BOTTLED WATER: PURE DRINK OR PURE HYPE?

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EXECUTIVE SUMMARY

More than half of all Americans drink bottled water; about a third of the public consumes it regularly. Sales have tripled in the past 10 years, to about $4 billion a year. This sales bonanza has been fueled by ubiquitous ads picturing towering mountains, pristine glaciers, and crystal-clear springs nestled in untouched forests yielding absolutely pure water. But is the marketing image of total purity accurate? Also, are rules for bottled water stricter than those for tap water?

Not exactly. No one should assume that just because he or she purchases water in a bottle that it is necessarily any better regulated, purer, or safer than most tap water. NRDC has completed a four-year study of the bottled water industry, including its bacterial and chemical contamination problems. We have conducted a review of available information on bottled water and its sources, an in-depth assessment of Food and Drug Administration (FDA) and all 50 states' programs governing bottled water safety, and an analysis of government and academic bottled water testing results. We have compared FDA's bottled water rules with certain international bottled water standards and with the U.S. Environmental Protection Agency (EPA) rules that apply to piped tap water supplied by public water systems. In addition, NRDC commissioned independent lab testing of more than 1,000 bottles of 103 types of bottled water from many parts of the country (California, the District of Columbia, Florida, Illinois, New York, and Texas). Our conclusions and recommendations follow.

No one should assume that just because he or she purchases water in a bottle that it is necessarily any better regulated, purer, or safer than most tap water.

AN EXPLODING BOTTLED WATER MARKET

▶ There has been an explosion in bottled water use in the United States, driven in large measure by marketing designed to convince the public of bottled water's purity and safety, and capitalizing on public concern about tap water quality. People spend from 240 to over 10,000 times more per gallon for bottled water than they typically do for tap water.

▶ Some of this marketing is misleading, implying the water comes from pristine sources when it does not. For example, one brand of "spring water" whose label pictured a lake and mountains, actually came from a well in an industrial facility's parking lot, near a hazardous waste dump, and periodically was contaminated with industrial chemicals at levels above FDA standards.

▶ According to government and industry estimates, about one fourth of bottled water is bottled tap water (and by some accounts, as much as 40 percent is derived from tap water)—sometimes with additional treatment, sometimes not.

MAJOR REGULATORY GAPS

▶ FDA's rules completely exempt 60-70 percent of the bottled water sold in the United States from the agency's bottled water standards, because FDA says its rules do not apply to water packaged and sold within the same state. Nearly 40 states say they *do* regulate such waters (generally with few or no resources dedicated to policing this); therefore, about one out of five states do not.

▶ FDA also exempts "carbonated water," "seltzer," and many other waters sold in bottles from its bottled water standards, applying only vague general sanitation rules that set no specific contamination limits. Fewer than half of the states require these waters to meet bottled water standards.

▶ Even when bottled waters *are* covered by FDA's specific bottled water standards, those rules are weaker in many ways than EPA rules that apply to big city tap water. For instance, comparing those EPA regulations (for water systems which serve the majority of the U.S. population) with FDA's bottled water rules:

- City tap water can have no confirmed *E. coli* or fecal coliform bacteria (bacteria that are indications of possible contamination by fecal matter). FDA bottled water rules include no such prohibition (a certain amount of any type of coliform bacteria is allowed in bottled water).
- City tap water from surface water must be filtered and disinfected (or the water system must adopt well-defined protective measures for the source water it uses, such as control of potentially polluting activities that may affect the stream involved). In contrast, there are no federal filtration or disinfection requirements for bottled water—the only source-water protection, filtration, or disinfection provisions for bottled water are completely delegated to state discretion, and many states have adopted no such meaningful programs.
- Bottled water plants must test for coliform bacteria just once a week; big-city tap water must be tested 100 or more times a month.
- Repeated high levels of bacteria (i.e., "heterotrophic-plate-count" bacteria) in tap water combined with a lack of disinfectant can trigger a violation for cities—but not for water bottlers.
- Most cities using surface water have had to test for *Cryptosporidium* or *Giardia*, two common water pathogens that can cause diarrhea and other intestinal problems (or more serious problems in vulnerable people), yet bottled water companies don't have to do this.
- City tap water must meet standards for certain important toxic or cancer-causing chemicals such as phthalate (a chemical that can leach from plastic, including plastic bottles); some in the industry persuaded FDA to exempt bottled water from regulations regarding these chemicals.
- Any violation of tap-water standards is grounds for enforcement—but bottled water in violation of standards can still be sold if it is labeled as "containing excessive chemicals" or "excessive bacteria" (unless FDA finds it "adulterated," a term not specifically defined).
- Cities generally must test at least once a quarter for many chemical contaminants. Water bottlers generally must test only annually.
- Cities must have their water tested by government-certified labs; such certified testing is not required for bottlers.
- Tap water test results and notices of violations must be reported to state or federal officials. There is no mandatory reporting for water bottlers.
- City water system operators must be certified and trained to ensure that they know how to safely treat and deliver water—not so for bottlers.

Bottled water plants must test for coliform bacteria just once a week; big-city tap water must be tested 100 or more times a month.

- City water systems must issue annual "right-to-know" reports telling consumers what is in their water; as detailed in this report, bottlers successfully killed such a requirement for bottled water.

▶ FDA and state bottled water programs are seriously underfunded. FDA says bottled water is a low priority; the agency estimates it has the equivalent of *fewer than one* staff person dedicated to developing and issuing bottled water rules, and the equivalent of *fewer than one* FDA staffer assuring compliance with the bottled water rules on the books. Although a small number of states (such as California) have real bottled water programs, our 1998 survey found that 43 states have fewer than one staff person dedicated to bottled water regulation. By comparison, hundreds of federal staff and many more state personnel are dedicated to tap water regulation. Directing disproportionate resources to tap water protection is warranted. At the same time, over half the U.S. public (including many immunocompromised people) uses bottled water, and many millions of people use bottled water as their chief or exclusive drinking water source.

▶ FDA's regulations are less stringent than some international standards. For example, unlike FDA's rules, the European Union's (EU's) bottled natural mineral water standards regulate total bacteria count, and explicitly ban all parasites and pathogenic microorganisms, *E. coli* or other coliform bacteria, fecal streptococci (e.g., *Streptococcus faecalis*, recently renamed *Enterococcus faecalis*), *Pseudomonas aeruginosa*, and sporulated sulphite-reducing anaerobic bacteria. Moreover, unlike the weaker FDA rules, the EU rules require natural mineral bottled water's labels to state the composition of the water and the specific water source, and mandate that only one water label may be used per source of water. Similarly, recent EU standards applicable to *all* bottled water also are far stricter than FDA standards. FDA's standards for certain chemicals (such as arsenic) also are weaker than certain World Health Organization (WHO) guidelines.

FDA estimates it has the equivalent of fewer than one staff person dedicated to developing and issuing bottled water rules, and the equivalent of fewer than one FDA staffer assuring compliance with the bottled water rules on the books.

BOTTLED WATER: AS PURE AS WE ARE LED TO BELIEVE?

▶ While most bottled water apparently is of good quality, publicly available monitoring data are scarce. The underfunded and haphazard patchwork of regulatory programs has found numerous cases where bottled water has been contaminated at levels above state or federal standards. In some cases bottled water has been recalled.

▶ Our "snapshot" testing of more than 1,000 bottles of 103 brands of water by three independent labs found that most bottled water tested was of good quality, but some brands' quality was spotty. About one third of the bottled waters we tested contained significant contamination (i.e., levels of chemical or bacterial contaminants exceeding those allowed under a state or industry standard or guideline) in at least one test. This is the most comprehensive independent testing of bottled water in the United States that is publicly available. Moreover, NRDC contracted with an independent data verification firm to confirm the accuracy of our positive test results. Still, the testing was limited. The labs tested most waters for about half of the drinking water contaminants regulated by FDA (to control costs). They found:

Approximately one third of the tested waters violated an enforceable state standard or exceeded microbiological-purity guidelines, or both, in at least one sample.

• Nearly one in four of the waters tested (23 of the 103 waters, or 22 percent) violated strict applicable state (California) limits for bottled water in at least one sample, most commonly for arsenic or certain cancer-causing man-made ("synthetic") organic compounds. Another three waters sold outside of California (3 percent of the national total) violated industry-recommended standards for synthetic organic compounds in at least one sample, but unlike in California, those industry standards were not enforceable in the states (Florida and Texas) in which they were sold.

