

## MAKING NEWS

### ■ That Dirty Killer Air

Particulates (smoke, soot and invisible aerosols) at levels commonly found in U.S. cities may be killing 64,000 Americans a year, reports the Natural Resources Defense Council (NRDC) in an analysis of premature deaths in 239 U.S. metropolitan areas.

A British government report this year found that fine particulates from motor vehicle exhaust would have to be cut by at least two-thirds in U.K. cities in order to reduce higher-than-average death rates for heart and lung diseases and a rise in the prevalence of asthma.

Children age 8 to 12 in communities with highest levels of acid aerosol particulates were "significantly more likely" to suffer bronchitis, in a Harvard study of 13,369 U.S. and Canadian children; the study also found that long-term exposure to these fine particulates "may have a deleterious effect on lung growth, development, and function." NRDC says that tightened National Ambient Air Quality Standards for particulates could prolong 56,238 lives a year. (Reported in NRDC's "Breath-taking" report, *Nature* and *Environmental Health Perspectives*, May 1996.)

### ■ Ozone Watch

Analyses of ground-level air masses by the National Oceanic and Atmospheric Administration have shown reduced concentrations of some ozone-devouring chlorinated chemicals. However, atmospheric levels of CFC-12, methyl bromide and halons continue to rise; the hole in the ozone layer above Antarctica measured in 1995 was twice as large as the year before; and record ozone depletion occurred above Northern Europe. Increased UVB radiation may be behind a die-off of baby Antarctic penguins. (Reported in *The Nation*, 7/8/96.)

—MP



## TOXINS On Tap

BY WENDY GORDON, M.S.

I remember, as a child, when you called someone a drip she would respond, "A drip is a drop, a drop is water, water is nature, thank you for the very nice compliment." She was right. Over two-thirds of a person's body mass consists of water. We are part of a vast natural cycle with no beginning or end, including the oceans from which fresh water evaporates, filling up the clouds. Four trillion gallons of rain fall on the U.S. every day, replenishing rivers and lakes and running back to the sea, or percolating down through the soil to recharge underground reservoirs called aquifers.

### Drinking Water: A Vast Yet Limited Resource

This sheer abundance can hide the fact that the pressures of economic development and population growth are straining the quality and the quantity of water available for drinking. Each day, homeowners and industrial and agricultural users withdraw 300 billion gallons of fresh water, using it for everything from flushing the toilet and washing the car to irrigating crops. Sooner or later this used water finds a path back into a river, lake or groundwater supply, along with whatever contaminants it has picked up along the way. It may come from a mountain spring or a backyard well, but regardless of its source, your tap water may contain some surprises that you would not want to drink.

Making sure that the water we drink is pure is one of the most important steps we can take to protect our families' health. More than this, water is our shared resource—a global cycle—that we must protect for the common good.

### Types of Pollutants Found in Drinking Water

Even a pristine mountain stream can contain pathogens carried by livestock or wild animals, or toxic minerals that leach naturally from the ground. However, the most common sources of the drinking water contaminants listed on the next page include human sewage, industrial waste, pesticide runoff, backyard dumping and leaching from municipal landfills. Another area of grave concern is the leaking of pollutants from underground storage tanks, which hold everything from gasoline and heating oil to chemical and nuclear waste. According to recent U.S. Environmental Protection Agency (EPA) estimates, up to one-quarter of the 3-10 million underground storage tanks in the U.S. are likely to be leaking.

Continued on Page 2

Following is a list of selected contaminants and the effects of exposure through drinking water:



◆ **Pathogens** are microorganisms—bacteria, viruses, and protozoa—that enter drinking water from human sewage or animal feces. They cause diseases ranging from dysentery and hepatitis to Legionnaire's disease. Pathogens such as the bacteria *E. coli* in water sicken an estimated 940,000 people a year, kill several hundred and can cause miscarriages. Pathogens contaminate water through failure by water companies and government agencies to protect watersheds, to filter or adequately disinfect water or guard against treatment plant or animal feedlot overflow. At present the most effective disinfectant is chlorine.

Chlorine, however, does not kill two protozoa, *Giardia lamblia* and *Cryptosporidium parvum*, which can result in chronic illness or death to AIDS patients and others with weakened immune systems. Find out if your water system monitors for protozoa (see "Q&A," page 6). To be safe, boil drinking water or use a tap water filter that removes particles of 1 micron or less. Bottled water labeled "micro-filtered" may not be protozoa-proof.

