. For information on potential sources from a Superfund site, you can find a record of any reports at the documents repository, which is normally located in the county library nearest the Superfund site. You also can call the RCRA/Superfund Hotline at 1-800-424-9346.

Industry Response to the LEPC

The Chemical Manufacturers Association (CMA) requires its member companies to participate in the Community Awareness and Emergency Response (CAER) program. CAER's objectives are to inform people about industry operations in their communities and to help develop and test emergency response plans. Through participation in CAER, the industry is providing technical assistance to LEPCs, communicating SARA Title III emissions information to the public, and donating equipment to LEPCs and emergency response agencies.

The LEPC's ability to focus community attention on the releases and inventories of chemicals at facilities in the community has forced some facilities to rethink their chemical housekeeping practices. In some cases, companies have decided to change the amount of inventories they keep as a result of the law.

LEPC Success Stories

One railroad company, Conrail, typically has an annual average of 5,500 freight cars carrying hazardous substances through a major population center. Conrail recently reported to the LEPC that it has re-routed 2,500 of these cars onto rail lines in less populated areas outside the city.

Ciba-Geigy's Toms River, New Jersey, plant is informing the community about its SARA Title III information by compiling an annual report, which contains information on the chemicals used at the plant that come under Title III, a summary of Section 313 of Title III with reportable releases, and background information about the operations at the plant.

Management and employees of Solkatronic Chemicals in Morrisville, Pennsylvania, instructed public officials and emergency responders in the properties of the company's products. Solkatronic also donated a weather station to the communities surrounding its facility and held a seminar on dispersion modeling to help local officials understand its use during an emergency.

3M and Ashland Chemical Co. in Minnesota donated computers and software to the local LEPC. The software contains information on 2,600 chemicals; keeps Title III plans; and records, runs, and stores scenarios for quick retrieval. The software also performs preliminary risk assessment calculations.

Dow Chemical U.S.A. and other companies in the LaPorte, Texas, area are working with the LEPC to perform hazard assessments at each facility. The assessments are being conducted to identify potential hazards at each facility and to find ways to reduce them.

Other Community Organizations or Agencies that Support Community Actions

In addition to your LEPC, other organizations or agencies in your community provide helpful services and information:

- state and local emergency management agencies,
- fire departments,
- police departments,
- state and local environmental agencies,
- state and local transportation agencies,

- state and local public health agencies,
- state, regional, and local nonprofit environmental groups,
- public service agencies,
- volunteer groups, such as the Red Cross,
- local industry and industrial associations, and
- regional offices of federal agencies such as EPA and FEMA.

You and your neighbors can use these resources to help take actions to reduce sources of environmental problems in your community. You may want to attend public hearings or encourage community groups to sponsor programs and other opportunities for community education. Here are just a few examples:

- **Lead in drinking water or radon may be problems in your area.** To find out, call state or county health officials, your state radon office, or your state drinking water office. If you determine that your community has problems with lead in drinking water or radon in homes, help organize community awareness programs to educate the public about these environmental problems and what to do about them. Information programs at malls and libraries can be successful for reaching other community members.

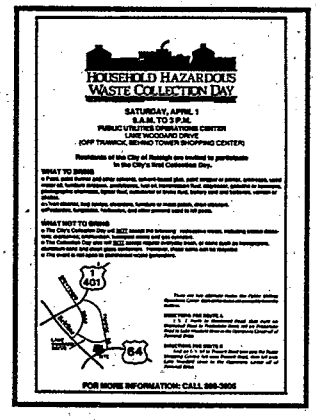
Radon Awareness Week

Some cities have conducted radon awareness days as part of community outreach programs to alert citizens to the danger of radon. For example, in Frederick, Maryland, the mayor signed a proclamation of Radon Awareness Week and the local paper carried articles about radon throughout the week. State and local health officials made presentations to civic organizations, including the Lions Club and the League of Women Voters. The American Lung Association also participated in several activities. Contact your state radon office about how to organize a radon awareness week in your community. State radon offices are listed in Table 7 beginning on page 91.

- **In most communities, the improper disposal of household hazardous wastes is a serious environmental problem.** Materials that are improperly disposed of often end up in local water bodies either because they are dumped into the ground or they cannot be extracted during waste treatment. Organize an information program on household hazardous wastes or, if your community does not already have a household hazardous waste collection program, participate in developing one.

Household Hazardous Waste Collection Programs

Many cities and counties in the United States have organized programs for household hazardous waste collection. Some local governments have developed programs to educate the public about the problems of improper disposal of household hazardous wastes and have offered a collection day or amnesty day on which residents are encouraged to bring in household wastes for proper disposal. The wastes are then disposed of appropriately, usually by paying a hazardous waste facility to accept them. Some areas have adopted programs to collect household hazardous wastes on a regular basis.


HOUSEHOLD HAZARDOUS WASTE COLLECTION DAY

Planning a household hazardous waste collection program is a complex and expensive process. If you are interested in starting a program in your community, first consult EPA's *A Survey of Household Hazardous Waste and Related Collection Programs*. See page 66 for information about how to order this publication.

- **Hazardous substances from automobile exhaust by-products enter the environment with the runoff from parking lots, commercial developments, roadways, and other impermeable surfaces.** Work with your city council or local governing body to reduce the pollution caused by runoff. Stormwater management techniques can limit the amount of hazardous substances that run off impermeable surfaces into surface water bodies during periods of heavy rainfall.

- **Automobile emissions contribute to environmental degradation.** In some areas, automobile emissions are the largest source of pollution. Organize carpools and/or use public transportation to reduce the amount of automobile emissions.

More Information

This chapter described community actions aimed at reducing your exposure to hazardous substances. If you would like to know more about this topic, the publications listed below would be a good place to start.

Hazardous Materials Emergency Planning Guide

Write to: Hazmat Planning Guide (NRT-1)
U.S. Environmental Protection Agency
OS-121
401 M Street, SW
Washington, DC 20460

Chemicals in Your Community: A Guide to the Emergency Planning and Community Right-to-Know Act

Write to: Emergency Planning and Community
Right-to-Know Information Line
U.S. Environmental Protection Agency
OS-120
401 M Street, SW
Washington, DC 20460
or call: 1-800-535-0202
In Washington, DC and Alaska
(202) 479-2449

What It Means to You: A Videotape on the Emergency Planning and Community Right-to-Know Act

Write to: Office of Pesticides and Toxic Substances
U.S. Environmental Protection Agency
TS-799
401 M Street, SW
Washington, DC 20460

Reducing the Risk of Chemical Disaster: A Citizen's Guide

Write to: National Wildlife Federation
Environmental Quality Division
1400 16th Street, NW
Washington, DC 20036
or call: (202) 797-6800
Cost: $7.00

A Survey of Household Hazardous Waste and Related Collection Programs

Write to: RCRA/Superfund Hotline
OSW/OPMS Hotline
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460
or call: 1-800-424-9346
In Washington, DC
(202) 382-3000

7 ACTIONS YOU CAN TAKE TO REDUCE YOUR EXPOSURE TO HAZARDOUS SUBSTANCES

HIGHLIGHTS:

- Although the government takes a number of actions to reduce people's exposure to hazardous substances, you may want to take further action on a personal level.
- You can reduce your exposure to some hazardous substances by taking actions in the following four general categories: (1) decrease indoor exposures; (2) select and use products carefully; (3) change personal habits; and (4) improve your diet.

Getting Started

We are exposed to many hazardous substances because we make decisions about all kinds of risks in our daily lives based on best scientific judgments, common sense, and even habits or superstitions. These decisions range from the food we choose to eat and drink, whether or not we smoke, where we live and work, and even the recreational activities in which we participate.

Chapter 5 discussed government legislation aimed at reducing people's exposure to hazardous substances. Unfortunately, many factors such as the following limit the effectiveness of government actions:

- Scientific knowledge is incomplete.
- There is a time lag between discovering a risk and regulating its source.
- Regulated substances still have residual (leftover) risks that when added together may cause adverse health effects.
- Not everyone obeys the laws.
- Accidental releases still occur.

- Uninformed parties may misuse hazardous substances.

The local government and community programs described in Chapter 6 are designed to help communities reduce their citizens' exposure to environmental substances. Depending on the source of a hazardous substance, you also may be able to lessen your exposure (and, hence, your risk of illness) by changing your personal habits.

This chapter discusses some personal actions you can take to reduce the hazardous substances in your environment. This chapter is not intended to be comprehensive. You may decide you need more information, especially for indoor environmental exposures or improving your personal health habits. You can get some of this information from local organizations such as LEPCs (see Chapter 6). Additional information is available from hotlines, federal and state agencies, and private organizations. Chapter 8 provides telephone numbers and addresses of these organizations and information on available printed materials.

You may want to tailor these suggestions to fit your needs. Following some of these suggestions may be less convenient or take more time or effort than your current habits. Merely finding out about new methods and products requires time and effort. But changing your habits can reduce your exposure to hazardous substances. By taking a little more time to think and plan before you buy, mix, or use products, you can help protect yourself.

You do not have to change all your habits at once. Make easier changes first and begin learning about others so that you gradually reduce the number and types of risks you are exposed to.

Personal Actions

The actions that we suggest you take fall into four general categories:

- Decrease indoor exposures,
- Select and use products carefully,
- Change habits that expose you to hazardous substances, and
- Improve your diet.

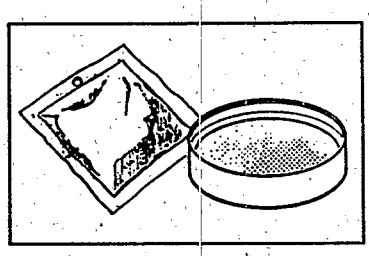
This chapter provides useful suggestions in each of these areas.

Decrease Indoor Exposures

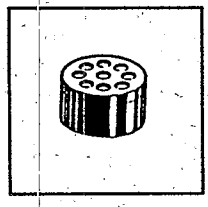
Some hazardous substances may be present in your home—for example, in the air, building materials, furniture, and carpet.

Radon: The Public Health Service and EPA recommend that all single-family detached houses and apartments and condominiums below the third floor be tested for radon. You can test your home for radon using simple detectors that are available at hardware stores or through radon testing companies. The tests cost between $10 and $50 depending on the type. When a radon problem is found, homeowners can reduce the problem for expenditures ranging from $200 to $2,000. To get more information on radon, call 1-800-S0S-RADON, call your state radon office, or read one of EPA's radon information booklets. Table 7 beginning on page 91 lists the state radon offices in all 50 states, and Table 12 on page 113, lists a number of publications on radon that are available from EPA.

Charcoal Detector
Recommended Test Period:
2 to 7 days
Approximate Cost: $12 to $25.



Alpha Track Detector
Recommended Test Period:
3 to 12 months
Approximate Cost:
$25 to $50.



Radon test devices are available from hardware stores or radon testing companies.

Asbestos: EPA prohibited the spraying of asbestos-containing materials for insulation, fireproofing and soundproofing in 1973. Several other asbestos-containing materials were prohibited in the 1970's by EPA and the Consumer Product Safety Commission (CPSC). Houses and apartments that were built or remodeled before 1970 may contain asbestos. If you suspect that fireproofing, insulation materials, or other building materials in your environment contain asbestos, **do not disturb them.** Generally, a health risk only exists when asbestos fibers are released from the material. Get professional advice to identify and alleviate potential asbestos problems. Call the Toxic Substances Control Act Assistance Information Service [(202) 554-1404] for information on asbestos and for a list of laboratories that can test for asbestos problems. EPA's and CPSC's *Asbestos in the Home* contains more information (see Table 12, page 113).

Indoor tobacco smoke: Tobacco smoke may be a problem even for nonsmokers indoors where smoking is allowed. Ventilation will reduce but not eliminate exposure to tobacco smoke. Because smoking produces such large amounts of pollutants, natural or mechanical ventilation techniques do not remove them from the air in your home as quickly as they build up. The most effective way to reduce exposure to tobacco smoke in the home is to eliminate smoking there. EPA's and CPSC's *The Inside Story: A Guide to Indoor Air Quality* contains further information about environmental tobacco smoke (see page 79 for information on how to order this publication).

Lead in paint: Older homes and apartments may have walls painted with lead-based paint. If you suspect the interior or exterior of your house has been painted with lead-based paint, do not disturb it unless it is in bad condition and children could eat it. If you need to remove the paint, wear a mask. Do not sand or burn off paint that may contain lead. If paint is cracked or peeling, cover it with wallpaper or some other building material or replace the painted surface. EPA's and CPCS's *The Inside Story: A Guide to Indoor Air Quality* contains further information about lead in paint (see page 79 for information on how to order this publication).

Lead in drinking water: You cannot see or taste lead in water. Homes and apartments most likely to have high lead levels are those that have water service connections or interior plumbing made of lead, or those that are less than 5 years old and have copper pipes soldered with lead. In dwellings with copper piping more than 5 years old, mineral deposits have formed a coating on the inside of the pipes if the water is not too corrosive. This coating insulates the water from the lead solder. If you suspect that you have high levels of lead in your drinking water, have your water tested. Many city water departments offer testing, sometimes at no cost. Call the Safe Drinking Water Hotline or your State Pollution Control Department for information about where to have your water tested.

If your water contains lead, you can reduce the problem in several different ways:

- Run your water from the tap until you feel that the water has become as cold as it will get before you drink it or cook with it;
- Do not cook with or drink water from the hot-water tap;
- Use bottled water; or
- Replace the plumbing.

EPA's *Lead and Your Drinking Water* contains further information about lead in drinking water (see Table 12, page 108, for information on how to order this publication).

Other sources of indoor exposures: Other sources of indoor exposures to hazardous substances include pressed wood products (such as furniture) containing formaldehyde, new carpets that give off benzene, combustion products from improperly maintained wood stoves, and consumer products such as cleaners and pesticides. The next section discusses the selection and proper use of consumer products. EPA's and CPSC's *The Inside Story: A Guide to Indoor Air Quality* contains further information about other indoor air contaminants (see page 79 for information on how to order this publication).