• Nearly one in five tested waters (18 of the 103, or 17 percent) contained, in at least one sample, more bacteria than allowed under microbiological-purity "guidelines" (unenforceable sanitation guidelines based on heterotrophic-plate-count [HPC] bacteria levels in the water) adopted by some states, the industry, and the EU. The U.S. bottled water industry uses HPC guidelines, and there are European HPC standards applicable overseas to certain bottled waters, but there are no U.S. standards in light of strong bottler opposition to making such limits legally binding.

• In sum, approximately one third of the tested waters (34 of 103 waters, or 33 percent) violated an enforceable state standard or exceeded microbiological-purity guidelines, or both, in at least one sample. We were unable to test for many microbial contaminants, such as *Cryptosporidium*, because the logistics and cost of testing for them post-bottling were beyond our means.

• Four waters (4 percent) violated the generally weak federal bottled water standards (two for excessive fluoride and two for excessive coliform bacteria; neither of the two latter waters were found to be contaminated with coliform bacteria in our testing of a different lot of the same brand).

• About one fifth of the waters contained synthetic organic chemicals—such as industrial chemicals (e.g., toluene or xylene) or chemicals used in manufacturing plastic (e.g., phthalate, adipate, or styrene)—in at least one sample, but generally at levels below state and federal standards. One sample contained phthalate—a carcinogen that leaches from plastic—at a level twice the tap water standard, but there is no bottled water standard for this chemical; two other samples from different batches of this same water contained no detectable phthalate.

• In addition, many waters contained arsenic, nitrate, or other inorganic contaminants at levels below current standards. While in most cases the levels found were not surprising, in eight cases arsenic was found in at least one test at a level of potential health concern.

• For purposes of comparison, we note that EPA recently reported that in 1996 about 1 in 10 community tap water systems (serving about one seventh of the U.S. population) violated EPA's tap water treatment or contaminant standards, and 28 percent of tap water systems violated significant water-monitoring or reporting requirements. In addition, the tap water of more than 32 million Americans (and perhaps more) exceeds 2 parts per billion (ppb) arsenic (the California Proposition 65 warning level, applicable to bottled water is 5 ppb);

and 80 to 100 million Americans drink tap water that contains very significant trihalomethane levels (over 40 ppb). Thus, while much tap water is supplied by systems that have violated EPA standards or that serve water containing substantial levels of risky contaminants, apparently the majority of the country's tap water passes EPA standards. Therefore, while much tap water is indeed risky, having compared available data we conclude that there is no assurance that bottled water is any safer than tap water.

▶ Other academic and government bottled water surveys generally are consistent with the testing NRDC commissioned. Though usually limited in scope, these studies also have found that most bottled water meets applicable enforceable standards, but that a minority of waters contain chemical or microbiological contaminants of potential concern.

RECOMMENDATIONS

Every American has a right to safe, good-tasting water from the tap. If we choose to buy bottled water, we deserve assurances that it too is safe. In addition, whether our water comes from a tap or a bottle, we have a right to know what's in it. Among our key recommendations are:

▶ FDA should set strict limits (equivalent to those in California, EPA rules, international standards, or industry guidelines, whichever is most health protective) for contaminants of concern in bottled water, including arsenic, heterotrophic-plate-count bacteria, *E. coli* and other parasites and pathogens, *Pseudomonas aeruginosa*, and synthetic organic chemicals, including chemicals such as phthalate, which can leach from plastic.

▶ FDA's rules should be overhauled and should apply to all bottled water distributed nationally or within a state, carbonated or not. To comply with common sense and a new requirement tucked into the 1996 Safe Drinking Water Act Amendments, FDA standards must be made at least as strict as those applicable to city tap water supplies. The FDA should adopt rules for bottled water testing, to control microbial and chemical contaminants, to protect water sources, to ensure the reporting of test results and violations to state and federal officials, to train and certify operators of water bottling plants, and to require the use of certified labs. In addition, FDA should do its own audits and monitoring of the quality of bottled water sold across the nation and should publicly release the results.

▶ Right-to-know requirements should require water-bottle labels to disclose contaminants, the exact water source, treatment, and other key information, as is now required of tap water systems. If bottled water is so pure, why not prove it with full disclosure on the label?

▶ FDA's bottled water program and state programs must be better funded, with a new penny-per-bottle fee on bottled water to fund regulatory programs, testing, and enforcement.

▶ State bottled water programs should be subject to federal review and approval, and should receive federal funding from the penny-per-bottle fee recommended above.

FDA's rules should be overhauled and should apply to all bottled water distributed nationally or within a state, carbonated or not.

The long-term solution to our water woes is to fix our tap water so it is safe for everyone, and tastes and smells good.

▶ If FDA fails within 18 months to make its bottled water rules and its regulatory oversight and enforcement at least as stringent as those for tap water, the bottled water regulatory program and funding for it (including the proceeds from a penny-per-bottle fee) should be transferred to EPA. We recommend this transfer with some trepidation, in light of EPA's less-than-perfect tap water program and its own serious resource constraints. We conclude, however, that it would be hard for EPA authority to be worse than FDA's seriously deficient program, and that a transfer of funding for bottled water supervision to EPA from FDA would help. Clearly EPA has more resources dedicated to drinking water and has adopted stricter rules and oversight of state programs than FDA has. More stringent EPA tap water rules should be applied to bottled water within six months after transfer of authority.

▶ A credible independent third-party nongovernmental organization should establish a "certified safe" bottled water program that is truly open, ensures full compliance with all FDA, EPA, state, industry, and international standards and guidelines, does twice-a-year surprise inspections, documents sufficient source protection and treatment to meet EPA/Centers for Disease Control and Prevention (CDC) criteria for *Cryptosporidium*-safe bottled water, and makes readily available (including on the Web) all inspections and monitoring results. Currently neither NSF nor International Bottled Water Association certifications have sufficiently stringent criteria, nor are they sufficiently independent of the industry, to provide consumer confidence that such strict standards are met. Immune-compromised or other vulnerable people particularly may want such certification to be fully confident of their bottled water's purity.

▶ While we reasonably may choose to use bottled water for convenience, taste, or as a temporary alternative to contaminated tap water, it is no long-term national solution to this problem. Bottled water sometimes is contaminated, and we don't use it to bathe, shower, etc.—major routes of exposure for some tap water contaminants. A major shift to bottled water could undermine funding for tap water protection, raising serious equity issues for the poor. Manufacture and shipping of billions of bottles causes unnecessary energy and petroleum consumption, leads to landfilling or incineration of bottles, and can release environmental toxins. The long-term solution to our water woes is to fix our tap water so it is safe for everyone, and tastes and smells good.

CHAPTER 1

PRINCIPAL FINDINGS AND RECOMMENDATIONS

Americans increasingly are turning to bottled water, making it a $4 billion-a-year business in the United States.[1] Millions of us are willing to pay 240 to over 10,000 times more per gallon for bottled water than we do for tap water—though we probably rarely think of it that way.[2] However, some bottled water contains bacterial contaminants, and several brands of bottled water contain synthetic organic chemicals (such as industrial solvents, chemicals from plastic, or trihalomethanes—the by-products of the chemical reaction between chlorine and organic matter in water) or inorganic contaminants (such as arsenic, a known carcinogen) in at least some bottles (see Chapter 3 and our accompanying *Technical Report*).* Moreover, as Chapter 4 documents, bottled water regulations have gaping holes, and both state and federal bottled water regulatory programs are severely underfunded. In Chapter 5 we present evidence that there is substantially misleading marketing of some bottled water, and in Chapter 6 we argue that consumers should be informed about the contaminants found in the water they purchase. NRDC's major findings and recommendations are summarized below.

FINDINGS

1. Most bottled water apparently is of good quality, but some contains contamination; it should not automatically be assumed to be purer or safer than most tap water.

Based on available data and our testing, most bottled water is of good quality, and contamination posing immediate risks to healthy people is rare (see Chapter 3 and the *Technical Report*). However, blanket reassurances from the bottled water industry that bottled water is totally safe and pure are false.