◆ **Inorganic chemicals and toxic metals:**

**LEAD.** According to the EPA, more than 800 U.S. cities have water that exceeds the EPA's "action level" for lead. Over half of U.S. cities still use lead-lined pipes or copper pipes with lead soldering, which are the primary sources of lead in drinking water. Even at low intake levels, lead can cause fetal damage and delayed neurological and physical development in children, and high blood pressure, heart attacks, kidney damage, reproductive dysfunction and strokes in adults.

**VOLATILE ORGANIC COMPOUNDS (VOCs)** are a special class of synthetic organic chemicals which include solvents like benzene, carbon tetrachloride, trichloroethylene, p-dichlorobenzene, and the building block of PVC plastic, vinyl chloride. Many VOCs are known or suspected carcinogens and can also affect the nervous system. VOCs evaporate readily, and thus can be inhaled while you shower.

**ARSENIC**, a well-known poison, is also classified as a known human carcinogen by the EPA. It can cross the placenta and accumulate in the body. Arsenic enters the water supply from smelting of many ores, such as copper and iron, and through its use as a wood preservative. Three hundred thousand people in the U.S. may be drinking water containing higher than the EPA's maximum allowable limit of 50 parts per billion of arsenic. High levels of intake can lead to abnormal fetal development and cardiovascular disease. The Northwest and Southwest have the lowest concentrations of arsenic in water.

**CADMIUM**, like lead, can be leached out of pipes, especially by soft, acidic water. Used for electroplating, in paint and pigments, and in the manufacture of PVC as well as nickel-cadmium batteries, cadmium enters the water supply from leaking landfills and fertilizer runoff (where it is a trace contaminant). Intake of cadmium, which accumulates in the body over time, is associated with hypertension and kidney damage.

◆ **Non-metallic inorganics** include asbestos from cement water mains; cyanide from insecticides, metal refining, and pigment and plastic manufacture; and nitrates. Water contaminated with nitrates from nitrogen fertilizers is most common in farming areas, and can enter municipal watersheds through farm runoff. Infants who drink nitrate-tainted water can contract "blue-baby syndrome."

◆ **Synthetic organic chemicals (SOCs)** are man-made chemicals that contain carbon. SOC's in some drinking water include pesticides like atrazine and alachlor (both suspected carcinogens), notorious industrial chemicals like dioxins and PCBs, and plastic-related chemicals such as phthalates and styrene. A 1995 study by the Environmental Working Group in Washington, D.C. found that approximately 10.2 million people in the Midwest, 1.5 million in Louisiana and 2.4 million in the Chesapeake Bay region drink water contaminated with weed killers; as a result, EWG concludes, 3.5 million people face cancer risks 10 to 100 times higher than the federal benchmark.

◆ **Radioactive materials**, including

naturally occurring or manmade radionuclides like uranium, radium, radon and strontium (all carcinogenic), may be contaminating the drinking water of 50 million Americans.

◆ **Chlorine and its by-products.** Chlorine, an effective and currently necessary disinfectant, is added to all water supplies at treatment facilities to neutralize bacteria. Unfortunately, chlorine, reacting with organic chemicals left in the water by soil and decaying vegetation, also forms a group of chemicals called disinfection by-products (DBPs) or trihalomethanes (THMs). DBPs/THMs may be associated with 10,000 or more rectal and bladder cancers each year in the U.S., and are linked to pancreatic cancer as well. These chemicals may also cause major birth defects.

◆ **Fluoride** is naturally occurring in some waters, and is also added to water supplies to fight tooth decay. Too much fluoride can cause mottling of teeth. Since fluoride is removed from the body by the kidneys, people with kidney disease who drink lots of water with fluoride can accumulate fluoride in their bones producing skeletal fluorosis, which can eventually have a crippling effect. There is some suggestion that fluoride is correlated with increased rates of cancer, though the evidence is not clear. Local drinking water programs are required to announce to the public when the fluoride level reaches more than 2 ppm; at this level the possibility of moderate to severe dental mottling increases. There is much debate over whether the risks of fluoridation outweigh its benefits.



## What You Can Do

◆ **Find out what's in your water** (see "Q&A," page 6).