Select and Use Products Carefully

Many consumer products contain hazardous substances. To find out if a product contains hazardous substances, read the label. If you are unaware of the hazards from a particular chemical on the label, call EPA's Toxic Substances Control Act (TSCA) assistance information service (see Table 9, page 99). The following contains tips about product selection, product use, preparation, storage, and disposal that will help reduce your exposure to hazardous substances from these products.

Product Selection: In many cases there are nonchemical products that can be used instead of a product that contains hazardous substances. These products may be as effective as one that is hazardous. Consider substituting products that do not contain hazardous substances or ones that contain less hazardous substances. Also choose products that are packaged in materials that are environmentally safe.

Examples of Less Hazardous Alternatives to Hazardous Household Products

- Use boiling water, a plunger, or a metal snake to clear drains.
- Leave one-fourth cup of ammonia in the oven overnight to prepare oven for cleaning.
- Use rubbing alcohol or cold water and detergent immediately after clothing is stained instead of spot remover.
- Sand off old paint or lacquer finish in a well-ventilated area rather than using paint stripper.

For further information see EPA's *A Survey of Household Hazardous Wastes and Related Collection Programs* (see Table 12, page 109).

Alternatives to Insecticide and Herbicide Use

Use natural pesticides rather than chemical ones for your garden and for indoor plants. Depending on the site or the pest to be controlled, one or more of the following steps can be effective:

- Use microorganisms like milky spore disease to control Japanese beetles in your garden.
- Use companion plants such as marigolds (a natural bug repellent) near vegetable plants.
- Use disease-resistant plants.

Appropriately fertilizing, watering, and aerating lawns can reduce the need for chemical pesticide treatments of lawns. Mechanical treatments such as cultivating to control weeds, hand-picking weeds from the lawn and pests from plants, and trapping to control rodents and some insects can be useful. Use traps to control rodents and insects and screen off living areas to limit mosquito and fly access. Wash indoor plants and pets frequently.

For further information see EPA's *A Citizen's Guide to Pesticides* (page 79 or Table 12, page 114).

Alternatives When Using Commercial Pest Control

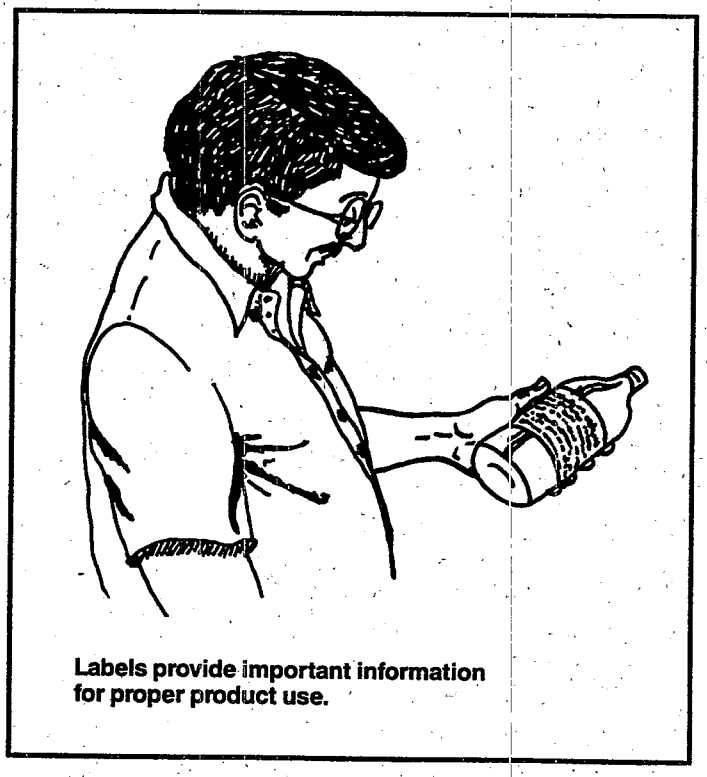
If you decide to use a pest control company for pest removal or for termites, choose one carefully. Ask the company to use the least toxic means available or to use chemical-free pest control. Some pest control companies offer an electro-gun technique to control termite and similar infestations by penetrating infested areas and using heat treatments to eliminate the problem pests.

Ask for an inspection of your home and get a written control program for evaluation before you sign a contract. The control program should list specific names of pests to be controlled and chemicals to be used. It should also reflect your safety concerns.

For further information see EPA's *A Citizen's Guide to Pesticides* (page 79 or Table 12, page 114).

Preparation for Product Use: Before you use products containing hazardous substances, prepare your work environment to reduce unnecessary exposures. Here are some tips:

- Choose the least hazardous product that will accomplish the task.
- Read the labels of pesticides, paints, solvents, glues, and household cleaning products. Follow the directions carefully. Even if you have used the products before, read the label again. Refresh your memory about the details.
- Use only the amount of pesticides directed, at the time and under the conditions specified, and for the purpose listed. It is **not** true that twice the dosage will do twice the job.
- Wear protective equipment to reduce exposure to your skin, eyes, and lungs from such products. The label will indicate what protective equipment is recommended. Follow these directions. Protective equipment may include impermeable gloves (made from materials such as vinyl), long sleeves, long pants, footwear, goggles, and/or a respirator.
- Make sure your work space is well ventilated to reduce the concentration of any exposure you may receive. Use products outside or with the windows open to provide fresh air.
- Close the windows in the house if you are spraying pesticides outdoors.



Labels provide important information for proper product use.

Product Usage: Using products properly will reduce unnecessary exposures to hazardous substances.

- Determine the correct dosage of the product. Mix only the amount of product you need for the job at hand to avoid storing or disposing of the excess.
- Use products in a well-ventilated area or outdoors. If you cannot avoid using products on a windy day, make sure you are standing upwind of the product.
- Avoid spraying pesticides near wells or fish ponds. Do not over-apply pesticides when treating the lawn, shrubs, or the garden. Runoff or seepage from excess pesticides can contaminate water supplies. Also, excess spray may leave harmful residue on home-grown produce.
- Stand so that you do not smell gasoline when filling your tank at a self-service gas station. Use the automatic pump setting, if available, so you can walk away from your car while your tank is being filled.
- Place items stored with mothballs in trunks or other containers that can be stored in areas that are separately ventilated from the home, such as the attic or a detached garage.
- Do not accept dry cleaning goods if they have a strong chemical odor when you pick them up. Wait until they have properly dried, or leave them outdoors until they are dry.
- Wear gloves, a long-sleeved shirt, and long pants when spraying hazardous materials. Wash hands and clothes after spraying.

Tips for What to do in an Accident with a Pesticide or Other Hazardous Substance

First aid is the first step in treating a pesticide poisoning. Study the product label before you use a pesticide, especially the statement of treatment. The best source of information is the label since the appropriate first aid treatment depends on which pesticide was used. Here are some tips for first aid before, but not instead of, medical treatment:

- ***Poison on skin.*** Drench skin with water and remove contaminated clothing. Wash skin and hair thoroughly with soap and water. Dry victim and wrap in blanket. Later, discard contaminated clothing or thoroughly wash it separately from other laundry.
- ***Chemical burn on skin.*** Drench skin with water and remove contaminated clothing. Cover burned area immediately with loose, clean, soft cloth. Do not apply ointments, greases, powders, or other drugs. Later, discard or thoroughly wash contaminated clothing separately from other laundry.
- ***Poison in eye.*** Eye membranes absorb pesticides faster than any other external part of the body. Eye damage can occur in a few minutes with some types of pesticides. Hold eyelid open and wash eye quickly and gently with clean, running water from the tap or a hose for 15 minutes or more. Do not use eye drops or chemicals or drugs in the wash water.
- ***Inhaled poison.*** Carry or drag victim to fresh air immediately. (If proper protection for yourself is unavailable, call for emergency equipment from the fire department.) Open doors and windows so no one else will be poisoned by fumes. Loosen victim's tight clothing. If the victim's skin is blue or the victim has stopped breathing, give artificial respiration and call rescue service for help.
- ***Swallowed poison.*** A conscious victim should rinse his mouth with plenty of water and drink up to one quart of milk or water to dilute the pesticide. Induce vomiting only if instructions to do so are on the label. If there is no label available to guide you, do **not** induce vomiting if the victim has swallowed a corrosive poison or an emulsifiable concentrate or oil solution, or if the victim is unconscious or is having convulsions.

In dealing with any poisoning, **act fast**; speed is crucial. After initial first aid has been performed, get medical help immediately.

Call the National Pesticides Telecommunications Network at 1-800-858-PEST or your local poison control center for further information on how to deal with poisonous substances. The number can be found on the inside cover of your telephone book with the other emergency numbers.

Product Storage and Disposal: Properly storing and disposing of products that contain hazardous substances is important for reducing your exposures to them.

- Buy only the amount of product you need for the intended use (or for a season's use). This will reduce storage problems.
- Keep a list of all the hazardous substances you have in your home and where they are stored.
- Store products containing hazardous substances away from children and pets. Store them in a locked cabinet in a well-ventilated utility area or garden shed.
- Store products in a safe place as specified by the label. Avoid storing pesticides in places where flooding is possible, or in open places where they might spill or leak into the environment. Store flammable liquids outside living quarters and away from ignition sources.
- Contact your city government to see if you city has a household hazardous waste cleanup program where you can bring your waste from hazardous household products.
- Do not flush leftover pesticides or hazardous substances in the toilet or down the sink as they could interfere with the operation of the septic tank or pollute waterways. Many municipal sewage treatment systems cannot remove all pesticide or hazardous substance residues from wastewater.
- Dispose of unfinished containers of powdered household cleaners, window cleaners, dyes, and water-based paints by wrapping them tightly in newspaper or putting them in a box, taping shut, and placing in garbage can.
- Dispose of unfinished containers of drain cleaners, oven cleaners, spot removers, tile cleaners, silver and furniture polishes, lead-based paints, lacquer, varnish, and stripper by taking them to a household hazardous waste collection site or call your garbage disposal service for disposal information.
- Dispose of used oil by placing it in a closed container and taking it to a service station or other facility that offers collection services. Do not mix other substances such as gasoline, paint stripper, or pesticides into used oil. Trade in car batteries or take them to a special recycling center.
- Do not reuse empty containers because they may contain residues.

Recycling Used Oil

Used oil is recycled mostly as a fuel. In some areas, local gas stations accept oil for recycling. When virgin oil prices drop, used oil prices also drop and facilities (such as gas stations) have to pay used oil collectors to pick up used oil. Consequently, some stations no longer accept used oil from do-it-yourself oil changers. This means that it may be difficult to find a facility that will accept used oil. Your state pollution control office may be able to tell you which facilities currently accept used oil.

Do not dump used oil down drains or storm sewers—it kills wildlife and causes human health risks.

Change Habits that Expose You to Hazardous Substances

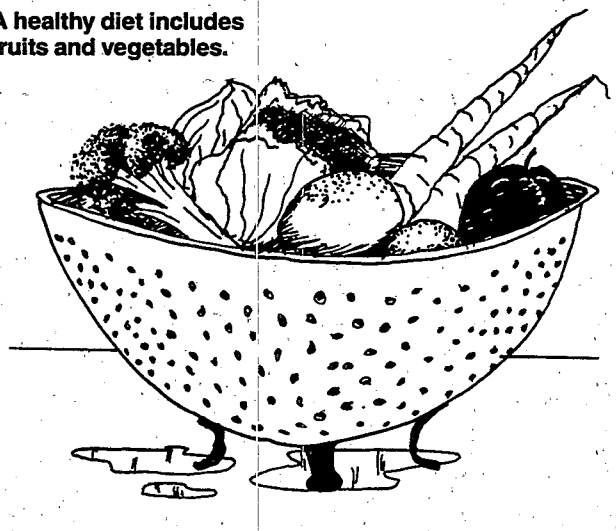
Some exposures to hazardous substance can be reduced or prevented by changing habits or behaviors. Here are some examples:

- Avoid long exposures to heavy concentrations of environmental tobacco smoke. And if you smoke, quit.
- Avoid outdoor activities when the air quality is poor. For example, in some cities air pollution alerts are issued on occasion. Avoid exercising outside during these periods.
- Avoid eating fish from waterbodies where water contamination is known to have occurred. Pay attention to posted signs warning of contamination.

Improve Your Diet

Paying attention to your diet is important for two reasons. First, your diet is one possible way of being exposed to hazardous substances. Second, some studies suggest that certain dietary components reduce or increase the risks of certain diseases. And third, some studies suggest that healthier people are better able to resist harm from hazardous substances.

A healthy diet includes fruits and vegetables.



Nature puts some hazardous substances in our food. Aflatoxin is an example. In addition, we constantly consume small amounts of natural and man-made pesticides in our diet. Fruits, vegetables, and grains as well as meat, poultry, eggs, and milk all can contain measurable pesticide residues.

Although EPA regulations limit the amount of man-made pesticide residues that can be contained in commercial foods, you can further reduce risks in other ways. Rinsing fruits and vegetables with water, scrubbing them with a brush, and peeling them, if possible, will remove much of the existing surface residues and dirt but not the "systemic" pesticide residues taken up into the growing plant. Also, trimming the fat from meat and poultry and discarding the fat and oils in broths and pan drippings reduce risks of residues because most are concentrated in fat.

The Department of Health and Human Services promotes proper diet as one of the best ways to reduce risks. The department suggests varying your diet to include foods high in fiber and low in fat. Your daily diet should include fresh fruits and vegetables and whole grain breads and cereals.