No one should assume that just because water comes from a bottle that it is necessarily any purer or safer than most tap water. Testing commissioned by NRDC and studies by previous investigators[3] show that bottled water is sometimes contaminated. NRDC contracted with three leading independent laboratories to do

* Throughout this document we use the term contaminant in the same way that term is used in the Safe Drinking Water Act (SDWA)—i.e, "any physical, chemical, biological, or radiological substance or matter in water." 42 U.S.C. §300f(6).

"snapshot" testing (testing one to three times for a subset of contaminants of concern) of bottled water.

We found after testing more than 1,000 bottles that about one fourth of the bottled water brands (23 of 103 waters, or 22 percent) were contaminated at levels violating strict enforceable state (California) limits for the state in which they were purchased, in at least one sample. We also found that almost one fifth of the waters we tested (18 of 103, or 17 percent) exceeded unenforceable sanitary guidelines for microbiological purity (heterotrophic-plate-count [HPC] bacteria guidelines, adopted in some states, the European Union (EU), and recommended by the bottled water industry) in at least one test. While HPC bacteria may be harmless themselves, they may mask the presence of pathogens; some states, the EU and the bottled water industry have adopted HPC guidelines to help ensure sanitary source water, processing, and bottling practices. In all, at least one sample of one third of the waters we tested (34 of 103, or 33 percent) exceeded a state enforceable standard for bacterial or chemical contamination, a nonenforceable microbiological-purity (HPC) guideline, or both.

While our testing is the most comprehensive publicly available independent testing of U.S. bottled water, it must be viewed as incomplete.

The labs contracted by NRDC detected contaminants of potential concern (either microbes or chemicals regulated in tap or bottled water) in at least one sample of about half of the bottled waters we tested, though in the majority of the waters no standards were exceeded. While *state or industry* standards and guidelines were violated in at least one test for about one fourth of the bottled waters, just four waters (4 percent) exceeded the weak *federal* standards. Of these four waters, two violated the FDA coliform-bacteria rule (coliforms are bacteria that can be harmless themselves but may indicate the presence of fecal contamination and disease-carrying organisms in the water) in one test. When we retested another lot of the same waters for coliform bacteria, however, both of these waters tested clean. In addition, two other waters violated the FDA standard for fluoride in two sequential tests of samples from different lots of these two waters.

While our testing is the most comprehensive publicly available independent testing of U.S. bottled water, it must be viewed as incomplete. Only about half of the drinking water contaminants regulated by FDA and EPA were tested, due to cost constraints. There are, conservatively, more than 700 brands selling bottled water in the United States, yet we tested only 103 waters. Additionally, we generally tested just one to three lots of each water, whereas often thousands or even millions of bottles may be produced annually by a single bottler, with the potential for periodic (and undetected) contamination problems. Testing by other investigators generally has been consistent with our results. For example, as is discussed in detail in the accompanying *Technical Report*, a major survey of microbiological contamination of domestic and imported bottled water sold in Canada published in 1998 yielded results very similar to NRDC's.[4] We were not able to test for *Cryptosporidium* in bottled water (nor did the Canadian investigators) because the current EPA method for *Cryptosporidium* monitoring requires the filtration of many gallons of water and analysis of the filter using a method feasible for bottlers prior to bottling the water, but this was logistically and financially infeasible for us to use on finished product sold at stores.

Bottled water recalls and other contamination incidents—whether bacterial, industrial-chemical, algae, excessive-chlorine, or other contamination problems—have sometimes been quietly dealt with by bottlers, generally with little or no public fanfare. In other cases, violations of bottled water standards have been allowed to go on for months without a recall or formal enforcement action. Although most of the bottled water on the market seems to be of good quality, some of these products are not as absolutely pure and pristine as many of their consumers may expect.

Comparing the data for bottled water quality with those for tap water is not straightforward. Far more monitoring data are publicly available for tap water than for bottled water. EPA requires frequent monitoring of tap water and makes available on its Web site national compliance data for all tap water systems.[5] Additionally, numerous surveys of tap water quality (beyond simple compliance data) are available for tap water quality,[6] whereas no such comprehensive data are available for bottled water. Thus, direct comparison of tap water quality versus bottled water quality is not possible based on comparable databases. However, EPA recently reported that in 1996, almost 10 percent of community tap water systems (serving 14 percent of the U.S. population) violated federal EPA tap water treatment or contaminant standards, and 28 percent of these tap water systems violated significant water quality monitoring or reporting requirements.[7] While these tap water system compliance data are plagued by underreporting and likely understate the extent of the problem somewhat,[8] without question they are based on a far larger database than is publicly available for bottled water. Moreover, according to available data, nearly half of the U.S. population served by tap water systems gets legally allowable but from a health standpoint potentially significant levels of contaminants such as cancer-causing trihalomethanes, radon, and/or arsenic in their tap water.[9] Thus, while there definitely are problems with a substantial minority of the nation's tap water systems, based on the limited data available there is little basis to conclude that just because water is purchased in a bottle it is necessarily any better than most tap water.

2. Bottled water contamination with microbes may raise public health issues, particularly for people who are immunocompromised.

Millions of Americans use bottled water as their primary source of drinking water. Some of these people are immunocompromised (such as people undergoing cancer chemotherapy, organ-transplant recipients, the chronically ill elderly, some infants whose immune systems are not fully developed, and people with AIDS) and use bottled water at the recommendation of public health officials or health care providers, who suggest that tap water use may be too risky.* In some cases, officials also may urge the general public to use bottled water during a tap water contamination crisis.

* EPA and CDC have jointly recommended that severely immunocompromised people consult with their health care provider to decide whether they should drink tap water or switch to bottled water treated with certain advanced technologies (or use tap water that is boiled or treated with an advanced home filter). However, we have found that very few bottled water companies clearly label their bottles to enable consumers to determine whether the water meets the EPA-CDC recommendations.

As discussed in Chapter 3 and our attached *Technical Report*, NRDC's testing and other published and unpublished data indicate that while most bottled water apparently is of high quality in terms of microbiological purity, a substantial minority of it may not be. As noted there, a small percentage of the bottled water we tested (about 3 percent) sometimes contained coliform bacteria—a possible indicator of contamination with pathogenic bacteria—and nearly one fifth of the waters we tested contained heterotrophic-plate-count (HPC) bacteria at levels exceeding state and industry guidelines in at least one test. Some bottled waters contain bacteria (sometimes naturally occurring), including species of *Pseudomonas* and others, some of which may be a health concern for immunocompromised people. [10]

In cases where there is known tap water microbial contamination, or where an individual suffers from specific health problems such as a compromised immune system, tap water can be boiled for one minute to kill all microbes. In the alternative, certain types of bottled water may be a temporary solution. To be cautious, however, an immunocompromised person should buy bottled water only if it is from a protected source, and is subjected to EPA-CDC-recommended treatment to kill *Cryptosporidium*, the intestinal parasite that sickened over 400,000 people and killed over 100 in a 1993 Milwaukee tap water incident.[11] For example, to remove or kill *Cryptosporidium*, water must be treated with "absolute one micron" membrane filtration or reverse osmosis, adequately high levels of ozone disinfection, or distillation, at a minimum.

Thus, NRDC recommends that seriously immunocompromised people boil their tap water for one minute before using it for consumption or washing food. If they choose to buy bottled water, they should consider purchasing only certified "sterile" bottled water. Most bottled water has *not* been independently certified to meet either the EPA-CDC standards for killing *Cryptosporidium* or the definition of "sterile" water, so vulnerable people must be especially careful in selecting a drinking water supply.*

3. Government bottled water regulations and programs have serious deficiencies. Chapter 4 outlines in detail the gaping holes in federal regulatory controls for bottled water, and the trivial FDA resources dedicated to protecting bottled water. FDA estimates that one half of a full-time FDA staff person is dedicated to bottled water regulation, and fewer than one FDA staff-person equivalent is spent on assuring compliance with FDA bottled water rules.[12] An estimated 60 to 70 percent of the bottled water sold in the United States, according to FDA interpretations, is exempted from FDA's contamination limits and specific bottled water standards because it is bottled and sold in the same state.