◆ **Filter and flush out contaminants.** The first water out of the faucet and pipes in the morning will have the highest lead levels because it may have been sitting in lead-containing faucets and pipes all night. Flush your lines by running water in the sink for a few minutes until the water cools, indicating it is coming from pipes outside the



house. You can use the flushed water on plants or for washing. Lead and other heavy metals, asbestos, microbes and SOCs can also be filtered out (see page 5).

◆ **Choose watershed protection, not bottled water.** Bottled water, and even filters, should be temporary measures at best. Whether your water is contaminated now or not, watershed protection is the only way we can ensure a healthy future supply. But for a variety of reasons, from media reports of tap water pollutants to health and fitness trends, many consumers have been turning increasingly to bottled water since the 1970s.

Bottled water sales in New York City doubled in just one decade, climbing from 5.2 to 10.4 gallons per person between 1985 and 1994. This trend continues despite the fact that bottled water is not necessarily of higher quality than public water supplies (see page 5).

## Water Is Our Shared Resource

The cheapest, most effective way to ensure clean drinking water for all of us is through protection at the source. Strong protection programs for watersheds, such as controls against animal feedlot runoff and sewage overflow, can virtually eliminate dangerous levels of bacteria and other pathogens.

To reduce DBPs/THMs and other contaminants, we need to support farming practices that prevent erosion, and screen out organic material before chlorination to prevent DBPs/THMs from forming, or use granular activated carbon filtration at the tap to remove those that have formed.

◆ **Write or call your congressional delegation** to support federal water-protection laws: the Safe Drinking Water Act, Clean Water Act and Farm Bill all have source protection provisions (call Congress at 800/962-3524). At the end of this month, for the first time since 1986, the Safe Drinking Water Act is likely to be strengthened, with incentives for states to protect drinking water sources. In addition, a new "right-to-know" provision will require municipal water systems to

announce the contaminants found in drinking water on consumers' water bills once a year. We can urge that federal grant programs help municipalities replace, upgrade, or improve crumbling asbestos-cement water mains, lead-coated service lines and leaking waste and sewage lines.

◆ **Speak to your city council.** Cities and towns with water supplies contaminated with industrial waste or pesticide runoff should install either granular activated carbon filtration or other advanced purification systems. An inexpensive ultraviolet light system that kills *E. coli*, typhoid and cholera will be available next year. Currently, less than 10 percent of large systems use these modern techniques, which could save the \$3.5 billion we spend each year on bottled water and home purification systems.

◆ **Join local and national environmental groups active in watershed protection** (see Resources, page 5).

◆ **Get involved in watershed protection initiatives as a consumer.** The National Geological Survey reports that there are over 22,000 watersheds in the U.S. Some very large municipal systems have made watershed protection their first line of defense and thus far have averted the need for advanced filtration or purification systems. In addition, according to the Institute for Agriculture and Trade Policy, there may be as many as 1,000 farmer-led watershed protection associations nationwide. Some are large, like the Agricultural Council of the Catskill/Delaware watershed which provides most of New York City's drinking water. Others are small, like the dozen farmers at Iosco Creek in Southwestern Minnesota, who are pioneering Netherlands-developed on-farm pollution "yardsticks," able to reduce nutrient run-off by 30 percent or more.

The farmers can't and don't want to do it alone, however. They need incentives, according to Dick Coombe of the Watershed Agriculture Council in Walton, New York. In watershed districts such as Roundout Valley, where Coombe farms, many farmers and foresters concerned with protecting their local water grow their products according to "best-management practices." These include feeding animals

## The Green Guide

ENVIRONMENTAL CHANGE BEGINS AT HOME

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grass rather than row crops, which tend to run off sediments and nutrients into the water supply; storing manure rather than spreading it in winter when it runs off with the snow melt in spring; or planting woodland buffer zones along stream banks. "But these practices are not cost-effective, and farmers are pressured to sell out to subdivisions," Coombe says. Watershed housing development and the accompanying rise in sewage have resulted in the need to filter waters from the Croton Reservoir System before they're piped to New York City. "If the Catskill/Delaware System has to be filtered, too, it'll cost eight to ten billion dollars," Coombe says.