The following dietary factors have been linked with disease:

- High saturated fat diets are linked to coronary heart disease;
- Elevated levels of serum cholesterol are also linked with coronary heart disease;
- A fat-rich diet is linked to various kinds of cancer, with the strongest link between high fat diet and colon cancer;
- High sodium diets have been linked with hypertension for some groups of people;
- Low potassium diets have been linked with hypertension; and
- Obesity is linked with diabetes, hypertension, and coronary heart disease.

A recommended source for further information on diet is *Diet and Health: Implications for Reducing Chronic Disease Risk*, published by the National Academy Press (see page 79 or Table 12, page 115).

More Information

This chapter has suggested actions you can take on your own to reduce your exposure to hazardous substances. If you would like to know more about this topic, the sources listed below would be a good place to start.

The Inside Story: A Guide to Indoor Air Quality

Write to: Public Information Center PM-211B
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460
or call: (202) 382-2080

A Citizen's Guide to Pesticides

Write to: Public Information Center PM-211B
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460
or call: (202) 382-2080

Diet and Health: Implications for Reducing Chronic Disease Risk

Write to: National Academy Press
2101 Constitution Avenue, NW
Washington, DC 20418
or call: (202) 334-3313
Cost: $49.95

Diet, Nutrition, and Cancer Prevention: The Good News

Write to: Office of Cancer Communications
National Cancer Institute
Bethesda, MD 20892
or call: 1-800-4-CANCER

Chemical Risks: Personal Decisions

Write to: Office of Legislative and Regulatory Programs
Department of Government Relations and Science Policy
American Chemical Society
11155 16th Street, NW
Washington, DC 20036
or call: (202) 872-8725

Pesticides In Drinking Water

Write to: Public Information Center PM-211B
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460

or call: (202) 382-2080

8 GETTING MORE INFORMATION ON HAZARDOUS SUBSTANCES

This chapter provides tables that list sources of further information on hazardous substances. The first six tables provide telephone numbers and addresses for contact persons in federal and state governments and in other organizations who can help answer questions about hazardous substances. The last two tables provide information about printed and computer resources that are publicly available.

Reference Tables: A Guide

You may want to get more information on some of the techniques and actions described in this guidebook. This chapter lists additional sources of information, including hotlines, booklets, public information sources, and computerized information. These sources are organized under the following tables:

Table 6 State Emergency Response Commissions and State Section 313 Contacts Under the Emergency Planning and Community Right-to-Know Act (SARA Title III) (pages 84-90)—lists the Commissions and Section 313 contacts for each state in the United States. The State Emergency Response Commission (SERC) can help you find a contact person at the Local Emergency Planning Committee (LEPC) in your area. The Section 313 contacts can help you get information on releases of certain types of hazardous substances.

Table 7 State Radon Contacts (pages 91-95)—lists the name and address of a contact person in the state radon office for each state.

Table 8 U.S. Environmental Protection Agency Regional Offices (page 96)—lists the name and address of the Superfund Community Relations Coordinator for each EPA region. A map showing the EPA regions follows the table on page 97.

Table 9 U.S. Environmental Protection Agency Resources (pages 98-101)—lists hotlines and other public information services that are operated or funded by EPA. The table also lists the main services each resource provides. Many of the services relate to a particular law so it may be most useful to read the description of the information they provide to get a sense of whom to call. The toll-free information services are listed first in alphabetical order by name, followed by other public information resources.

Table 10 Other Federal Government Resources (pages 102-104)—lists hotlines and other public information services that are operated by other federal agencies that have jurisdiction over hazardous substances. The table lists the main services each resource provides. The resources are listed in alphabetical order.

Table 11 Private and Nonprofit Organizations (pages 105-107)—lists some national private and nonprofit organizations that provide useful information or resources concerning hazardous substances. A brief description of the main services of each organization is also included. These organizations are listed in alphabetical order.

Table 12 Printed Information on Hazardous Substances (pages 108-116)—lists information available to the public about hazardous substances and what EPA, other branches of the federal government, and the public can do about hazardous substances. These publications are listed according to the type of exposure (for example, indoor air). The table also provides general sources of health effects information.

Table 13 Computerized Information on Hazardous Substances (page 117)—provides health effects information available on line through a personal computer from the National Library of Medicine.

How to Use the Resources

Local health departments and local environmental groups generally are more familiar with the particular characteristics of your local environment. Information on releases of hazardous substances from certain facilities (information required by the Emergency Planning and Community Right-to-Know Act) is available from a variety of sources. The EPA regional offices listed in Table 8 cannot provide information on local and regional nonprofit environmental groups.

You also may want to contact your Local Emergency Planning Committee (LEPC) or look in your public library for information produced by your LEPC. Your LEPC already may be in the process of making this information more meaningful by putting it into context in your local community. To contact your LEPC, call your State Emergency Response Commission and ask them for information on the LEPC in your area. If some of the release data you are interested in obtaining are not available from the LEPC, contact your state's Section 313 contact listed in Table 6 or obtain access to the Toxics Release Inventory (TRI) database listed in Table 9. The TRI database itself can be accessed by computer and modem and at the public reading room in Washington, DC.

Information is also available through state pollution control agencies. This chapter does not list all the state pollution control agencies, because many states have more than one agency with jurisdiction over hazardous substances. To contact the appropriate agency in your state, call the operator in your capital city and ask for the main number of the state environmental or pollution control agency. Once you contact that agency, ask them to help you find the office that can address your question.

National public information services can supplement information you get from local and state agencies and provide information about federal laws and regulations, health effects from exposure to hazardous substances, and methods for reducing environmental problems. Also, they can refer you to specific program offices within the federal agency or in the state government for more detailed information.

Skim the tables in this chapter to find out what information sources are available. Beside each listing is a brief description of the services provided by each hotline, information service, or organization. Even after you have read these lists, you may still have difficulty deciding whom to contact. If you decide to call someone in a local office, ask that person for names of people to contact in other offices inside or outside the agency. Also, ask for names in other levels of government. For example, ask federal officials for contacts at a regional or state office, or ask a local official whom to call at the state, regional, or federal level. Check to see if local environmental groups have developed a list of contact persons that may be useful.

You may need to make several calls to get the information you need. Keep in mind that every contact will not have all the answers. Be persistent—it is your right as a citizen to learn about the hazardous substances in your environment.

Table 8. State Emergency Response Commissions and State Section 313 Contacts Under the Emergency Planning and Community Right-to-Know Act (SARA Title III)

Alabama
Alabama Emergency Response Commission
Alabama Emergency Management Agency
520 South Court Street
Montgomery, AL 36130
(205) 834-1375

Section 313 contact:
Alabama Emergency Response Commission
Alabama Department of Environmental Management
1751 Congressman W. L. Dickinson Drive
Montgomery, AL 36109
(205) 271-7700

Alaska
Alaska Emergency Response Commission
900 Old Glacier Highway
P.O. Box 32420
Juneau, AK 99801
(907) 465-2630

American Samoa
Territorial Emergency Management Coordination Office
American Samoan Government
Pago Pago, AS 96799
(684) 633-2331

Section 313 contact:
Pati Faiai, Director
American Samoa, EPA
Office of the Governor
Pago Pago, AS 96799
(684) 633-2304

Arizona
Arizona Emergency Response Commission
Division of Emergency Services
5636 East McDowell Road
Phoenix, AZ 85008
(602) 231-6326

Arkansas
Arkansas Department of Pollution Control and Ecology
P.O. Box 9583
8001 National Drive
Little Rock, AR 72219
(501) 562-7444

Section 313 contact:
Depository of Documents
Arkansas Department of Labor
10421 W. Markham
Little Rock, AR 72205
(501) 682-4534

California
Chemical Emergency Planning and Response Commission
Office of Emergency Services
Hazardous Material Division
2800 Meadowview Road
Sacramento, CA 95832
(916) 427-4287

Section 313 contact:
Office of Environmental Affairs
ATTN: Section 313 Reports
P.O. Box 2815
Sacramento, CA 95812
(916) 324-8124

Colorado
Colorado Emergency Planning Commission
Colorado Department of Health
4210 East 11th Avenue
Denver, CO 80220
(303) 331-4830

Section 313 contact:
Same address as above
(303) 331-4858
Emergency Release Notification:
(303) 331-4858
After hours: (303) 377-6326

Connecticut
Connecticut Emergency Response Commission
Department of Environmental Protection
State Office Building
Room 161
165 Capitol Avenue
Hartford, CT 06106
(203) 566-4856

Delaware
Emergency Planning & Operations
Department of Public Safety
P.O. Box 527
Delaware City, DE 19706
(302) 834-4531
(800) 292-9588

Section 313 contact:
Air Resource Section
Department of Natural Resources and Environmental Control
89 Kings Highway
P.O. Box 1401
Dover, DE 19903
(302) 739-4791
Emergency Release Notification:
(302) 739-4764
In Delaware (800) 662-8802

Table 6. State Emergency Response Commissions and State Section 313 Contacts Under the Emergency Planning and Community Right-to-Know Act (SARA Title III) (continued)

District of Columbia
District of Columbia Emergency Response Commission
Office of Emergency Preparedness
2000 14th Street, NW
Frank Reeves Center for Municipal Affairs
Washington, DC 20009
(202) 727-6161

Florida
State Emergency Response Commission
Florida Department of Community Affairs
2740 Centerview Drive
Tallahassee, FL 32399-2149
(904) 488-1472
In Florida (800) 635-7179

Georgia
Georgia Emergency Response Commission
Georgia Department of Natural Resources
205 Butler Street, SE
Floyd Towers East, 11th floor
Atlanta, GA 30334
(404) 656-4713

Section 313 contact:
Same address as above
(404) 656-6905
Emergency Release Notification:
(800) 241-4113

Guam
Guam State Emergency Response Commission
Civil Defense
Guam Emergency Services Office
Government of Guam
P.O. Box 2877
Aguana, GU 96910
(671) 472-7230

Section 313 contact:
Guam EPA
P.O. Box 2999
Aguana, GU 96910
(671) 646-8863

Hawaii
Hawaii State Emergency Response Commission
Hawaii Department of Health
P.O. Box 3378
Honolulu, HI 96801
(808) 548-4139

Section 313 contact:
Same address as above
(808) 548-6505

Idaho
Idaho Emergency Response Commission
1410 N. Hilton, 2nd Floor
Boise, ID 83706
(208) 334-5888
Emergency Release Notification:
(800) 632-8000

Illinois
Illinois Emergency Response Commission
Illinois Emergency Services and Disaster Agency
ATTN: Hazmat Section
110 E. Adams Street
Springfield, IL 62706
(217) 782-4694

Section 313 contact:
Emergency Planning Unit
Illinois EPA
ATTN: Joe Goodner
P.O. Box 19276
2200 Churchill Road
Springfield, IL 62794-9276
(217) 782-3637

Indiana
Indiana Emergency Response Commission
5500 West Bradbury Avenue
Indianapolis, IN 46241
(317) 243-5176

Iowa
Iowa Disaster Services Division
Hoover Building
Level A, Room 29
Des Moines, IA 50319
(515) 281-3231

Section 313 contact:
Department of Natural Resources
Records Department
900 East Grand Avenue
Des Moines, IA 50319
(515) 281-8852

Table 6. State Emergency Response Commissions and State Section 313 Contacts Under the Emergency Planning and Community Right-to-Know Act (SARA Title III) (continued)

Kansas
Kansas Emergency Response Commission
Community Right-to-Know Program
Mills Building, Suite 501
109 S.W. 9th Street
Topeka, KS 66612
(913) 296-1690
Emergency Release Notification:
(913) 296-3176

Kentucky
Kentucky Emergency Response Commission
Kentucky Disaster and Emergency Services
EOC Bldg.
Boone National Guard Center
Frankfort, KY 40601-6168
(502) 564-8660

Section 313 contact:
Section 313
Deputy Commissioner for Special Projects
Kentucky Department for Environmental Protection
18 Reilly Road
Frankfurt, KY 40601
(502) 564-2150

Louisiana
Louisiana Emergency Response Commission
Office of State Police
P.O. Box 66614
7901 Independence Boulevard
Baton Rouge, LA 70896
(504) 925-6113

Section 313 contact:
Emergency Response Coordinator
Department of Environmental Quality
P.O. Box 44066
Baton Rouge, LA 70804-4066
(504) 342-8617
Contact: R. Bruce Hammatt, Director of Emergency Response

Maine
State Emergency Response Commission
Station 72
Augusta, ME 04333
(207) 289-4080
In Maine (800) 452-8735

Maryland
Governor's Emergency Management Agency
Maryland Emergency Management Agency
2 Sudbrook Lane East
Pikesville, MD 21208
(301) 486-4422

Section 313 contact:
State Emergency Response Commission
Maryland Department of the Environment
Toxics Information Center
2500 Broening Highway
Baltimore, MD 21224
(301) 631-3800

Massachusetts
Title III Emergency Response Commission
C/O DEP
Department of Environmental Quality Engineering
One Winter Street, 10th floor
Boston, MA 02108
(617) 292-5993
For LEPC Information: (508) 820-2000

Michigan
Michigan Department of Natural Resources
Environmental Response Division
Title III Notification
P.O. Box 30028
Lansing, MI 48909
(517) 373-8481

Minnesota
Minnesota Emergency Response Commission
290 Bigelow Bld.
450 N. Syndicate
St. Paul, MN 55104
(612) 643-3000

Mississippi
Mississippi Emergency Response Commission
Mississippi Emergency Management Agency
P.O. Box 4501
Fondren Station
Jackson, MS 39296-4501
(601) 960-9973

Table 6. State Emergency Response Commissions and State Section 313 Contacts Under the Emergency Planning and Community Right-to-Know Act (SARA Title III) (continued)

Missouri
Missouri Emergency Response Commission
Missouri Department of Natural Resources
2010 Missouri Blvd.
Jefferson City, MO 65109
(314) 751-7929

Montana
Montana Emergency Response Commission
Environmental Sciences Division
Department of Health and Environmental Sciences
Cogswell Building A-107
Helena, MT 59620
(406) 444-6911