Thus, under FDA's interpretation, the regulation of most bottled water is left to ill-equipped and understaffed state governments. Yet 43 of 50 states have the

* The use of home filtration devices is an issue beyond the scope of this study, but experts recommend that at a minimum, an immunocompromised person should only purchase a filter certified by NSF International for "cyst removal" (i.e., to remove protozoa "cysts," such as *Cryptosporidium*). In addition, users of home filters must be extremely careful to maintain the filter and to change the filtration media at least as frequently as recommended by the manufacturer, or more often.

equivalent of *fewer than a single staff person* dedicated to regulating bottled water, according to our 1998 state survey. Four states have adopted no regulations at all for bottled water, and the majority of states have simply republished FDA's deficient rules. About 40 states say they regulate "intrastate" waters, but most have dedicated virtually no resources to doing so.

FDA's rules also exempt many forms of what most of us would consider "bottled water" from all of its specific water-testing and contamination standards. If the product is declared on the ingredient label simply as "water," "carbonated water," "disinfected water," "filtered water," "seltzer water," "sparkling water," or "soda water," it is not considered "bottled water" by FDA,[13] nor, as noted in Chapter 4, do most states regulate this water as bottled water. For these products, the specific FDA contamination standards and water quality testing requirements for bottled water are *not* applicable. No contamination monitoring is required, and only a vague narrative legal standard applies, stating that the water cannot be "adulterated"—a term not specifically defined and, to date, apparently never enforced against any of these products by FDA. Therefore, the generalized FDA "good manufacturing practice" requirements applicable to these waters[14] set no specific contamination standards. The same is true with most state regulations.

An estimated 60 to 70 percent of the bottled water sold in the United States is exempted from FDA's contamination limits and specific bottled water standards because it is bottled and sold in the same state.

Even what FDA defines to be "bottled water" is exempt from many of the standards and testing requirements that apply to tap water. This appears to directly contradict the letter and the spirit of the Federal Food, Drug, and Cosmetic Act (FFDCA), which requires—under a provision strengthened in 1996—that FDA's bottled water standards must be at least as stringent as tap water standards.[15] For example, EPA's rules clearly prohibit tap water from containing *any* confirmed *E. coli* or fecal coliform bacteria (bacteria that are indicators of possible fecal matter contamination often associated with waterborne disease).[16] FDA has no such prohibition for bottled water; instead, any type of coliform bacteria is allowed up to a certain level.[17] (See Table 1 for a comparison of EPA and FDA rules.)

Similarly, a big city has to test its tap water 100 times or more each month for coliform bacteria—many times a day, on average—yet bottled water (even at an enormous bottling plant) must be tested for coliform bacteria only once a week under FDA rules. Moreover, while high overall levels of bacteria (known as heterotrophic-plate-count [HPC] bacteria) can be are counted toward bacteria violations for city tap water (in the absence of adequate disinfection), as described in Chapter 4, FDA bowed to bottled water industry arguments and decided to apply no standards for HPC bacteria in bottled water. HPC bacteria are commonly found in bottled water.

EPA's "information collection rule" generally requires big cities that use surface water (such as rivers or lakes) for tap water to test for common parasites such as viruses, *Giardia*, and *Cryptosporidium*. Under FDA rules, water bottlers are *never* required to do so. In the same vein, cities using surface water generally must disinfect their water and filter it to remove bacteria and certain parasites.* Yet there

* Cities using surface water as their source generally must disinfect, unless they can document and obtain state approval for a filtration waiver, based on evidence that their source water is pure and highly protected from contamination.

TABLE 1
Key Differences Between EPA Tap Water and FDA Bottled Water Rules

Water Type	Disinfection Required?	Confirmed *E. Coli* & Fecal Coliform Banned?	Testing Frequency for Bacteria?	Must Filter to Remove Pathogens, or Have Strictly Protected Source?	Must Test for *Cryptosporidium, Giardia*, Viruses?	Testing Frequency for Most Synthetic Organic Chemicals?	Operator Must Be Trained & Certified?	Must Test for and Meet Standards for Asbestos & Phthalate?	Must Use Certified Labs to Do Testing?	Must Report Violations to State, Feds?	Consumer Right to Know About Contamination?
Bottled Water	No	No	1/week	No[a]	No	1/year	No	No	No	No	No
Carbonated or Seltzer Water	No	No	None	No	No	None	No	No	No	No	No
Big City[b] Tap Water (using surface water)	Yes	Yes	Hundreds/ month	Yes	Yes	1/quarter (limited waivers available if clean source)	Yes[c]	Yes (though limited waivers available if if clean source)	Yes	Yes	Yes
Small Town Tap Water (using a well)	No (though new rule in 2002 will require if needed)	Yes	20/month	No (unless subject to surface contaimination)	No	1/quarter (waivers available if clean source)	Yes[c]	Yes (though which is available if clean source	Yes	Yes	Yes

[a] FDA requires state or local approval of bottled water sources, but there is no federal definition or control of what may be a bottled water source; the FDA "approved source" requirement thus has been called a "regulatory mirage."

[b] Big city refers to city system serving 100,000 people or more. A big city using only wells would have to comply with all requirements noted for a surface water-supplied city, except that if its wells were not under the influence of surface water, it currently would not have to disinfect, filter, or test for *Cryptosporidium*, *Giardia*, or viruses. A new rule for such groundwater-supplied systems must be issued in 2002, which may require some cities using wells to disinfect or filter and do additional microbial monitoring.

[c] The Safe Drinking Water Act Amendments of 1996 require states, subject to EPA guidelines, to train and certify operators of all public water systems. EPA's rules to implement this provision are required to be issued by February 1999.

[d] Small town refers to a town of 20,000 people. Such a small town using surface water would have to comply with all the same requirements noted for a large city using surface water, except the monitoring frequency for coliform would be 20/month, and there currently are no *Cryptosporidium*, *Giardia*, or virus monitoring requirements for small towns.

Source: NRDC

are *no* FDA standards requiring bottled water to be disinfected or treated in any way to remove bacteria or parasites. Additionally, the FDA requirement that bottled water be derived from an "approved source" is no substitute for source water protection, filtration, or disinfection. This rule has been aptly characterized as a "regulatory mirage," since what is "approved" is left to state discretion with no meaningful federal requirements or oversight.

For chemical contaminants, the regulations for bottled water are also weak in many ways. While a city generally must test its tap water for scores of organic chemicals (such as industrial chemicals, some pesticides, and trihalomethanes) at least quarterly,* bottlers generally need only test once a year under FDA's rules. These infrequent annual tests could miss serious problems, because levels of these contaminants sometimes vary substantially depending on when they are tested.

Also, phthalate‡—a toxic chemical produced in plastic-making that tests show can leach from plastic into water under common conditions—is regulated by EPA in tap water but FDA does not regulate it in bottled water. After some water bottlers and plastics manufacturers argued that phthalate controls would be inappropriate and burdensome for bottled water, FDA decided not to regulate it in bottled water, where it is sometimes found, particularly after long storage.

Furthermore, FDA currently has no enforceable standard or treatment requirement for three other contaminants regulated by EPA in tap water—acrylamide, asbestos, and epichlorohydrin. Thus, while city water systems generally must test for all of these contaminants and must meet EPA standards for them, presently water bottlers need not.

EPA also requires city tap water suppliers to test for more than a dozen "unregulated" contaminants—chemicals that are not currently subject to EPA standards but which, if present, may pose a health concern, such as a risk of cancer. Under EPA rules, states are to consider adding 15 additional named unregulated contaminants to this list for mandatory water system monitoring, if they are believed to be a potential problem in local tap water.[18] Bottlers face no monitoring requirements for *any* unregulated contaminants.

Even if bottled water is more contaminated than FDA's standards would otherwise allow, FDA rules explicitly allow the water to be sold, as long as it says on the label "contains excessive chemical substances" or "contains excessive bacteria" or includes a similar statement on the label. FDA says it *may* enforce against such labeled contaminated water if it finds that it is "adulterated" and "injurious to health." However, there is no requirement that water bottlers report such problems

* In certain cases, EPA's rules allow tap water to be tested less frequently than quarterly for some organic contaminants. For example, a waiver may be available to a system if the contaminant was not detected in the first round of four quarterly tests and the system is evaluated by the state and found unlikely to become contaminated in the future.