As a consumer, you can help rural initiatives by buying sustainably-grown farm and forestry products cultivated within your watershed according to best-management practices. Seek these farmers out at open-air green markets and encourage your local supermarkets and stores to stock their products. You'll be forging an urban-rural partnership for water that's naturally pure. ◆

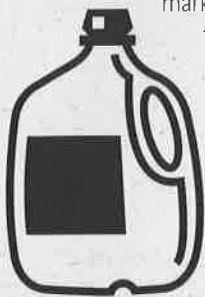
*Wendy Gordon, Co-founder and Executive Director of Mothers & Others, received her Master's degree in Environmental Health Sciences from Harvard School of Public Health. As a former staff scientist at the Natural Resources Defense Council she concentrated on safe drinking water issues.*

## WATER, FOR A PRICE

Most of us trust that the bottled water being marketed and sold to us is in fact purer than that which pours from the kitchen faucet. I recently spent \$2 for a 12-ounce bottle of water at the movie theater. Should I have invested the two bucks in licorice instead, and filled my cup from the water fountain? Probably. A 1991 analysis of 39 bottled waters by the University of Iowa found contaminants like nitrates (mostly from agricultural runoff) in 18 samples and trihalomethanes (THMs) in 11 samples, while others contained traces of arsenic and significant levels of bacteria. The study concluded that the bottled water was not significantly better or worse than the public drinking water in that state. And according to the International Bottled Water Association (IBWA), as much as 25 percent of water bottled in the U.S. is simply treated city water, and the purification treatments used are unregulated by the government. The bottled water industry currently takes in upwards of \$2.5 billion every year in the U.S.

Here's a quick look at the types of water being sold, and some questions you should ask when you're thinking of buying them:

- **Vendor water:** Dispensing machines, found most often outside the automatic doors of the supermarket, are usually hooked directly into the municipal water supply. The water is processed through a filter, distiller and/or disinfectant, and then dispensed into a container which you provide. Unlike bottled water, vending machine water is not currently regulated by the FDA. If you're going to buy your drinking water this way, be sure to find out from the machine itself, the vending company or supermarket manager what kinds of filtration are used (a combination of several would be ideal). Also ask how often the filter elements are serviced; if they're not changed often enough, built-up contaminants can flush into the water being dispensed.



- **Bottled water:** When researching bottled water companies that deliver in your area, get on the phone with them. You want to be sure that they stand behind any "pure and natural" claims. (One distributor may sell many different brands, and qualities, of water.) Request that a breakdown of both mineral and contamination

content be sent to you, and ask where the source(s) are, its history, how often and by whom the water is tested, and if it's certified by an independent organization like the National Sanitation Foundation International (NSF)—a nonprofit testing and certification organization. Quality water should be higher in trace minerals (like calcium and magnesium, necessary to good health), lower in pollutants (see cover story), and priced competitively.

Another concern regarding bottled water is known as "backwatering"—a practice by bottlers whereby water is imported from other sources (lakes, rivers, reservoirs, other springs, etc.) when the source supply cannot meet the demand. Ask the water company if they commingle water from other sources, and if they do, what those sources are.

### FDA's Standards for Bottled Water

Bottled water is regulated as a food product by the FDA. The main difference between tap and bottled water is the source; municipalities generally get their water supply from surface water, while about 75 percent of bottled water comes from confined underground sources. FDA labeling rules specify that "spring," "artesian," "well," and "mineral" waters are drawn from these underground sources, while "purified," "distilled," "deionized" and "reverse osmosis" only refer to the types of treatment the water—probably tap water—has undergone. The treatments are not regulated.

### It's Packaged in Plastic

Those reusable five-gallon plastic jugs that bulk water is delivered in, made from a type of plastic called polycarbonate, can leach bisphenol-A, particularly if exposed to high temperatures or caustic cleaners, a team of Stanford University School of Medicine researchers found in 1993. Bisphenol-A is a chemical that can emulate the female sex hormone estrogen in the body. And distilled water aggressively leaches toxins from non-glass containers. Further, bottled water can sit indefinitely before it is sold, as a shelf life has not been established for it by the FDA.

Two water companies which don't use plastic bottles are Mountain Valley Spring Water, which has been sourced from the same Arkansas artesian spring since 1871 and is sold in glass jugs, and High Birches Mountain Spring Water, a new company that packages its New Hampshire water in aseptic drink boxes. (Currently, High Birches is only available in a 12-ounce, single-serving size; the company has plans to package in 1 and 1.5 liter sizes at the end of this year.)

### Filter It Instead

Our bottom line recommendation for getting the most healthful water for your family in the short-term: make a one-time investment in a water filtration system. The best filtration system for you will be the one that will filter out the specific contaminants in your local water supply (see main article). NSF publishes a free 40-page kit called the "Drinking Water User's Package," listing all NSF-certified filters and purification systems and the specific contaminants they reduce. Reserve bottled water for trips and emergencies (but don't store it for long periods of time or in the sun, as chemicals may leach from the plastic container).