Nebraska
Nebraska Emergency Response Commission
Nebraska Department of Environmental Control
P.O. Box 98922
State House Station
Lincoln, NE 68509-8922
(402) 471-2186
Emergency after hours:
(402) 471-4545

Nevada
Nevada Division of Emergency Management
2525 South Carson Street
Carson City, NV 89710
(702) 885-4240
Emergency Release Notification:
(702) 885-5300

New Hampshire
State Emergency Management Agency
Title III Program
State Office Park South
107 Pleasant Street
Concord, NH 03301
(603) 271-2231

New Jersey
New Jersey Emergency Response Commission
SARA Title III Project
Department of Environmental Protection
Division of Environmental Quality
CN-405
Trenton, NJ 08625
(609) 292-6714
Emergency number: (609) 292-7172

New Mexico
New Mexico Emergency Response Commission
New Mexico Department of Public Safety
P.O. Box 1628
Santa Fe, NM 87504-1628
(505) 827-9222

New York
State Emergency Management Office
Building 22
State Campus
Albany, NY 12226
(518) 457-9996

Section 313 contact:
New York Emergency Response Commission
New York State Department of Environmental Conservation
Bureau of Spill Prevention & Response
50 Wolf Road, Room 326
Albany, NY 12233-3510
(518) 457-4107
Contact: William Miner

North Carolina
North Carolina Emergency Response Commission
North Carolina Division of Emergency Management
116 West Jones Street
Raleigh, NC 27603-1335
(919) 733-3867
In North Carolina (800) 451-1403 for general information only

North Dakota
North Dakota Division of Emergency Management
P.O. Box 5511
Bismarck, ND 58501-5511
(701) 224-2111

Section 313 contact:
SARA Title III Coordinator
North Dakota State Department of Health and Consolidated Laboratories
Environmental Health Section
1200 Missouri Avenue
P.O. Box 5520
Bismarck, ND 58502-5520
(701) 224-2374

Table 6. State Emergency Response Commissions and State Section 313 Contacts Under the Emergency Planning and Community Right-to-Know Act (SARA Title III) (continued)

Ohio
Ohio Emergency Response Commission
Ohio Environmental Protection Agency
Office of Emergency Response
P.O. Box 1049
Columbus, OH 43266-0149
(614) 644-2260

Section 313 contact:
Division of Air Pollution Control
1800 Watermark Drive
Columbus, Ohio 43215
(614) 644-2270

Oklahoma
Oklahoma Emergency Response Commission
Office of Civil Defense
P.O. Box 53365
Oklahoma City, OK 73152
(405) 521-2481

Oregon
Oregon Emergency Response Commission
c/o State Fire Marshall
3000 Market Street Plaza
Suite 534
Salem, OR 97310
(503) 378-2885

Pennsylvania
Pennsylvania Emergency Response Commission
c/o Pennsylvania Emergency Management Agency
P.O. Box 3321
Harrisburg, PA 17105
(717) 783-8150, (717) 783-7388

Section 313 contact:
Pennsylvania Emergency Response Commission
c/o Bureau of Right-to-Know
Room 1503
Labor and Industry Building
Harrisburg, PA 17120
(717) 783-2071

Puerto Rico
Puerto Rico Emergency Response Commission
Environmental Quality Board
P.O. Box 11488
Sernades Juncos Station
Santurce, PR 00910
(809) 722-1175

Section 313 contact:
SERC Commissioner
Title III-SARA and 313
Same address as above

Rhode Island
Rhode Island Emergency Response Commission
State House Room 27
Providence, RI 02903-1197
(401) 277-3039
Emergency release no. (401) 274-7745

Section 313 contact:
Department of Environmental Management
Division of Air and Hazardous Materials
291 Promenade Street
Providence, RI 02908
Attn: Toxic Release Inventory
(401) 277-2808
Emergency Release Notification:
(401) 277-3070

South Carolina
South Carolina Emergency Response Commission
Division of Public Safety Programs
Office of the Governor
1205 Pendleton Street
Columbia, SC 29201
(803) 734-0425

Section 313 contact:
Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201
(803) 734-5200

Table 6. State Emergency Response Commissions and State Section 313 Contacts Under the Emergency Planning and Community Right-to-Know Act (SARA Title III) (continued)

South Dakota
South Dakota Emergency
Response Commission
Department of Water
and Natural Resources
Joe Foss Building
523 East Capitol
Pierre, SD 57501-3181
(605) 773-3151

Section 313 contact:
Same address as above
(605) 773-3296

Tennessee
Tennessee Emergency Response
Commission
Tennessee Emergency
Management Agency
3041 Sidco Drive
Nashville, TN 37204
(615) 252-3300
In Tennessee (800) 262-3300
Out of State (800) 258-3300

Texas
Texas Emergency Response
Commission
Division of Emergency
Management
P.O. Box 4087
Austin, TX 78773-0001
(512) 465-2138

Section 313 contact:
Emergency Response Unit
Texas Water Commission
P.O. Box 13087-Capitol Station
Austin, TX 78711-3087
(512) 463-8527
Emergency Release Notification:
(512) 458-7410

Utah
Utah Comprehensive Emergency
Management
P.O. Box 58136
Salt Lake City, UT 84158-0136
(801) 584-8370

Section 313 contact:
Utah Hazardous Chemical Emergency
Response Commission
Utah Division of Environmental Health
288 North 1460 West
P.O. Box 16690
Salt Lake City, UT 84116-0690
(801) 538-6121

Vermont
Department of Labor and Industry
State Office Building
Montpelier, VT 05602
(802) 828-2286

Section 313 contact:
Department of Health
60 Main Street
P.O. Box 70
Burlington, VT 05402
(802) 863-7281

Virgin Islands
Department of Planning and Natural
Resources
US Virgin Islands Emergency
Response Commission
Title III
Suite 231
Nisky Center
Charlotte, Amalie
St. Thomas, VI 00802
(809) 774-3320, ext. 169, 170

Virginia
Virginia Emergency Response
Council
Department of Waste
Management
James Monroe Building
11th Floor
101 North 14th Street
Richmond, VA 23219
(804) 225-2513

Table 6. State Emergency Response Commissions and State Section 313 Contacts Under the Emergency Planning and Community Right-to-Know Act (SARA Title III) (continued)

Washington
Washington Emergency Response Commission
Department of Community Development
Mail Stop GH-51
9th and Columbia Building
Olympia, WA 98504-4151
(206) 753-5625, (206) 459-9191
In Washington (800) 633-7585

Section 313 contact:
Department of Ecology
Hazardous Substance Information Office
Mail Stop PV-11
Olympia, WA 98504-8711
(206) 438-7252

West Virginia
West Virginia Emergency Response Commission
West Virginia Office of Emergency Services
State Office Building; EB-80
Charleston, WV 25305
(304) 348-5380

Wisconsin
Wisconsin Emergency Response Commission
Division of Emergency Government
4802 Sheboygan Avenue
P.O. Box 7865
Madison, WI 53707
(608) 266-3232

Section 313 contact:
Department of Natural Resources
P.O. Box 7921
Madison, WI 53707
(608) 266-9255

Wyoming
Wyoming Emergency Response Commission
Wyoming Emergency Management Agency
Comprehensive Emergency Management
P.O. Box 1709
Cheyenne, WY 82003
(307) 777-7566

Information about your Local Emergency Planning Committee can be obtained by contacting the State Emergency Response Commission, which is the first contact listed for each state. Information on releases of certain hazardous substances from facilities in your area can be obtained from the State Section 313 contact listed or from the State Emergency Response contact if a separate Section 313 contact is not listed. This table also provides emergency release notification telephone numbers in those states where it is not already listed under the State Emergency Response Commission.

List is current as of August 1990.

Table 7. State Radon Contacts

Alabama
Aubrey V. Goodin, Director
(Jim McNee)
Radiological Health Branch
State Department of Public Health
State Office Building
Montgomery, AL 36130
(205) 261-5315

Alaska
Sidney Heidersdorf, Chief
Radiological Health Program
Department of Health and Social Services
Division of Public Health
P.O. Box H
Juenau, AK 99811-0610
(907) 465-3019

Arizona
Charles F. Tedford, Director
(Paul Weeden)
Arizona Radiation Regulatory Agency
Environmental Surveillance
4814 South 40th Street
Phoenix, AZ 85040
(602) 255-4845

Arkansas
Greta Dicus, Director
Arkansas Department of Health
Division of Radiation Control and Emergency Management
4815 W. Markham Street
Little Rock, AR 72205-3867
(501) 661-2301

California
Dr. Jack S. McGurk, Chief
(Dave Quinton)
Environmental Health Division
California State Department of Health
714 P Street, Office Bldg. #8
Sacramento, CA 95814
(916) 322-2040

Colorado
Robert Quillin, Director
Radiation Control Division
Colorado Department of Health
4210 East 11th Avenue
Denver, CO 80220
(303) 331-4812

Connecticut
Alan J. Siniscalchi
Radon Program
Connecticut Department of Health Service
150 Washington Street
Hartford, CT 06106
(203) 566-3122

Delaware
Allan C. Tapert, Program Administrator
Office of Radiation Control
Division of Public Health
Bureau of Environmental Health
Robbins Bldg., Silver Lake Plaza
P.O. Box 637
Dover, DE 19901
(203) 736-4731
1-800-544-INFO

District of Columbia
Frances A. Bowie, Administrator
Department of Consumer and Regulatory Affairs
614 H Street, NW, Room 1014
Washington, DC 20001
(202) 727-7728

Florida
Dr. Lyle E. Jerret, Chief
(N. Michael Gilley)
Office of Radiation Control
Department of Health and Rehabilitative Services
1317 Winewood Boulevard
Tallahassee, FL 32399-0700
(904) 488-1525
1-800-543-8273

Georgia
Thomas Hill, Acting Director
(Jim Drinnon)
Radiological Health Section
Georgia Department of Human Resources
878 Peachtree Street, Room 100
Atlanta, GA 30309
(404) 894-6644

Hawaii
Thomas Anamizo, Chief
Department of Health
Environmental Health Services Division
591 Ala Moana Boulevard
Honolulu, HI 96813-2498
(808) 548-4383

Table 7. State Radon Contacts (continued)

Idaho
Brian Monson
(Joanne Mitten)
Department of Health and Welfare
Bureau of Preventive Medicine
450 West State Street
Boise, ID 83720
(208) 334-5927

Illinois
Richard Allen, Chief
Department of Nuclear Safety
Radioecology Division
Illinois Department of Nuclear Safety Laboratory
1301 Knotts Street
Springfield, IL 62703
(217) 786-7126

Indiana
Jack C. Corpuz
Indiana State Board of Health
1330 W. Michigan Street
P.O. Box 1964
Indianapolis, IN 46206-1964
(317) 633-0153
1-800-272-9723 (in State)

Iowa
Donald A. Flater, Chief
Department of Public Health
Lucas State Office Building
Des Moines, IA 50319
(515) 281-5605

Kansas
Gerald W. Allen, Chief
Radiation Control Program
Bureau of Environmental Health Services
Division of Health
Department of Health and Environment
Forbes Field, Building 740
Topeka, KS 66620-0110
(913) 296-1560

Kentucky
Donald R. Hughes
Radiation Control Branch
Division of Radiation and Product Safety
Department of Human Resources
275 East Main Street
Frankfort, KY 40621
(502) 564-3700

Louisiana
William H. Spell, Administrator
Louisiana Nuclear Energy Division
Louisiana Department of Environmental Quality
P.O. Box 14690
Baton Rouge, LA 70898-4690
(504) 925-4518

Maine
W. Clough Tappan
Indoor Air Program
Division of Health Engineering
Department of Human Services
State House, Station 10
Augusta, ME 04333
(207) 289-3826

Maryland
Roland G. Fletcher, Administrator
Maryland Air Management Administration
Department of the Environment
2500 Broening Highway
Baltimore, MD 21224
(301) 631-3300
1-800-872-3666 (in State)

Massachusetts
Robert M. Hallisey, Director
Radiation Control Program
Massachusetts Department of Public Health
150 Tremont Street, 11th Floor
Boston, MA 02111
(617) 727-6124

Michigan
George W. Bruchmann, Chief
(Robert DeHaan)
Michigan Department of Public Health
Bureau of Environmental and Occupational Health
Division of Radiological Health
3423 North Logan, P.O. Box 30195
Lansing, MI 48909
(517) 335-8190

Minnesota
Alice T. Dolezal Hennigan, Chief
(Laura Oatman)
Environmental Health Division
Minnesota Department of Health
717 Delaware Street, SE,
Minneapolis, MN 55440
(612) 627-5062

Table 7. State Radon Contacts (continued)

Mississippi
Eddie S. Fuente, Director
(Robert Bell)
Division of Radiological Health
Department of Health
3150 Lawson Street,
P.O. Box 1700
Jackson, MS 39215-1700
(601) 354-6657

Missouri
Kenneth V. Miller, Chief
Bureau of Radiological Health
Missouri Department of Health
1730 E. Elm
P.O. Box 570
Jefferson City, MO 65102
(314) 751-6083
1-800-669-7236 (in State)

Montana
Adrian C. Howe, Chief
Occupational Health Bureau
Montana Department of Health
and Environmental Sciences
Cogswell Building
Helena, MT 59620
(406) 444-3671

Nebraska
Harold R. Borchert, Director
Division of Radiological Health
Nebraska Department of Health
301 Centennial Mall, South
P.O. Box 95007
Lincoln, NE 68509
(402) 471-2168

Nevada
Stan Marshall, Supervisor
Radiological Health Section
Health Division
Department of Human Resources
505 E. King Street, Room 203
Carson City, NV 89710
(702) 885-5394

New Hampshire
Diane E. Tefft, Administrator
Bureau of Radiological Health
Division of Public Health Services
Health and Welfare Building
6 Hazen Drive
Concord, NH 03301-6527
(603) 271-4674