‡ Specifically, di(2-ethylhexyl)phthalate, or DEHP—a likely carcinogen that studies have indicated also may cause disruption of the endocrine system. See, e.g., B.J. Davis, R.R. Maronpot, and J.J. Heindel, " Di-(2-ethylhexyl) phthalate Suppresses Estradiol and Ovulation in Cycling Rats," *Toxicol Appl Pharmacol*, vol. 128, no. 2, pp. 216–223 (October 1994), (exposure to DEHP resulted in hypoestrogenic anovulatory cycles and polycystic ovaries in adult female rats).

to FDA, and apparently there are no cases of FDA having taken any enforcement action against any such bottlers.

FDA has stated that bottled water regulation carries a low priority.[19] Because of this, water bottlers can expect to be FDA-inspected only about every four to five years, on average.[20] This is far too infrequent to detect certain possible problems, such as periodic contamination caused by occasional substandard plant operations or maintenance, bacteria from sewage overflows or leaks, pest infestations, or occasional spikes of pollution due to short-lived phenomena. In addition, bottlers are not required to keep records of their operations and testing for more than two years, making effective inspections difficult or impossible, since evidence of periodic or past problems can simply be discarded before it is ever reviewed by inspectors.

It also should be noted than in many cases FDA's rules are weaker than international standards. The European Union's (EU's) bottled natural mineral water standards, for example, set limits for total bacteria count,[21] which, as noted above, FDA does not. Moreover, the EU's bottled mineral water rules ban all parasites and pathogenic microorganisms, *E. coli* or other coliform bacteria, fecal streptococci (e.g., *Streptococcus faecalis*, recently renamed *Enterococcus faecalis*), *Pseudomonas aeruginosa*, or sporulated sulphite-reducing anaerobes, whereas FDA's rules include no such bans.[22] Additionally, unlike the FDA rules, EU rules require natural mineral water's labels to state the waters' "analytical composition, giving its characteristic constituents" and the specific water source and name, and information on certain treatments used.[23] The EU mineral water rules further forbid use of more than one brand label per source of water[24] and generally prohibit labels from making any claims about the prevention, treatment or cure of human illness.[25] No such provisions are included in FDA rules. Similarly, the EU's new general standards for *all* bottled water generally are far stricter than FDA's rules, and FDA's standards for certain chemicals (such as arsenic) are weaker than World Health Organization (WHO) guidelines for drinking water.[26]

4. Voluntary bottled water industry controls are commendable, but an inadequate substitute for strong government rules and programs.

The bottled water industry's trade association, the International Bottled Water Association (IBWA), has sometimes been a progressive force in seeking to improve certain FDA controls (petitioning for stronger FDA rules in some areas, for example). Moreover, IBWA has adopted a voluntary state bottled water code—somewhat stricter than the FDA rules—which has been adopted in whole or in part by 16 states. However, IBWA sometimes has vigorously fought against tough FDA rules, such as possible controls on *Pseudomonas aeruginosa* bacteria, rules for heterotrophic bacteria, and right-to-know requirements for bottled water. The fight against right-to-know for bottled water is interesting in light of the bottled water industry's frequent references to tap water contamination problems. It also starkly contrasts with IBWA's admission that bottled water sales may have increased due to the requirement that diet soda labels disclose all ingredients, which IBWA said may have driven consumers concerned about diet soda's contents to use bottled water.[27]

IBWA has adopted a much-ballyhooed voluntary industry code and inspection program for its members. The association claims its members produce 85 percent of the bottled water sold in the United States.[28] But these voluntary IBWA standards are just that—voluntary—in the 34 states that have not adopted them, and there is no published reporting about compliance. Additionally, IBWA does not disclose the results of its inspections and testing to the public, so it is impossible to verify independently the effectiveness of these voluntary programs. Moreover, even by IBWA's count, many bottlers are not IBWA members and have never volunteered to comply with the association's standards. In fact, some of the problems with some bottled waters discussed in this report have occurred with IBWA members, suggesting the IBWA program is not foolproof. Finally, it should be noted that, as with FDA rules, IBWA standards do not apply to seltzer, soda water, carbonated water, or the many other waters exempt from FDA's bottled water rules.[29]

5. Bottled water marketing can be misleading.

Chapter 5 shows that despite recent FDA rules intended to reduce misleading marketing, some bottled water comes from sources that are vastly different from what the labels might lead consumers to believe. One brand of water discussed in this report was sold as "spring water" and its label showed a lake and mountains in the background—with FDA's explicit blessing. But until recently the water actually came from a periodically contaminated well in an industrial facility's parking lot, near a waste dump (a state whistleblower informed the local media after years of internal struggles, finally putting an end to the use of this source).[30] Another brand of water sold with a label stating it is "pure glacier water" actually came from a public water supply, according to state records.[31] While FDA recently adopted rules intended to curb such practices, those rules include many weak spots and loopholes (including those that allowed the water taken from an industrial-park well to be sold as spring water with a label picturing mountains), and there are very few resources to enforce them.

Water with one brand name can come from numerous different sources.

Water with one brand name can come from numerous different sources, depending upon the time of year, location of sale, or other market factors. Moreover, water from one source (such as the industrial-parking-lot well noted above) can be used and labeled for a half-dozen or more different labels and brands. In addition, according to government and industry estimates, about one fourth or more of the bottled water sold in the United States[32] (and by some accounts 40 percent[33]) is taken from public water systems—tap water, essentially. Sometimes this tap water is bottled after additional treatment (such as carbon filtration or ozonation), and sometimes it is bottled with little or no additional treatment.

6. The long-term solution to drinking water problems is to fix tap water—not to switch to bottled water.

Many people may choose to use bottled water because they prefer its taste and smell, or because it is convenient. Bottled water, in some cases, also may be needed as a stopgap measure when tap water is contaminated, rendering the water non-potable (as in the case of a boil-water alert). In the long run, however, it is far better

from an economic, environmental, and public health point of view to improve public drinking water supplies than it is to have a massive societal shift from consumer use of tap water to use of bottled water. We cannot give up on tap water safety. The reasons we have reached this conclusion include:

▶ **Public health concerns.** Bottled water sometimes poses its own potential health risks due to contamination. Furthermore, even if bottled water is completely pure, use of it can only *somewhat* reduce public exposure to contaminants in tap water; some people will continue to use tap water. Even if no one were to drink tap water, virtually everyone would continue to be exposed to some common contaminants (especially those that are volatile or can penetrate the skin) when showering, bathing, washing dishes, and cooking.

▶ **Equity concerns.** If those who can afford bottled water shift to it as their primary source of drinking water, only low-income people are left drinking tap water, its quality may then slip into an ever-downward spiral.

▶ **Environmental concerns.** Provision of water by underground pipe is energy-efficient and consumes far fewer natural resources per gallon than using bottled water. Placing water in bottles and transporting those heavy bottles around the country (or around the globe) consumes far more energy and other resources than using tap water. The manufacture of bottles also can cause release of phthalates, and other byproducts of plastic-making, into water, air, or other parts of the environment. And, ultimately, many bottles will be added to already overflowing landfills or incinerated, potentially adding to our environmental problems.

▶ **Economic concerns.** Bottled water typically costs hundreds of times more than tap water, even up to 10,000 or more times more than what comes out of your faucet. These costs cannot be easily borne by low-income people and should not have to be borne by the elderly, the immunocompromised, or chronically ill people in order to get water that is safe to drink. The $4 billion a year now spent by consumers on bottled water could be better spent on upgrading tap water supplies.

Thus, in NRDC's view, although bottled water may be a convenience or needed as a short-term solution to tap water contamination problems in some communities or for highly vulnerable subpopulations, it should generally be viewed only as a temporary fix. Our study leads us to make the following recommendations:

RECOMMENDATIONS

1. Fix tap water quality—don't give up and just rely on bottled water.

For the reasons just noted, it would generally be better to upgrade and improve tap water quality than to have a part of society shift to bottled water. Those who dislike the taste and smell of their tap water may want to consider placing tap water in a

glass or ceramic pitcher in their refrigerator, with the top loose to allow the chlorine to dissipate overnight. This also will allow volatile disinfection by-products to evaporate (though less volatile disinfection by-products may stay in the water). Overnight refrigeration in a loosely capped container eliminates the objectionable chlorine taste and odor, and the chilled water can be put in reusable sports bottles as desired to make it convenient to carry ice-cold water to the office, on trips, or when exercising. It also saves money and has environmental and other benefits, as previously noted.