By using filters instead of bottled water, we'll also reduce our reliance on the petroleum necessary for plastic bottle production and water transport over thousands of miles, and the landfill where we dump the bottles (recyclables like some plastics cannot be recycled over and over again into the same product).

If we're buying Poland Spring Water in Dallas, the water has travelled 1,900 miles. If we're buying Evian in Chicago, it's come over 4,000 miles. We must regain our proximity to the healthful water we need to drink every day, the water that should be waiting for us only twenty-odd steps away, at the kitchen tap.

### RESOURCES

- *The Sierra Club Guide to Safe Drinking Water*, 1996, \$10. An excellent primer on the subject, providing detailed information about 200 municipal water systems, bottled water and home purification devices. Some of the information in *The Sierra Club Guide* was condensed to create these articles.

- *The Green Guide* #26 "Fieldwork" on the Dutch 'yardstick' program. Send \$1 to Mothers & Others, 40 W. 20th St., New York, NY 10011. Free to members (with S.A.S.E.).

#### Environmental organizations leading the national effort to strengthen drinking water protection:

- *Institute for Agriculture and Trade Policy (IATP)*, 1313 Fifth St. SE, Ste. 303, Minneapolis, MN 55414-1546, 612/379-5980.
- *Natural Resources Defense Council*, 40 W. 20th Street, New York, NY 10011, 212/727-2700. NRDC, New York City and other groups are suing the EPA for failure to comply with the Clean Water Act in setting limits on pollution entering reservoir basins.
- *Sierra Club*, 85 Second St., 2nd Fl., San Francisco, CA 94105, 415/977-5500.

#### Industry organizations:

- *NSF International*, 313/769-8010.
- *IBWA* maintains Model Code inspection program for the products and bottling processes of its approximately 200 bottler members. Two free pamphlets available: "Q&A About Bottled Water" lists FDA regulations and product definitions for the different types of bottled water, and a list of the 250 member brand names, 800/WATER-11.

#### Bottled water companies:

- *Mountain Valley Spring Water*: 800/638-2323.
- *High Birches Mountain Spring Water*: 800/898-4235.

—by Kristin Ebbert



# The Green Guide

ENVIRONMENTAL CHANGE BEGINS AT HOME



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## Special Fresh Water Issue

NEXT ISSUE: A Preview of "Baby's Natural Nursery"  
You were mentioned inside!

### Q&A

#### How do I find out what's in my tap water?

—Anne McAndrews, CA

All large and most small water companies are required by the Safe Drinking Water Act to test their water at regular intervals and report to the state and the EPA. To get a free copy of the results of these tests, call your water company using the phone number on your water bill or in the phone book.

Find out how your water is being treated. You may even take a tour of the facility. Do they use filtration? What kind of disinfectants do they use, and what do they do to reduce disinfection by-products?

Some state water agencies publish newsletters or other reports, written for consumers, that describe measures the state is taking to

protect its drinking water supplies. They can also tell you the names and numbers of your water company and local testing labs.

The EPA has a Safe Drinking Water Hotline, at 800/426-4791, to assist you in learning about your drinking water. They can also help you get test results on your water if you haven't had success at the local or state level.

Having your water tested from a certified private testing laboratory will provide the most reliable information available about the water coming out of your tap. Any contaminants that enter the water between the treatment center and your faucet will not show up in water company or state agency tests. Such contaminants can include asbestos from cement water mains; lead and other metals leached from service lines to—and plumbing and fixtures within—your building; and bacteria and other pathogens growing in places like

your hot water tank, the water tank on the roof of your apartment house, or reservoirs between the water treatment plant and your point of use. For example, E. coli outbreaks in New York City in 1993 and 1994 were attributed to bird droppings in a city reservoir.

In addition, if you are on a private well or water supply, you might want to try private testing. Make sure that the lab you choose is EPA-certified. Testing can get expensive, especially if you are going to test for SOCs or radiation, so shop around. To find a lab, either look in the yellow pages under "Laboratories," call your state water agency for names of EPA-certified labs in your area, or call EPA's Safe Drinking Water Hotline.

The following two EPA-certified labs test by mail: Suburban Water Testing Labs, 800/433-6595, and National Testing Labs, 800/426-8378.



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