New Jersey
Christopher J. Daggett, Commissioner
New Jersey Department of
Environmental Protection
410 State Street
Trenton, NJ 08625-0402
(609) 987-6402
1-800-648-0394 (in State)

New Mexico
Benito J. Garcia, Chief
Radiation Licensing and
Registration Section
Environmental Improvement
Division
New Mexico Health and
Environmental Department
1190 Street Francis Drive
Santa Fe, NM 87503
(505) 827-2948

New York
David Axelrod, Commissioner
New York State Department of
Health
Corning Tower
Albany, NY 12237
(518) 458-6450
1-800-458-1158 (in State)

North Carolina
Dayne H. Brown, Chief
(Dr. Felix Fong)
Radiation Protection Section
Division of Facility Services
Department of Human Resources
701 Barbour Drive
Raleigh, NC 27603-2008
(919) 733-4283

North Dakota
Dana K. Mount, P.E., Director
Division of Environmental Engineering
North Dakota Department of Health
and Consolidated Laboratories
1200 Missouri Avenue, Room 304
P.O. Box 5520
Bismarck, ND 58502-5520
(701) 224-2348

Ohio
Bob Owen
Radiological Health Program
Division of Technical
Environmental Health Services
Ohio Department of Health
1224 Kinnear Road
Columbus, OH 43212
(614) 644-2727
1-800-523-4439 (in State)

Table 7. State Radon Contacts (continued)

Oklahoma
Paul Brown
Radiation Protection Division
Consumer Protection Service
Oklahoma State Department of Health
P.O. Box 53551
Oklahoma City, OK 73152
(405) 271-5221

Oregon
Ray Paris, Manager
Radiation Control Section
Department of Human Resources
Health Division
1400 SW 5th Avenue
Portland, OR 97201
(503) 229-5797

Pennsylvania
Thomas M. Gerusky, Director
Radon Program Office
Department of Environment Resources
Bureau of Radiation Protection
P.O. Box 2063
200 N. Third Street
Harrisburg, PA 17120
(717) 787-2163
1-800-23RADON

Puerto Rico
Enrique Mendez, Jr., M.D.
Call Box-70184
San Juan, PR 00936
(809) 767-3563

Rhode Island
James E. Hickey, Chief
Division of Occupational Health and Radiation Control
Rhode Island Department of Health
206 Cannon Bldg., Davis Street
Providence, RI 02908
(401) 277-2438

South Carolina
Heyward G. Shealy, Chief
Bureau of Radiological Health
Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201
(803) 734-4700/4631

South Dakota
Mike Pochop
Division of Air Quality and Solid Waste
South Dakota Department of Water and Natural Resources
Joe Foss Building, Room 217
523 East Capitol
Pierre, SD 57501-3181
(605) 773-3153

Tennessee
Division of Air Pollution Control
Bureau of Environmental Health
Department of Health and Environment Customs House
701 Broadway
Nashville, TN 37219-5403
(615) 741-4634

Texas
Ruth E. Burney, Treasurer
(David K. Lacker, Chief)
(Gary Smith)
Bureau of Radiation Control
Texas Department of Health
1100 West 49th Street
Austin, TX 78756-3189
(512) 835-7000

Utah
Larry Anderson, Chief
Utah Division of Environmental Health
Bureau of Radiation Control
288 North 1460 West
P.O. Box 16690
Salt Lake City, UT 84116-0690
(801) 538-6734

Vermont
Raymond N. McCandless, Director
Occupational and Radiological Health Division
Vermont Department of Health
10 Baldwin Street
Montpelier, VT 05602
(802) 828-2886

Virginia
Leslie P. Foldesi, Director
Bureau of Radiological Health
Department of Health
109 Governor Street
Richmond, VA 23219
(804) 786-2163
1-800-468-0138 (in State)

Table 7. State Radon Contacts (continued)

Virgin Islands
Alan D. Smith, Commissioner
Department of Planning and
Natural Resources
Charlotte, Amalie
Street Thomas, VI 00801

Washington
T. R. Strong, Chief
(Robert Mooney)
Office of Radiation Protection
Department of Health
Airdustrial Building 5, LE-13
Olympia, WA 98504
(206) 586-3303

West Virginia
Dr. Kazim Sheikh, Director
Radiological Health Program
Industrial Hygiene Division
Department of Health
151 11th Avenue
South Charleston, WV 25303
(304) 348-3427

Wisconsin
Department of Health and
Social Services
Section of Radiation Programs
P.O. Box 7850
Madison, WI 53707
(608) 273-6421

Wyoming
Julius E. Haees, Director
Radiological Health Services
Division of Health and
Medical Services
Hathaway Building, 4th Floor
Cheyenne, WY 82002-0710
(307) 777-6015

List is current as of June 1990.

Table 8. U.S. Environmental Protection Agency Regional Offices

Region I
Diane Ready, Chief
Regional Community Relations Coordinator
Office of Public Affairs
EPA - Region I
John F. Kennedy Federal Building
Boston, MA 02203
(617) 565-3715

Region II
Lillian Johnson, Chief
Community Relations Staff
Office of External Programs
EPA - Region II
26 Federal Plaza
New York, NY 10278
(212) 264-2657

Region III
Harold Yates, Chief
Regional Community Relations Coordinator
(3EA21) Public Affairs
EPA - Region III
841 Chestnut Street
Philadelphia, PA 19107
(215) 597-9800

Region IV
Patricia Zweig, Chief
Community Relations Coordinator
Office of Public Affairs
EPA - Region IV
345 Courtland Street, NE
Atlanta, GA 30365
(404) 347-4727

Region V
Toni Lesser, Chief
Regional Community Relations Coordinator
Office of Public Affairs
EPA - Region V (5PA-14)
230 South Dearborn
Chicago, IL 60604
(312) 353-2000

Region VI
Ellen Greeney
Hazardous Waste Management Division
EPA - Region VI (6H/SS)
1445 Ross Avenue
12th Floor, Suite 1200
Dallas, TX 75270
(214) 655-6444

Region VII
Rowena Michaels, Chief
Community Relations Coordinator
Office of Public Affairs
EPA - Region VII
725 Minnesota Avenue
Kansas City, KS 66101
(913) 236-2800

Region VIII
Wanda Taunton
Regional Community Relations Coordinator
EPA - Region VIII (80EA)
1 Denver Place - 999 18th Street
Denver, CO 80202
(303) 293-1603

Region IX
Pam Cooper, Chief
Communication Relations Coordinator
EPA - Region IX (T-1-3)
215 Fremont Street
San Francisco, CA 94105
(415) 744-8071

Region X
Janet O'Hara, Chief
Hazardous Waste Policy Office
EPA - Region X (HW-117)
1200 6th Avenue
Seattle, WA 98101
(206) 442-1200

EPA REGIONAL OFFICES

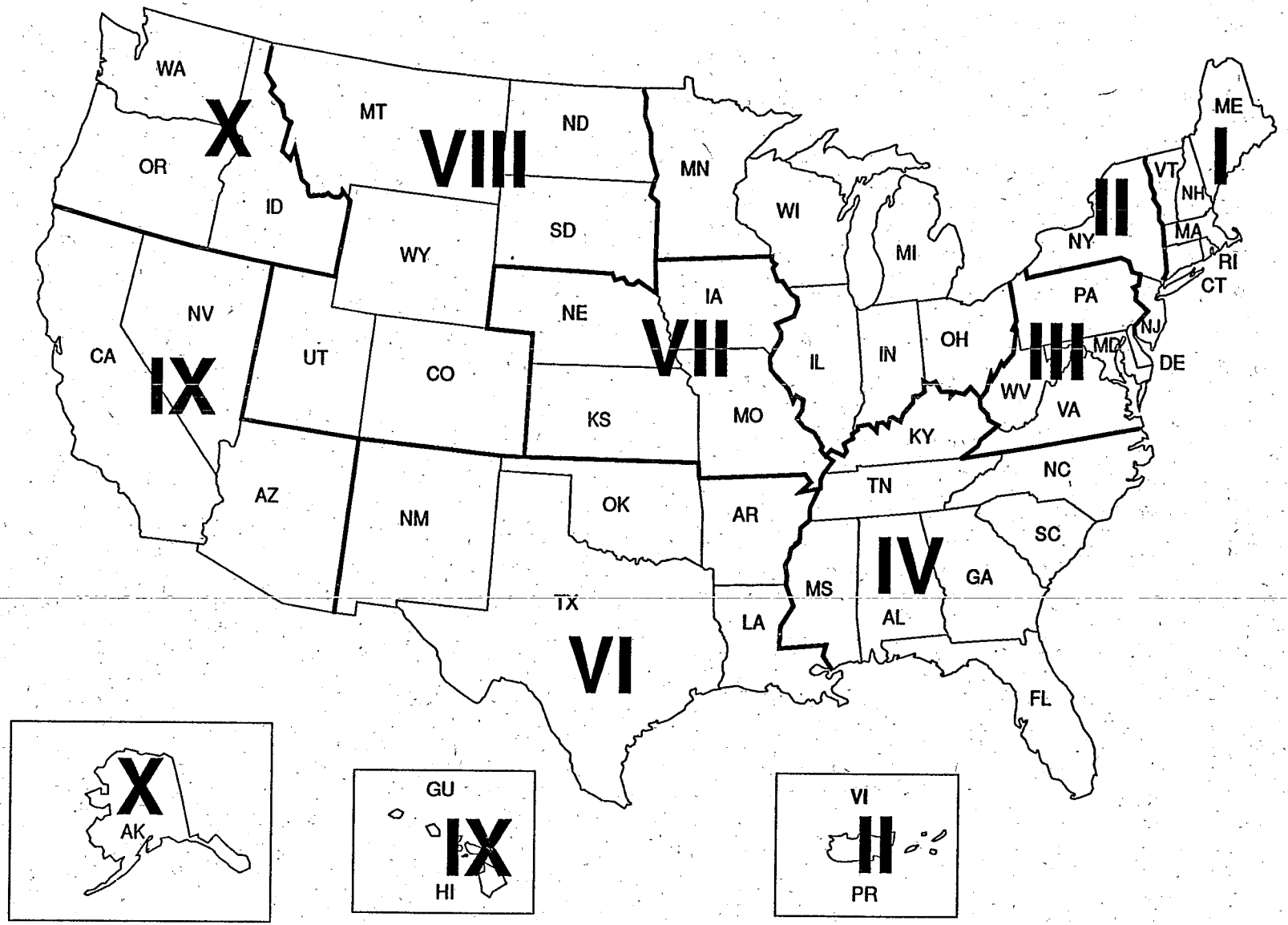


Table 9. U.S. Environmental Protection Agency Resources

RESOURCE	DESCRIPTION OF SERVICES
Hotlines	
Emergency Planning and Community Right-to-Know Information Hotline **1-800-535-0202** **In Washington, DC and Alaska** **(202) 479-2449** Operates 8:30 AM to 7:30 PM EST Monday through Friday Address written questions to: Emergency Planning and Community Right-to-Know Information U.S. Environmental Protection Agency OS-120 401 M Street, SW Washington, DC 20460	This toll-free hotline answers questions about local emergency response planning committees, state emergency response commissions, emergency planning, and reporting requirements under various sections of Title III. Refers technical information requests to the appropriate office in EPA. Can also provide publications about the Emergency Planning and Community Right-to-Know Act and on community planning. Requests for publications should be made in writing.
National Pesticides Telecommunications Network **1-800-858-PEST** Operates 24 hours a day all year Address written questions to: National Pesticides Telecommunications Network Texas Tech University Health Sciences Center, Room 1A111 4th Street and Indiana Lubbock, TX 79430	This toll-free hotline provides information about pesticides to the general public and to the medical, veterinary, and professional communities. Provides information on the health effects of pesticides, pesticide use, treatment procedures for accidents with pesticides, and exterminators.
RCRA/Superfund Hotline **1-800-424-9346** **In Washington, DC:** **(202) 382-3000** Operates 8:30 AM to 7:30 PM EST Monday through Friday Address written questions to: RCRA/Superfund Hotline OSW/OPMS Hotline U.S. Environmental Protection Agency 401 M Street, SW Washington, DC 20460	This toll-free hotline provides information on federal regulations regarding solid and hazardous wastes and on the Superfund law. Refers technical information requests to the appropriate office in EPA.

Table 9. U.S. Environmental Protection Agency Resources (continued)

RESOURCE	DESCRIPTION OF SERVICES
Hotlines (cont'd)	
Safe Drinking Water Hotline **1-800-426-4791** **In Washington, DC and Alaska** **(202) 382-5533** Operates 8:30 AM to 4:30 PM EST Monday through Friday Address written questions to: Safe Drinking Water Hotline U.S. Environmental Protection Agency WH-550 401 M Street, SW Washington, DC 20460	This toll-free hotline provides information on federal regulations regarding drinking water, including lead in drinking water, and maintains a list of state drinking water offices. Also provides information on water testing laboratories. Refers technical information requests to the appropriate office in EPA.
Toxic Substances Control Act (TSCA) Assistance Information Service **(202) 554-1404** Operates 8:30 AM to 5 PM EST Monday through Friday	This information service provides information on federal regulations of toxic substances and on EPA's asbestos programs. Provides information about such substances as ammonia, asbestos, formaldehyde, and hexanes in household products. Maintains a list of laboratories that analyze potential asbestos samples. Refers technical information requests to the appropriate office in EPA.
General Information	
Public Information Center PM-211B **U.S. Environmental Protection Agency** **401 M Street, SW** **Washington, DC 20460** **(202) 382-2080** Operates 8 AM to 5:30 PM EST Monday through Friday	This information center distributes general, nontechnical information about EPA to the public, as well as to other government agencies at all levels. Also refers technical information requests to the appropriate office in EPA or the appropriate government agency.
U.S. Environmental Protection Agency **Center for Environmental Research Information** **26 West Martin Luther King Drive** **Cincinnati, OH 45268** **(513) 569-7391**	This information center distributes many EPA publications including information about Superfund.