2. Establish the public's right to know for bottled water as now required for tap water.

Bottled water labels should be required to list any contaminants found in the water (as well as health goals and standards), the water's fluoride and sodium content, the health effects of the contaminants found, the bottler's compliance with applicable standards, the source of the water, and any treatment used. Labels also should indicate whether the water meets the EPA-CDC criteria for *Cryptosporidium* safety. The date of bottling and information on how to get further information also should be placed on labels. We fail to understand why, if bottled water is as pure as the bottlers say, they are so afraid of a right-to-know requirement. However, FDA has the authority to require such information on bottled water labels, has been required by the Safe Drinking Water Act to evaluate the feasibility of doing so, and therefore should move forward with rules requiring such disclosure for bottled water.

3. FDA should create a Web site and a phone-accessible information system on bottled water.

FDA should add to its Web site and should make available, through a hot line, a user-friendly array of information on bottled water brands, including all of the basic information noted in recommendation 2, for each bottler. This bottled water information should build upon and expand the EPA hotline and Web site that gives specific information on individual tap water systems and drinking water generally. The FDA hot line and Web site should make available the results of all government, industry, or other bottled water testing by certified labs for all brands. It also should include information on all inspections and recalls, and any other relevant consumer information on particular brands of bottled water.

4. Overhaul FDA rules for bottled water.

The FDA rules for bottled water are weak and should be strengthened. If necessary, FDA should request additional legislative authority to adopt these changes. FDA should:

▶ Establish standards and monitoring requirements for bottled water no less stringent than EPA's rules for tap water in major cities, including standards for all microbiological and chemical contaminants, specific and defined water treatment (including filtration and disinfection or strict source-protection requirements), operator-certification requirements, and unregulated-contaminant monitoring rules.

▶ Set strict, up-to-date standards for contaminants potentially found in bottled water. These standards should be at least as protective of public health as the strictest regulations adopted by other authorities. Thus, the standards should be as stringent as possible for the bottled water industry and certainly should be no less stringent than the following: arsenic less than 5 parts per billion (ppb) (California Proposition 65); heterotrophic-plate-count bacteria less than 100 colony-forming units per milliliter at bottling (EU standard), 200 cfu/ml 5 days after bottling in 90 percent of samples (industry recommendation), and a maximum at all times of 500 cfu/ml; no parasites, pathogens, fecal streptococci (e.g., the recently renamed *Enterococcus faecalis*), *Pseudomonas aeruginosa*, sporulated sulphite-reducing anaerobes (EU natural mineral water rules); trihalomethanes less than 10 ppb (California law and industry model code); phthalate less than 6 ppb (EPA tap water); individual synthetic organic and inorganic chemicals (e.g., bromodichloromethane) equal to California's Proposition 65 levels. For other contaminants more strictly controlled under bottled water industry code than under current FDA rules or with EPA Health Advisories, FDA should adopt the industry or EPA recommendation.

▶ Immediately finalize its 1993 proposed ban on coliform bacteria in bottled water.

▶ Establish clearly defined criteria and protections for an "approved source" of bottled water under FDA rules, and require annual state reevaluation of compliance with these new "approved source" rules, including review of potential contamination problems.

▶ Require bottlers to retain microbial test results for 5 years, and chemical tests for 10 years, as EPA requires for tap water.

▶ Mandate a bottling date and "refrigerate after opening" statement on labels, in order to inform consumers who seek to minimize the chances of potentially excessive microbial growth and contamination in bottled water.

▶ Require labs used for bottled water analysis to be certified by EPA or FDA.

▶ Direct that water be tested daily at the plant for microbes, quarterly for chemicals during bottling, and quarterly in bottles after extended storage, especially for chemicals that can leach from bottles and for microbes that can multiply during storage.

▶ Require quarterly reporting of test results to states and FDA, and reporting of acute violations within 24 hours to state and FDA officials.

▶ Prohibit all sales of water contaminated at levels above FDA standards.

▶ Apply FDA's standards to all intrastate bottled water sales.

▶ Mandate that water bottlers be trained and certified.

▶ Require state bottled water programs to be reviewed and approved by FDA, and FDA should oversee their effectiveness.

▶ Establish clear mandatory recall authority for FDA through administrative order or a civil action.

▶ Maintain an inventory, and register all water bottlers.

▶ Cover all water sold in a bottle that is likely to be ingested by people, including "purified," "disinfected," "seltzer," etc., under the FDA bottled water standards—as under California and other states' laws.

▶ Conduct routine FDA monitoring of bottled water quality for waters sold across the country, as has been done in Canada for many years, and release the results, including brand names, to the public in published reports and on its website.

5. Annual inspections should be required. FDA should conduct annual inspections (or fund annual state inspections) of all bottling facilities and of their water sources.

6. Institute a "penny–per–bottle" fee to assure bottled water safety. We recommend that a fee of one cent per bottle of bottled water sold should be instituted, to be placed in a trust fund for use without further appropriation by FDA to pay for a stringent bottled water regulatory program. The fee, which we estimate would raise more than $30 million dollars a year, should fund improved FDA implementation, random testing, a public Web site, state and federal inspections, and funding and oversight of state programs and bottlers.

7. Set a deadline for transferring the bottled water program to EPA if FDA lacks the resources or will to implement it effectively. FDA has made it clear that bottled water protection is a low priority. If FDA concludes that making bottled water comply with the same requirements as tap water is unduly burdensome, or that the preceding recommendations to achieve that goal are not of sufficient priority to claim FDA resources, the program should be transferred to EPA, which already regulates tap water. FDA should be given no more than 18 months to demonstrate, by overhauling its rules and program, whether it wishes to retain the program. If such an overhaul does not occur, the program should be automatically transferred to EPA. EPA should be given six months to apply the rules applicable to big city water systems to bottled water; of course, the rules should be modified where they would be inapplicable to bottled water (as where EPA rules require monitoring at the tap). EPA also should be provided the revenue from a penny-per-bottle fee on bottled water to carry out the program. We make this recommendation for transfer with some uneasiness, since EPA's tap water regulatory program suffers from its own serious deficiencies and resource constraints. However, on balance we believe that if FDA continues to lack the will and resources to address bottled water issues as the sales skyrocket, even an inadequate EPA bottled water regulatory program could hardly be worse than FDA's current effort.

8. Establish "certified safe" bottled water. In light of the poor government regulatory performance, an independent third-party organization such as Green Seal or Underwriters Labs should establish a "certified safe" bottled water program. Criteria for inclusion would be that the water always meets the strictest of all standards, including FDA, IBWA, international (e.g., EU and WHO) and state rules, recommendations, and guidelines, meets all EPA health goals, health advisories, and national primary drinking water regulations, is tested at least daily for microbial contaminants and quarterly for chemicals (monthly if using surface water or other water subject to frequent water quality changes), meets source-water protection criteria, is

protected from *Cryptosporidium* in accordance with EPA-CDC guidelines, is disinfected, and is surprise inspected twice a year by independent third-party inspectors. The certifying organization should establish an open-docket release of its inspection, testing, and compliance evaluation results. While the current NSF and IBWA seals are intended to provide such a stamp of approval, we believe a more independent and open body imposing stricter standards and making all testing, inspection, and other collected information readily available to consumers (including on the Web), would provide greater consumer confidence in the certification.

Thus, we believe the long-term national solution is to fix the nation's tap water supplies. Until the recommended regulatory changes are adopted, those who wish to use bottled water for reasons of taste or otherwise cannot be confident that they are necessarily getting what they pay for—a pure, well-regulated product. Unless such reforms are adopted, bottled water consumers should observe the ancient rule of caveat emptor—"buyer beware."