Table 9. U.S. Environmental Protection Agency Resources (continued)

RESOURCE	DESCRIPTION OF SERVICES
Pesticides	
Office of Pesticide Programs Document Management Section (H7502C) ISB/PMSD U.S. Environmental Protection Agency 401 M Street, SW Washington, DC 20460 (202) 557-4474	This office provides a number of free handouts on pesticide use and safety. Also can provide document numbers for Pesticide Fact Sheets available through the National Technical Information Service.
Emissions Data	
Toxics Release Inventory (TRI) Database Title III Reporting Center Suite 7103 470/490 l'Enfant Plaza Washington, DC 20022 (202) 488-1501	This center is a public reading room where paper copies of the reporting forms submitted to the Toxics Release Inventory Database are available.
Toxics Release Inventory Database U.S. Environmental Protection Agency P.O. Box 70266 Washington, DC 20024-0266 Attn. TRI Public Inquiry	This database contains information on releases of certain hazardous substances from factories and businesses in your area. Information from the database is available by personal computer and a modem through the National Library of Medicine Toxicology Data Network (TOXNET) System. Call the National Library of Medicine at 1-800-638-8480 for information on how to obtain a MEDLARS account for accessing the database. Local information on releases eventually will be available on computer in a county library in each county in the United States. Release data are also currently available from state Section 313 contacts.

Table 9. U.S. Environmental Protection Agency Resources (continued)

RESOURCE	DESCRIPTION OF SERVICES
Pollution Prevention	
Pollution Prevention Office **U.S. Environmental Protection Agency** **401 M Street, SW** **Washington, DC 20460**	Through the Pollution Prevention Information Clearinghouse (PPIC), EPA's Pollution Prevention Office provides information on government and industry pollution prevention programs, grant and project funding opportunities, upcoming events, conferences, and seminars and contains the Electronic Information Exchange System (EIES). The EIES is a computerized information network that anyone can access, either through a PC with appropriate communication software or through the RCRA/Superfund hotline (1-800-424-9346). The hotline provides a telephone service to answer or refer any pollution prevention questions, access information in the PPIC, provide instruction on accessing the EIES data bases, and assist in document searches and ordering.
Superfund	
Superfund Document Repositories	EPA has established document repositories for the studies developed in conjunction with Superfund site cleanups. Usually these repositories are in the county library nearest the site.

Table 10. Other Federal Government Resources

RESOURCE	DESCRIPTION OF SERVICES
Agency for Toxic Substances and Disease Registry (F-38) **U.S. Public Health Service** **Department of Health and Human Services** **Caffilene Allen, Public Relations** **1600 Clifton Rd., NE** **Atlanta, GA 30333** **(404) 488-4630**	This agency provides toxicological profile documents for some hazardous substances commonly found at Superfund sites. Answers questions about human health effects at refuse sites. Works with private physicians during emergencies to answer human health related questions.
Cancer Information Service (CIS) **1-800-4-CANCER** **On Oahu, Hawaii** **524-1234** **(neighbor islands call collect)** Address written questions to: Office of Cancer Communications National Cancer Institute Bethesda, MD 20892	This toll-free information service provides information about cancer causes, prevention, diagnosis, and treatment. Supplies information about which substances are known carcinogens. The CIS also provides booklets containing dietary recommendations and cancer prevention. Spanish-speaking staff are available to callers from the following areas (daytime hours only): California, Florida, Georgia, Illinois, northern New Jersey, New York, and Texas.
Consumer Products Safety Commission (CPSC) **1-800-638-2772** Operates a completely automatic hotline 24 hours a day for touchtone phones. If you have a rotary phone or if you want to register specific complaints about hazardous products, you may speak to operators from 10:30 AM to 4:00 PM EST, Monday through Thursday Address written questions to: Consumer Products Safety Commission Westwood Towers 5401 Westbard Avenue Bethesda, MD 20207	This toll-free hotline provides information about the specific titles of CPSC publications on household chemicals and on asbestos and allows you to order them. This hotline is a prerecorded message.
Food and Drug Administration **Office of Consumer Affairs** **HFF-88** **5600 Fishers Lane** **Rockville, MD 20857** **(301) 443-3170**	Provides consumer information and consumer publications on food safety and a variety of other subjects. May also be able to identify an FDA Consumer Affairs office in your area to serve as a resource.

Table 10. Other Federal Government Resources (continued)

RESOURCE	DESCRIPTION OF SERVICES
Meat and Poultry Hotline **1-800-535-4555** **In Washington, DC** **447-333** Operates 10 AM to 4 PM EST Monday through Friday Address written questions to: Meat and Poultry Hotline U.S. Department of Agriculture Room 1163-S Washington, DC 20250	This toll-free hotline provides information on food safety and storage mostly with respect to meat and poultry. They can, however, answer general questions about food safety or can refer questions to appropriate sources.
National Hazardous Materials Information Exchange (HMIX) **Federal Emergency Management Agency** **State and Local Programs and Support Directorate** **Technological Hazards Division** **800 C Street, SW** **Washington, DC 20472** **1-800-752-6367** **(In Illinois, call 1-800-367-9592)**	The Federal Emergency Management Agency and the Department of Transportation sponsor this computerized information exchange bulletin board. It is a centralized database set up for the distribution and exchange of information pertaining to hazardous materials, emergency management, training, resources, technical assistance, and regulations. For access, by a personal computer and modem, call 312-972-3275.
National Library of Medicine (NLM) **8600 Rockville Pike** **Bethesda, MD 20894** **1-800-638-8480 or** **(301) 496-6193**	The library maintains the Toxicology Data Network (TOXNET) System, an online database file available through a personal computer and modem connection. There are four database files in TOXNET: (1) The Hazardous Substance Data Base, (2) the Registry of Toxic Effects of Chemical Substances, (3) the Chemical Carcinogenesis Research Information Service, and (4) the Toxic Release Inventory. The NLM must issue a MEDLARS account, for billing purposes, before the database can be accessed.

Table 10. Other Federal Government Resources (continued)

RESOURCE	DESCRIPTION OF SERVICES
National Response Center **1-800-424-8802**	This center is a single continuously staffed location that receives and refers for action or investigation all reports of environmental incidents throughout the United States. Use this hotline **only** to report an incident.
National Technical Information Service (NTIS) **Attn: Order Desk** **5285 Port Royal Road** **Springfield, VA 22161** **(703) 487-4650**	This information service provides government documents. Several EPA publications that are not available through the EPA Public Information Center can be ordered through NTIS. There is a charge for these publications. Orders may be placed by telephone or by mail. Reference the NTIS PB order number and the document title. In most cases, you must also specify a method of payment for the document.
Occupational Safety and Health Administration **Office of Information and Consumer Affairs** **Department of Labor** **200 Constitution Avenue, NW** **Washington, DC 20210** **(202) 523-8151**	This information office answers questions about safety and health laws in the workplace. Refers technical questions to specialists in the appropriate Program Office of OSHA. Maintains a list of publications on workplace health and safety.

Table 11. Private and Nonprofit Organizations*

ORGANIZATION	DESCRIPTION OF SERVICES
American Chemical Society Department of Government Relations and Science Policy 1155 16th Street, NW Washington, DC 20036 **(202) 872-4395, (202) 872-4391**	A member organization of chemists and chemical engineers. Can help citizens interpret technical data or can refer citizens to a scientist in their local community who can.
American Petroleum Institute 1220 L Street, NW Washington, DC 20005 **(202) 682-8000**	The Health and Environmental Sciences Department of the American Petroleum Institute sponsors research and information programs in the fields of occupational health, product safety, environmental biology, environmental technology, and community health. Reports and publications are available to nonmembers for a $0.25 per page fee.
Center for Emergency Response Planning (CERP) Workplace Health Fund 815 16th Street, NW Washington, DC 20006 **(202) 842-7834**	A consortium of industrial union departments, AFL-CIO, and the Workplace Health Fund. CERP is involved in planning, information dissemination, and research. CERP provides educational resources for workers, labor officials, and community leaders; planning assistance to worker representatives on LEPCs; and general chemical information through unions.
Chemical Manufacturers Association 2501 M Street, NW Washington, DC 20037 **(202) 887-1255**	A research organization for chemical companies. Operates a Chemical Referral Center to provide nonemergency health and safety information on chemicals. Call the Referral Center at 1-800-CMA-8200 in U.S. or 202-887-1315 (call collect in Alaska).
Citizens Clearinghouse for Hazardous Wastes Box 926 Arlington, VA 22216 **(703) 276-7070**	An organization that provides information about hazardous wastes to citizens.

*This list covers only some of the private and nonprofit organizations that can provide assistance. You may be able to identify other national and local organizations.

Table 11. Private and Nonprofit Organizations (continued)

ORGANIZATION	DESCRIPTION OF SERVICES
Clean Water Action 186 South Street, 5th Floor Boston, MA 02111 **(617) 423-4661**	A grassroots organization that was organized to help citizens get information about toxics in their area. Provides technical assistance and maintains a list of publications.
Electric Power Research Institute 3412 Hillview Avenue P.O. Box 10412 Palo Alto, CA 94303 **(415) 855-2411**	A research organization for the electric utility industry. Conducts research on environmental assessment issues affecting the electric power industry. Technical reports are available at a fee for nonmembers.
Friends of the Earth 218 D Street, SE Washington, DC 20003 **(202) 544-2600**	A member organization that has recently merged with the Environmental Policy Institute and the Oceanic Society. The organization's main function is lobbying the federal government for grassroots citizens groups. Can also provide guidance for lobbying in state and local government and strategies for citizen education and assistance in community organizing.
Greenpeace 1436 U Street, NW Washington, DC 20009 **(202) 462-1177**	An international organization dedicated to the protection of the natural environment through direct action, education, and legislature lobbying. Maintains a number of position papers on environmental problems.
League of Women Voters 1730 M Street, NW Washington, DC 20036 **(202) 429-1965**	Nonpartisan political organization that promotes the informed and active involvement of citizens in government and influences public policy through education and advocacy. A multi-issue organization with interests including natural resources and environmental protection.
National Toxics Campaign 37 Temple Place, 4th Floor Boston, MA 02111 **(617) 482-1477**	A coalition of citizens, consumer organizations, environmental groups, and others who are dedicated to implementing citizen-based preventive solutions to toxic and environmental problems.

Table 11. Private and Nonprofit Organizations (continued)

ORGANIZATION	DESCRIPTION OF SERVICES
National Wildlife Federation Environmental Quality Division 1400 16th Street, NW Washington, DC 20036 **(202) 797-6800**	A nonprofit organization that develops education programs, publications, and research activities to promote the wise use of national resources.
Sierra Club 730 Polk Street San Francisco, CA 94109 **(415) 776-2211**	A club organized to help members and the public understand environmental problems and their risks and solutions. Publishes the Sierra Club *Hazardous Materials/Water Resources* Newsletter for volunteer activists to communicate with each other about resources, research, and activities.
Working Group on Community Right-to-Know 218 D Street, SE Washington, DC 20003 **(202) 544-2600**	A coalition of public interest and environmental groups that provides information on the Emergency Planning and Community Right-to-Know Act. The coalition compiles documents on Title III for which they request donations to cover the cost of copying and mailing.

Table 12. Printed Information on Hazardous Substances

TITLE AND DESCRIPTION	WHERE TO WRITE OR CALL
EPA—An Overview	
Environmental Progress and Challenges: EPA's Update, EPA, 1988, EPA-230-07-88-033, 140 pages Provides an overview of environmental problems in the United States and the steps being taken by EPA and states and local governments to address these issues.	Public Information Center PM-211B U.S. Environmental Protection Agency 401 M Street, SW Washington, DC 20460 (202) 382-2080
Outdoor Air	
Trends in the Quality of the Nation's Air, EPA, 1988, OPA-87-019, 19 pages Contains a general summary of outdoor air quality with data on six primary air pollutants.	Public Information Center PM-211B U.S. Environmental Protection Agency 401 M Street, SW Washington, DC 20460 (202) 382-2080
Outdoor Water	
America's Wetlands—Our Vital Link Between Land and Water, EPA, 1988, OPA-87-016, 10 pages Provides a basic geographical description of wetlands, their importance, and statistics on how they are now being threatened.	Public Information Center PM-211B U.S. Environmental Protection Agency 401 M Street, SW Washington, DC 20460 (202) 382-2080
Drinking Water	
Lead and Your Drinking Water, EPA, 1987, OPA-87-006, 7 pages Gives a comprehensive overview of how lead gets into drinking water, information on testing, and ways to reduce your risk.	Public Information Center PM-211B U.S. Environmental Protection Agency 401 M Street, SW Washington, DC 20460 (202) 382-2080
Health Advisory Summaries, EPA, Office of Water, 1989, about 2 pages for each summary, available for 110 drinking water contaminants Provides information on health effects of pesticides and suggests actions to take to ensure a safe drinking water supply. Health advisory information has been prepared for substances that have the potential for reaching drinking water supplies.	Safe Drinking Water Hotline U.S. Environmental Protection Agency OS-305 401 M Street, SW Waterside Mall Washington, DC 20460 1-800-426-4791 In Washington, DC and Alaska (202) 382-5533

Table 12. Printed Information on Hazardous Substances (continued)