CHAPTER 2

Exploding Sales: Marketing a Perception of Purity

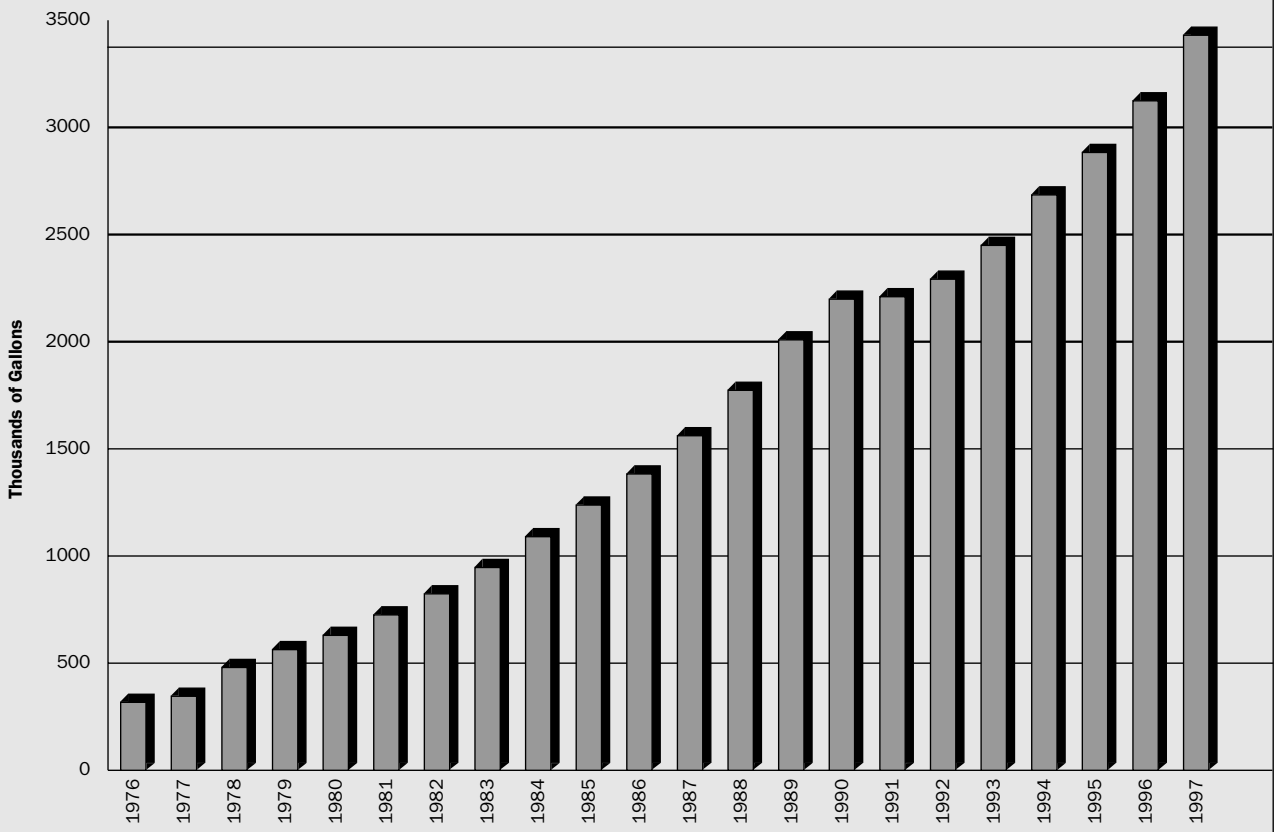
Over half of all Americans (54 percent) drink bottled water, and about 36 percent of us imbibe regularly (more than once a week).[34] Sales have nearly tripled in the last decade, to about $4 billion in 1997, rising from 4.5 gallons per year for the average American in 1986 to 12.7 gallons per year per person in 1997.[35] Americans consumed a total of 3.43 billion gallons of bottled water in 1997 (see Figure 1).[36] Globally, the market was estimated in 1995 to be worth more than $14 billion annually in *wholesale* sales, and it has certainly grown since then.[37] According to a 1992 inventory, there were already 700 brands of bottled water produced by about 430 bottling facilities in the United States,[38] a number that likely has grown since that time, because of the enormous expansion in bottled water sales.

ENORMOUS GROWTH IN SALES OF BOTTLED WATER

The industry has more than recovered from adverse public attention to problems with bottled water quality in 1990 and 1991. At that time benzene contamination was found in Perrier mineral water, causing a worldwide recall of this bottled water in February 1990. Congressional hearings convened in 1991 by Michigan congressman John Dingell focused intense public scrutiny on bottled water quality issues in the wake of the Perrier incident, giving the industry a fleeting black eye.[39]

Since expunging these blotches on its image of purity, the industry has exploded, with the market now growing at a strong rate of 8 to 10 percent per year—about twice as fast as the rate for other beverages.[40] According to industry stock analysts, "the profit margins in the business are really pretty good"—for some bottlers in the neighborhood of 25 to 30 percent.[41] That means every $1.50 bottle of water brings around $0.50 in profit. The actual cost of the *water* in the bottle purchased off a store shelf is generally just a fraction of a cent to a few cents.[42] Thus, typically 90 percent or more of the cost paid by bottled water consumers goes to things other than the water itself—bottling, packaging, shipping, marketing, retailing, other expenses, and profit. As the then-chairman of the board of the Perrier Corporation stated in a remarkable moment of candor, "It struck me...that all you had to do is take the water out of the ground and then sell it for more than the price of wine, milk, or, for that matter, oil."[43]

FIGURE 1
U.S. Bottled Water Market, 1976–1997, Gallonage



Source: Beverage Marketing Corporation, New York

The bottled water industry's rapid growth is surprising in light of the retail price of bottled water: It costs from 240 to over 10,000 times more per gallon to purchase bottled water than it does to purchase a gallon of average tap water. For example, in California average tap water costs about $1.60 per thousand gallons (about one tenth of a cent per gallon), while it has been reported that average bottled water costs about $0.90 per gallon—a 560-fold difference.[44] Expensive imported water sold in smaller bottles can cost several thousand times more than tap water: That $1.50 half-liter bottle of imported water may be costing you 10,000 times more per gallon than your tap water.

While Americans with annual incomes of $60,000 per year or more are about 35 percent more likely than those of lesser means to buy bottled water, the purchasers of bottled water are hardly limited to high income yuppies.[45] As was put starkly in *American Demographics* recently,

> *Black, Asian, and Hispanic households are more likely than whites to use bottled water, even though blacks and Hispanics as a group have lower-than-average household incomes.... Scares like the municipal water*

contamination that occurred in Milwaukee in 1993 may have even low-income families springing for bottled water. It's clear that many households are still opting for bottled water, even though it can be an expensive habit. A five-year supply of bottled water at the recommended intake of eight glasses a day can cost more than $1,000. An equivalent amount of tap water costs about $1.65.[46]

HEAVY MARKETING OF THE "PURITY" OF BOTTLED WATER VERSUS TAP WATER

What has driven this ever-greater consumer demand for bottled water? Market experts and public-opinion polls attribute the surprising increase primarily to several factors. People choose bottled water because it is perceived to be safer and of higher quality than tap water, and many are now using it because they view it as a healthful alternative beverage to soft drinks or alcohol.

The public is concerned about tap water safety and quality, and, with much encouragement from the bottled water industry's aggressive marketing, views bottled water as a purer, safer option. As a key industry consultant put it, "water bottlers are selling a *market perception* that water is 'pure and good for you....'"[47]

It costs from 240 to over 10,000 times more per gallon to purchase bottled water than it does to purchase a gallon of average tap water.

Just to be sure this public perception is carefully nurtured, the bottled water industry has engaged in an expensive public relations campaign to persuade the public about the purity of bottled water and to disabuse the public of any "misconceptions about the cost, safety, quality and regulations governing bottled water."[48] The PR campaign has included media releases, briefings in at least 10 cities, distribution of press kits, videos and video news releases. The campaign spent significant resources enlisting health groups as spokespeople, "educating" consumers and groups representing populations likely to be at elevated risk from tap water, and seeking to reach others about the safety of bottled water.[49] Recent figures for the total bottled water industry's advertising budget are difficult to come by, but as long ago as 1990—when the industry was selling much less water than it is today—total media outlays for the bottled water industry were $42.9 million dollars.[50] That spending likely has increased substantially in the past nine years.