TITLE AND DESCRIPTION	WHERE TO WRITE OR CALL
Hazardous Waste Cleanup	
The New Superfund: What It is, How It Works, EPA, 1987, 10 pages Gives a detailed description of the Superfund law, its provisions for cleaning up hazardous waste sites, and how individual communities are involved in the process.	Public Information Center PM-211B U.S. Environmental Protection Agency 401 M Street, SW Washington, DC 20460 (202) 382-2080
Waste Management	
The Solid Waste Dilemma: An Agenda for Action, EPA, 1989, EPA/530-SW-89-019, 70 pages Offers a concrete strategy for action by EPA, state and local governments, industry, and citizens for improving the nation's management of municipal solid waste.	RCRA/Superfund Hotline OSW/OPMS Hotline U.S. Environmental Protection Agency OS-305 401 M Street, SW Washington, DC 20460 1-800-424-9346 In Washington, DC: (202) 382-3000
Waste Minimization: Environmental Quality with Economic Benefits, EPA, 1987, EPA/530-SW-87-026, 26 pages Focuses on EPA's waste minimization program under the 1984 RCRA amendments. Also describes general waste minimization practices and lists federal and state offices that can assist in generating, initiating, or expanding their programs.	RCRA/Superfund Hotline OSW/OPMS Hotline U.S. Environmental Protection Agency OS-305 401 M Street, SW Washington, DC 20460 1-800-424-9346 In Washington, DC: (202) 382-3000
A Survey of Household Hazardous Wastes and Related Collection Programs, EPA, 1986, EPA-530-SW-86-038, PB 87-108072, 128 pages Summarizes the results of a study that addressed the quantities of household hazardous wastes in the municipal waste stream and the impacts of household hazardous wastes on homeowners and the environment. Also provides information on collection programs conducted at state and local levels and the benefits and problems associated with these programs.	RCRA/Superfund Hotline OSW/OPMS Hotline U.S. Environmental Protection Agency OS-305 401 M Street, SW Washington, DC 20460 1-800-424-9346 In Washington, DC: (202) 382-3000

Table 12. Printed Information on Hazardous Substances (continued)

TITLE AND DESCRIPTION	WHERE TO WRITE OR CALL
Emergency Planning and Community Right-to-Know Act—Title III	
Chemicals in Your Community: A Guide to the Emergency Planning and Community Right-to-Know Act, EPA, OSWER-88-002, 1988, 36 pages Describes the EPCRA Act passed by Congress, how it affects various groups, and what rights each group has in terms of getting information about hazardous substances in its area.	Emergency Planning and Community Right-to-Know Information U.S. Environmental Protection Agency OS-120 401 M Street, SW Washington, DC 20460
Community Right-to-Know and Small Business, EPA, 1988, OSWER-88-005, 23 pages Provides information for small businesses to help them comply with the Community Right-to-Know Act.	Emergency Planning and Community Right-to-Know Information U.S. Environmental Protection Agency OS-120 401 M Street, SW Washington, DC 20460
It's Not Over in October: A Guide for Local Emergency Planning Committees, EPA/FEMA/CMA and Working Group on Community Right-to-Know, 1988, OSWER-88-004, 27 pages Provides information for the Local Emergency Planning Committees on implementing Title III and on creative solutions to problems that may arise.	Emergency Planning and Community Right-to-Know Information U.S. Environmental Protection Agency OS-120 401 M Street, SW Washington, DC 20460
Hazardous Materials Emergency Planning Guide, U.S. EPA, 1987 (NRT-1) Provides information to assist communities in planning for hazardous materials incidents. This guide outlines how to develop planning teams and hazardous materials emergency plans.	Hazmat Planning Guide (NRT-1) U.S. Environmental Protection Agency OS-120 401 M Street, SW Washington, DC 20460
Technical Guidance for Hazards Analysis: Emergency Planning for Extremely Hazardous Substances, EPA, 1987, 186 pages This guidebook supplements the *Hazardous Materials Emergency Planning Guide* by providing technical assistance to LEPC to assess the lethal hazards related to potential airborne releases of extremely hazardous substances.	Emergency Planning and Community Right-to-Know Information U.S. Environmental Protection Agency OS-120 401 M Street, SW Washington, DC 20460

Table 12. Printed Information on Hazardous Substances (continued)

TITLE AND DESCRIPTION	WHERE TO WRITE OR CALL
Emergency Planning and Community Right-to-Know Act—Title III (cont'd)	
The Community Plume, a publication for the members of America's Local Emergency Planning Committees, Environmental Policy Institute ($10 donation) Provides news and information to Local Emergency Planning Committees and other emergency management personnel about incidents involving toxic substances and other aspects of complying with Title III.	Friends of the Earth 218 D Street, SE Washington, DC 20003 (202) 544-2600
Chemical Risk Communication—Preparing for Community Interest in Chemical Release Data, American Chemical Society, 1988, 28 pages Presents a basic explanation of risk assessment and risk communication that can be used when responding to public questions about chemical releases. This booklet is written for public information personnel in the chemical industry and local leaders.	American Chemical Society Department of Government Relations and Science Policy 1155 16th Street, NW Washington, DC 20036 (202) 872-4395, (202) 872-4391
Layperson's Guide to Reading MSDSs, Massachusetts Department of Environmental Quality, 4 pages Explains how to interpret Material Safety Data Sheets (MSDSs). MSDSs are the fact sheets on health effects and treatment information on specific chemicals that are prepared by manufacturers and must accompany certain chemicals under Title III requirements.	Massachusetts Department of Environmental Quality 1 Winter Street Boston, MA 02108 (617) 292-5993
Reducing the Risk of Chemical Disaster: A Citizen's Guide, National Wildlife Federation, 1989, 85 pages ($7 donation) Explains different elements of gathering information and using it for emergency planning and discusses barriers to effective planning.	National Wildlife Federation Environmental Quality Division 1400 16th Street, NW Washington, DC 20036 (202) 797-6800
Using Community Right-to-Know: A Guide to a New Federal Law, 1988, OMB Watch, 72 pages ($25 for businesses and national organizations, $5 for communities and individuals) Presents information for citizens on understanding the Emergency Planning and Community Right-to-Know Law and on the different types of information available.	OMB Watch 1731 Connecticut Avenue, NW Washington, DC 20009 (202) 234-8494

Table 12. Printed Information on Hazardous Substances (continued)

TITLE AND DESCRIPTION	WHERE TO WRITE OR CALL
Emergency Planning and Community Right-to-Know Act—Title III (cont'd)	
Citizens Clearinghouse for Hazardous Wastes Newsletter Contains a list of presentations and publications maintained by the Citizens Clearinghouse.	Citizens Clearinghouse for Hazardous Wastes Box 926 Arlington, VA 22216 (703) 276-7070
Hazardous Substance Fact Sheet Provides summaries of available information on the health effects of certain chemicals based on potential exposures and provides information on ways to reduce exposure.	TSCA Assistance Information Service U.S. Environmental Protection Agency TS-799 401 M Street, SW Washington, DC 20460 (202) 554-1404
Title III List of Lists, EPA, 1988, EPA-560/4-88-003 Lists the chemicals subject to reporting under Title III of SARA. The document lists the extremely hazardous substances with their threshold planning quantities, the CERCLA hazardous substances with their reportable quantities, the Section 313 toxic chemicals, and the RCRA hazardous wastes.	Emergency Planning and Community Right-to-Know Information U.S. Environmental Protection Agency OS-120 401 M Street, SW Washington, DC 20460
Chemical Advisories, EPA, 1984-1986 These fact sheets provide information to manufacturers, employees, and homeowners of the hazards from used motor oil and other hazardous substances such as 2-nitropropane, nitrosamines, *p*-tert-butyl benzoic acid, 4,4'-methylene bis(2-chloroaniline), and toluenediamines.	TSCA Assistance Information Service U.S. Environmental Protection Agency TS-799 401 M Street, SW Washington, DC 20460 (202) 554-1404
Publicly Available Title III Documents (A Bibliography), EPA, 1989 Contains title, availability, and a summary of documents concerning Title III	Emergency Planning and Community Right-to-Know Information U.S. Environmental Protection Agency OS-120 401 M Street, SW Washington, DC 20460
Toxic and Hazardous Chemicals, Title III and Communities, EPA 56-1-89-002, 1989 This outreach manual is written for community groups.	Office of Pesticides and Toxic Substances U.S. Environmental Protection Agency TS-799 401 M Street, SW Washington, DC 20460

Table 12. Printed Information on Hazardous Substances (continued)

TITLE AND DESCRIPTION	WHERE TO WRITE OR CALL
Indoor Air	
The Inside Story: A Guide to Indoor Air Quality, EPA and Consumer Product Safety Commission, 1988, EPA/400/1-88/004, 32 pages Provides information on sources of indoor air pollutants, as well as ways to mitigate or eliminate the problems; discusses indoor air quality in the workplace; contains good list of where to obtain additional information.	Public Information Center PM-211B U.S. Environmental Protection Agency 401 M Street, SW Washington, DC 20460 (202) 382-2080
Indoor Air—Asbestos	
Asbestos in the Home, EPA and Consumer Product Safety Commission, 1982, 12 pages Describes what asbestos is, where it may be found in the home, and possible health risks of exposure to asbestos; also describes proper procedures to use for asbestos removal.	"Asbestos in the Home" Washington, DC 20207
ABCs of Asbestos, EPA, the National Educational Association, and the National Parent Teacher Association, June 1989. Describes how to avoid asbestos exposure in schools.	Office of Pesticides and Toxic Substances U.S. Environmental Protection Agency TS-799 401 M Street, SW Washington, DC 20460
Indoor Air—Radon	
A Citizen's Guide to Radon, EPA and U.S. Department of Health and Human Services, 1990, 14 pages Discusses general information on what radon is, how to test your home, and how radon exposure increases the risk of lung cancer.	Public Information Center PM-211B U.S. Environmental Protection Agency 401 M Street, SW Washington, DC 20460 (202) 382-2080
Radon Reduction Methods: A Homeowner's Guide, EPA, 1986, 24 pages Provides information on various methods for reducing radon exposure in the home.	Public Information Center PM-211B U.S. Environmental Protection Agency 401 M Street, SW Washington, DC 20460 (202) 382-2080
Radon Reduction Techniques in Schools, EPA, October 1989 Provides information on various methods used to reduce radon exposure in schools.	Public Information Center PM-211B U.S. Environmental Protection Agency 401 M Street, SW Washington, DC 20460 (202) 382-2080

Table 12. Printed Information on Hazardous Substances (continued)

TITLE AND DESCRIPTION	WHERE TO WRITE OR CALL
Pesticides	
A Citizen's Guide to Pesticides, EPA, 1989, OPA-008-89, 24 pages Contains information on pesticide options, handling pesticides, determining the correct dosage level and storage and disposal methods, choosing a pest control company, reducing your exposure to pesticides, and helping someone who's been poisoned.	Public Information Center PM-211B U.S. Environmental Protection Agency 401 M Street, SW Washington, DC 20460 (202) 382-2080
Pesticides in Drinking-Water Wells, EPA, 1989, 12 pages Contains information on how pesticides are regulated, how pesticides get into drinking-water wells, the health concerns related to pesticides in drinking-water wells and EPA's advisory guidance, how to determine if your well water is safe to drink, testing methods, and actions to take.	Public Information Center PM-211B U.S. Environmental Protection Agency 401 M Street, SW Washington, DC 20460 (202) 382-2080
Pesticide Fact Sheets Describes the chemical composition, use patterns and formulations, scientific findings (on health effects), regulatory positions and rationale, labeling statements, summary of data gaps, and an EPA contact person for each of 206 pesticides.	Information about: Office of Pesticide Programs Document Management Section (H7502C) ISB/PMSD U.S. Environmental Protection Agency 401 M Street, SW Washington, DC 20460 (202) 557-4474 Order from: National Technical Information Service Attn. Order Desk 5285 Port Royal Road Springfield, VA 22161 (703) 487-4650
Health Advisory Summaries, EPA Office of Water, 1989 (2 pages each) Provides information on health effects of pesticides and suggests actions to take to ensure a safe drinking water supply. Health advisory information has been prepared for substances that have the potential for reaching drinking water supplies.	Safe Drinking Water Hotline U.S. Environmental Protection Agency OS-120 401 M Street, SW Washington, DC 20460 1-800-426-4791 In Washington, DC and Alaska (202) 382-5533

Table 12. Printed Information on Hazardous Substances (continued)

TITLE AND DESCRIPTION	WHERE TO WRITE OR CALL
Food	
Diet, Nutrition, and Cancer Prevention: The Good News, U.S. Department of Health and Human Services, 1986, 15 pages Provides general recommendations and information on food choices that reduce cancer risk and promote better health; good listings of high-fiber and low-fat foods.	Office of Cancer Communications National Cancer Institute Bethesda, MD 20892 1-800-4-CANCER On Oahu, Hawaii 524-1234 (neighbor islands call collect)
Diet, Nutrition, and Cancer Prevention: A Guide to Food Choices, U.S. Department of Health and Human Services, 1987, 39 pages Presents comprehensive information on healthy diet and nutrition; contains information on low-fat and high-fiber goods, shopping tips, recipes, and explanations of how to calculate the percentage of fat in your diet.	Office of Cancer Communications National Cancer Institute Bethesda, MD 20892 1-800-4-CANCER On Oahu, Hawaii 524-1234 (neighbor islands call collect)
Diet and Health: Implications for Reducing Chronic Disease Risk, National Research Council, 1989, 748 pages ($49.95)	National Academy Press 2101 Constitution Ave., NW Washington, DC 20418 (202) 334-3313 Send prepayment
General Sources of Health Effects Information	
Everything Doesn't Cause Cancer, U.S. Department of Health and Human Services, 1987, 16 pages Answers common questions about the causes and prevention of cancer and about the laboratory animal tests that can identify cancer-causing substances.	Office of Cancer Communications National Cancer Institute Bethesda, MD 20892 1-800-4-CANCER On Oahu, Hawaii 524-1234 (neighbor islands call collect)
Good News, Better News, Best News—Cancer Prevention, U.S. Department of Health and Human Services, undated, 22 pages Describes various factors that increase the risk of cancer and simple things that you can do to lower your risk.	Office of Cancer Communications National Cancer Institute Bethesda, MD 20892 1-800-4-CANCER On Oahu, Hawaii 524-1234 (neighbor islands call collect)

Table 12. Printed Information on Hazardous Substances (continued)

TITLE AND DESCRIPTION	WHERE TO WRITE OR CALL
General Sources of Health Effects Information (cont'd)	
Good News for Blacks About Cancer, U.S. Department of Health and Human Services, 1987, 8 pages Describes preventive steps that blacks can take to reduce their risk of various forms of cancer.	Office of Cancer Communications National Cancer Institute Bethesda, MD 20892 1-800-4-CANCER On Oahu, Hawaii 524-1234 (neighbor islands call collect)
Toxicological Profiles, ATSDR Provides profiles for the hazardous substances most commonly found at Superfund sites. Each profile characterizes the toxicological and health effects information for the substance and identifies and reviews key literature that describes the substances toxicological properties. Written for health professionals and for the public.	Information about: Agency for Toxic Substances and Disease Registry (F-38) U.S. Public Health Service Department of Health and Human Services Caffilene Allen, Public Relations 1600 Clifton Rd., NE Atlanta, GA 30333 (404) 488-4630 Order from: National Technical Information Service (NTIS) Attn: Order Desk 5285 Port Royal Road Springfield, VA 22161 (703) 487-4650

Publication list is current as of November 1989.

Table 13. Computerized Information on Hazardous Substances

TITLE AND DESCRIPTION	WHERE TO WRITE OR CALL
Toxicology Data Network System (TOXNET), Bethesda, MD, National Library of Medicine Available on line through a personal computer and modem connection, or in a medical library. The database provides citations, and often abstracts, for journal articles and monographs. TOXNET contains four databases: • Hazardous Substances Data Bank (HSDB), which focuses on toxicology of potentially hazardous chemicals; • Registry of Toxic Effects of Chemical Substances (RTECS), which contains information on the toxic effects of some 90,000 chemicals; • Chemical Carcinogenesis Research Information System (CCRIS), which contains information on carcinogenicity of substances; • Toxics Release Inventory (TRI), which contains information on the annual estimated releases of toxic chemicals in the environment. To access these files by personal computer, you must receive a MEDLARS account by calling the National Library of Medicine.	National Library of Medicine (NLM) 8600 Rockville Pike Bethesda, MD 20894 1-800-638-8480 or (301) 496-6193
The Integrated Risk Information System (IRIS) An electronic on-line database that provides risk assessment and regulatory information on chemical substances of environmental concern. IRIS provides reference citations and EPA contacts for finding further information.	IRIS can be purchased from either Dialcom Inc. at (301) 770-4280 or Stu Wiseman National Technical Information Service 5285 Port Royal Road, R32 Springfield, VA 22161 (703) 487-4807 Also, state and local health departments can contact The Public Health Foundation, which provides IRIS through the Public Health Network. Contact Paul Johnson at (202) 898-5600 for more information. For other questions about IRIS contact: IRIS User Support U.S. Environmental Protection Agency Office of Research and Development Environmental Criteria and Assessment Office, MS-114 Cincinnati, OH 45286 (513) 569-7254

Publication list is current as of November 1989.

GLOSSARY

GLOSSARY

Aflatoxin—A mycotoxin produced by molds that grow on nuts and seeds, especially corn or oil-seed meals. Humans exposed may have an increased risk of liver cancer.

Air Quality Standards—The level of air pollutants prescribed by regulations that may not be exceeded during a specified time in a defined area.

Alar—Trade name for daminozide, a pesticide once used to make apples redder, firmer, and less likely to drop off trees before growers were ready to pick them. It also was used to a lesser extent on peanuts, tart cherries, concord grapes, and other fruits. Humans exposed to Alar residues may have an increased risk of cancer.

Ammonia—A pungent colorless gaseous alkaline compound of nitrogen and hydrogen that is very soluble in water. Ammonia is a household cleaning product, and ammonia compounds are used as fertilizers.

Arsenic—A solid, brittle, poisonous element that is used to harden lead alloys that end up as bullets, bearings, battery grids, and cable sheathings. Large dose causes acute poisoning leading to convulsions and death. Chronic exposure to small amounts may cause a number of health effects including cancer.

Asbestos—A mineral fiber that can pollute air or water and cause cancer or asbestosis when inhaled. In the past, was used in manufacturing, construction, and fireproof fabrics. EPA has banned or severely restricted its use.

Ban—Legal prohibition.

Benzene—A colorless, volatile, flammable, toxic liquid used in organic synthesis, as a solvent, and as a motor fuel. Also given off by new carpets. Humans exposed have an increased risk of leukemia, other blood disorders, and other cancers.

By-product—Material, other than the principal product, that is generated as a consequence of an industrial process.

CAA—Clean Air Act—provides the basic legal authority for the nation's air pollution control programs and is designed to enhance the quality of air resources.

Cadmium—A bluish white, toxic metallic element used in electroplating, alloys, batteries, pigments (dyes), and fungicides.

Cancer—A tumor of potentially unlimited growth that can expand locally and to other organs.

Carbon—A nonmetallic element often found as a constituent of coal, petroleum, and asphalt; limestone and other carbonates; and organic compounds. Can be obtained artificially in varying degrees of purity.

Carbon tetrachloride—A colorless nonflammable toxic liquid that has an odor resembling that of chloroform. Has been used as a solvent for greases, as a dry-cleaning agent, and in fire extinguishers. In 1970, EPA banned the use of carbon tetrachloride in consumer products.

Carcinogen—A substance or agent capable of causing cancer.

CERCLA—Comprehensive Environmental Response, Compensation, and Liability Act—A federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act. The acts created a special tax that goes into a trust fund, commonly known as *Superfund*, to investigate and clean up abandoned or uncontrolled hazardous waste sites. Under Superfund, EPA can either pay for site cleanup when parties responsible for the contamination cannot be located or are unwilling or unable to perform the work or can take legal action to force parties responsible for site contamination to clean up the site or pay back the federal government for the cost of the cleanup.

Chlorine—A heavy greenish-yellow gas of pungent odor used in its liquid form as a bleach, oxidizing agent, and disinfectant in water purification.

Chloroform—A colorless, volatile, toxic liquid with an ether odor used especially as a solvent.

Contaminant—Any physical, chemical, biological, or radiological substance or matter that has an adverse effect on air, water, or soil.

CPSC—Consumer Product Safety Commission—Protects consumers through proper labeling of products.

CWA—Clean Water Act—the basic authority for water pollution control programs; goal is to make national waters fishable and swimmable.

Cyanide—Found as a highly toxic compound (such as potassium cyanide) with other elements. Hydrogen cyanide is used as a fumigant for killing insects and rodents; sodium cyanide is used to extract silver and gold from ore.

DDT—The first chlorinated hydrocarbon insecticide (chemical name: Dichloro-Diphenyl-Trichloromethane). It has a half-life of 15 years and can collect in fatty tissues of certain animals. EPA banned registration and interstate sale of DDT for virtually all but emergency uses in the United States in 1972 because of its persistence in the environment and accumulation in the food chain.

DHHS—Department of Health and Human Services.

DOE—Department of Energy—Governs the interstate compact system of low-level radioactive wastes.

DOT—Department of Transportation—Regulates hazardous substances while they are in transit.

Ecosystem—Any physical area defined by an interrelated group of plants and animals, including humans.

Emergency Planning and Community Right-to-Know Act (SARA Title III)—Legislation to set up programs for communicating chemical information to local agencies or the public, as established by the Superfund Amendments and Reauthorization Act of 1986.

Emission—Pollution discharged into the atmosphere from smokestacks, other vents, and surface areas of commercial or industrial facilities; from residential chimneys; and from motor vehicle, locomotive, and aircraft exhausts.

Environment—The sum of all external conditions affecting the life, development, and survival of an organism.

EPA—The U.S. Environmental Protection Agency, established in 1970 by Presidential Executive Order, bringing together parts of various government agencies involved with pollution control.

Exposure—The amount of pollutant present in an environment that may represent a potential health threat to the living organisms in that environment.

FDA—Food and Drug Administration—Monitors prescription drug advertising and labeling; also develops standards and regulations on the consumption, quality, and safety of cosmetics and foods, except meat and poultry products.

FD&C Act—Food, Drug, and Cosmetic Act.

FEMA—Federal Emergency Management Administration.

FIFRA—Federal Insecticide, Fungicide, and Rodenticide Act, which provides the basis for regulations governing the registration, distribution, sale, and use of pesticides in the United States.

Formaldehyde—A colorless, pungent, irritating gas, used chiefly as a disinfectant and preservative and in synthesizing other compounds and resins. Used in pressed wood products (furniture, building products).

Hazard—The inherent characteristic of a substance to cause harm.

Hazardous chemical—A chemical for which there is evidence that acute or chronic health effects may occur in exposed organisms.

Hazardous substance—Any material that poses a threat to human health and/or the environment.

Hazardous waste—By-product of society that can pose a substantial or potential hazard to human health or the environment when improperly managed. Possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity), or appears on special EPA lists.

Insecticide—An agent that kills insects.

L—Liter—a metric unit of capacity equal to the volume of 1 kilogram of water at 4 degrees Celcius (°C) and at standard atmospheric pressure of 760 millimeters of mercury; slightly more than 1 quart in volume.

Lead—A heavy metal that is hazardous to health if breathed or swallowed. The use of lead in gasoline, paints, and plumbing compounds has been sharply restricted or eliminated by federal laws and regulations.

Legislation—The exercise of the power and function of making rules (as laws) that have the force of authority by virtue of their promulgation by an official organ of a state or other organization.

LEPC—Local Emergency Planning Committee. A committee appointed by the State Emergency Response Commission, as required by SARA Title III, to formulate a comprehensive emergency plan for its jurisdiction.

LOC—Level of Concern. The concentration in air of an extremely hazardous substance above which there may be serious immediate health effects to anyone exposed to it for short periods of time.

mcg/m^3—Micrograms per cubic meter.

Methylene chloride—A nonflammable liquid used especially as a solvent, paint remover, and refrigerant. Released by some factories into the air. Humans exposed may have an increased risk of cancer.

Microorganism—An organism of microscopic size.

NPDES—National Pollutant Discharge Elimination System. A provision of the Clean Water Act that prohibits discharge of pollutants into waters of the United States unless a special permit is issued by EPA, a state, or (where delegated) a tribal government on an Indian reservation.

NRC—Nuclear Regulatory Commission—Licenses and regulates radioactive materials users and low-level radioactive waste disposal facilities.

NRDC—Natural Resources Defense Council.

OSHA—Occupational Safety and Health Administration—Agency under U.S. Department of Labor that administers and enforces the adoption and promulgation of occupational standards, regulations, and safety and health rules for the protection of most employees in the nation's workplaces.

Oxide—A compound of oxygen with a chemical.

Parathion—An extremely toxic insecticide.

Permit—An authorization, license, or equivalent control document issued by EPA or an approved state agency to implement the requirements of an environmental regulation, e.g., a permit to operate a wastewater treatment plant or to operate a facility that may generate harmful emissions.

Pesticide—General term for insecticides, herbicides, and fungicides. Insecticides are any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest. Herbicides are any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant. Fungicides are used to control plant diseases. Pesticides can accumulate in the food chain and/or contaminate the environment.

Pollution—Generally, the presence of matter or energy whose nature, location, or quantity produces undesired environmental effects. Under the Clean Water Act, for example, the term is defined as the man-made or man-induced alteration of the physical, biological, and radiological integrity of water.

Radon—A colorless, naturally occurring, radioactive, inert gaseous element formed by radioactive decay of radium atoms in soil or rocks. Long-term exposure can cause lung cancer.

RCRA—Resource Conservation and Recovery Act—A federal law that established a regulatory system to track hazardous substances from the time of generation to disposal. The law requires safe and secure procedures to be used in treating, transporting, storing, and disposing of hazardous substances. RCRA is designed to prevent new, uncontrolled hazardous waste sites.

Remedial action—The actual construction or implementation phase of a Superfund site cleanup that follows remedial design.

Risk—Probability or chance of loss or injury; a dangerous element or factor.

Salmonella—Any of the genus of bacteria that are pathogenic for man and other warm-blooded animals and cause food poisoning, gastrointestinal inflammation, or diseases of the genital tract.

Salmonellosis—Infection with or disease caused by *Salmonella*.

SARA—Superfund Amendments and Reauthorization Act of 1986.

SARA Title III—See Title III.

SDWA—Safe Drinking Water Act.

SERC—State Emergency Response Commission. Commission appointed by each state governor according to the requirements of SARA Title III. The SERCs designate emergency planning districts, appoint local emergency planning committees (LEPCs), and supervise and coordinate LEPC activities.

Solvent—A liquid substance capable of dissolving or dispersing one or more other substance(s).

Substance—Physical material from which something is made or which has discrete existence; matter of particular or definite chemical constitution.

Superfund—The program operated under the legislative authority of CERCLA and SARA that funds and carries out EPA's solid waste emergency and long-term removal remedial activities. These activities include establishing the National Priorities List, investigating sites for inclusion on the list, determining their priority level on the list, and conducting and/or supervising the ultimately determined cleanup and other remedial actions.

Title III—Third part of SARA, also known as the Emergency Planning and Community Right-to-Know Act of 1986. This Act concerns emergency planning, emergency notification, community right-to-know reporting, and toxic chemical release reporting; it requires that detailed information about the nature of hazardous substances be made available to the public; it provides stiff penalties for companies that do not comply; and it also allows citizens to

file lawsuits against companies and government agencies to force them to obey the law.

TRI—Toxics Release Inventory. A national inventory of annual toxic chemical releases from manufacturing facilities.

TSCA—Toxic Substances Control Act.

Xylene—Any of three toxic, flammable substances related to benzene and obtained from wood tar, coal tar, or petroleum distillates; also a mixture of xylenes and ethyl benzene used chiefly as a solvent.