The industry-encouraged consumer thirst for bottled water as a safer, higher-quality source of drinking water was recently explained in a bottled water industry association trade magazine:

> ***Consumers Want to Drink Water That's Safe.*** *News reports about crises involving municipal water supplies in many parts of the country heightened public awareness and concern about the safety of tap water. Environmental groups and the Environmental Protection Agency sounded the safety alarm in several cities last year. As a result, consumers began to choose bottled water as a safe alternative for drinking water.*[51]

Many companies directly and openly market to consumers by highlighting tap water contamination problems and offering their product as a safer alternative. An ad campaign of the nation's second-largest water-bottling company, McKesson Water

Products Company (bottlers of Sparkletts, Alhambra, Aqua Vend, and Crystal), for example, was cited in the advertising trade press as "right on" and highly effective because it took advantage of "consumers' concern over the purity of tap water...."[52] McKesson was commended for running ads that "listed some of the contaminants in tap water, juxtaposing Sparkletts as 'the source of pure water.'"[53] Other bottlers have used EPA data indicating widespread tap water contamination with lead,[54] and much has been made by the industry of the vulnerability of tap water to *Cryptosporidium* and the purported complete protection of bottled water from this parasite.[55]

One soft-drink-industry executive who has increasingly turned to bottled water to boost revenue and "sells lots of Evian" explained to *The New York Times* recently how the bottled water market is helped by pollution concerns: "Water quality in the United States is getting progressively worse. Every time there's a water main break on 23rd Street and people have to boil water for a week, or there's problems with the Ohio River, it clears out the supermarket shelves."[56]

In discussing the public's concern about tap water and how this opens up opportunities for bottlers, a recent article in the magazine of the International Bottled Water Association (IBWA), the industry's trade association, explained:

> *Consumers are being bombarded with headlines warning about the potential risks of tap water, particularly water that may be contaminated with the parasite* Cryptosporidium*.... [N]ational media attention has been focused on the issue for several reasons. First, the Natural Resources Defense Council—one of the country's most respected environmental groups—warned consumers about the dangers of* Cryptosporidium *in municipal water supplies. Next, the Centers for Disease Control and Prevention (CDC) released guidelines for immuno-compromised people who are concerned about the safety of their drinking water. Finally, the media has been extensively covering congressional activity on water safety.*
>
> *Naturally all of this has resulted in increased consumer awareness and concern about the safety of water.... The good news is that bottled water is a safe alternative. IBWA member companies produce safe, high-quality, strictly regulated products. The challenge for the industry is one of communication: how can we get the facts about bottled water to consumers?*[57]

In response, the industry has made a major effort to train its staff to "explain" why bottled water is safer than tap water and to place media stories focusing on the high quality of bottled water. These representatives portray their products as entirely free of any contamination and free of risk from *Cryptosporidium* and any other contaminants.[58]

Bottled water industry advertising materials and "fact sheets" routinely state that bottled water is pure or entirely free of contaminants. A widely circulated IBWA question-and-answer fact sheet for consumers is one typical example:

> ***How do I know that Cryptosporidium is not in my bottled water?***
> *For starters, bottled water companies are required to use approved sources.... By law, [springs and wells] must be protected from surface*

intrusion and other environmental influences. This requirement ensures that surface water contaminants such as Cryptosporidium *and* Giardia *are not present.... All IBWA member companies that use municipal supplies are encouraged to employ at least one of the three processing methods recommended by [CDC] for effective removal of microbial (surface water) contaminants, including* Cryptosporidium.

Does bottled water contain any chlorine or harmful chemicals?

No.[59]

As discussed in Chapter 3 and the accompanying *Technical Report*, these blanket reassurances of absolute purity of all bottled water are incorrect. At least one sample of about a quarter of the bottled waters we tested violated strict state (California) health standards or warning levels, and about one fifth of the waters exceeded unenforceable state or industry bacteria guidelines. Moreover, it is incorrect to assert that simply because water comes from a well or a spring it is immune from *Cryptosporidium* or other microbial contaminants of potential concern. Several waterborne-disease outbreaks—including outbreaks of *Cryptosporidium*-induced illness—have been caused by tap water taken from contaminated wells or springs.[60] There is no reason to believe that bottled water taken from springs, wells (or from tap water or other sources, for that matter) is necessarily impervious to such contamination; only strong regulatory controls of water sources and strict treatment mandates (controls well beyond the weak federal bottled water rules) can ensure that no microbial contaminants are present.

While it appears that many consumers who turn to bottled water do so out of concern about the safety of their tap water, some also have switched to bottled water because they are turned off by tap water's taste and odor (such as the pungent chlorine smell and taste) and simply prefer the taste and smell of bottled water. In addition, Americans are choosing bottled water as what industry insiders call a "refreshment beverage," because it is marketed and viewed as a light, clear, caffeine-, salt-, and sweetener-free, and healthful alternative to soft drinks like Coke and Pepsi.[61]

In fact, a 1993 poll of people who drink bottled water[62] found that 35 percent of bottled water drinkers used it primarily out of concern about tap water quality. Another 12 percent chose bottled water because of both safety or health concerns and the desire for a substitute for other beverages (see Figure 2). Thus, as of 1993 at least, nearly half (47 percent) of bottled water drinkers used it at least partially out of concern for their health and safety. Another 35 percent drank it as a substitute for soft drinks and other beverages. Seventeen percent said they chose bottled water for other reasons—such as "taste" (7 percent) or "convenience."

It is absolutely clear, therefore, that a leading reason for the explosion in bottled water sales is the public perception, fueled by heavy industry advertising, that bottled water is pure and pristine, and thus a healthier choice than tap water.

SELLING BOTTLED TAP WATER

What exactly are consumers getting for their money? Is the bottled water industry's carefully marketed image of absolute purity and pristine sources an accurate reflection

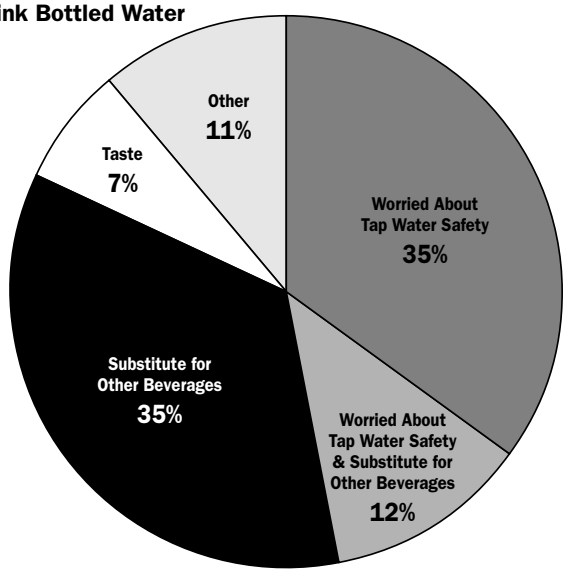
of where bottled water comes from, and is the water really so immaculately pure compared with tap water?

Government and industry estimates indicate that about 25 percent to 30 percent of the bottled water sold in the United States comes from a city's or town's tap water—sometimes further treated, sometimes not.[63] One IBWA expert reportedly estimated in 1992 that 40 percent of the bottled water was derived from tap water.[64] The percentage of bottled water derived from tap water may be rising, because some major bottlers have begun to sell new brands of water derived from city tap water.

One extremely popular newly launched brand of bottled water is Pepsico's Aquafina® brand (which reportedly has taken Pepsi into the top 10 sellers of bottled water in the United States, with sales jumping 126 percent in one year to more than $52 million in 1997, according to the trade press).[65] Aquafina® bottles, which picture beautiful stylized mountains on the label, do not mention that the water is derived from municipal tap water. The water reportedly is treated tap water taken from 11 different city and town water supplies across the nation.[66] Pepsi executives defend the practice. In a 1997 report, "Pepsi spokesman Larry Jabbonsky made no apologies for the Aquafina label or advertising and said Pepsi isn't hiding anything. He said anyone can find out the true source of Aquafina by calling the 800 number on the bottle top."[67] Coca-Cola, according to some accounts, is also very interested in the high profit potential of entering the U.S. bottled water market and has carefully tracked Pepsi's success with Aquafina.[68]

Other bottlers also use tap water as their source. For example, it has been reported that in south Texas, a brand of bottled water called Everest, with mountains on the

FIGURE 2
Why People Drink Bottled Water



Source: American Water Works Association Research Foundation, *Consumer Attitude Survey on Water Quality Issues*, p. 19 (1993).

label, lists the source as the municipal water supply of Corpus Christi, which, as one report noted, "is hard by the Gulf of Mexico and nowhere near Everest or any other mountain." [69]

NRDC's testing found that some brands of bottled water that claim to be spring water or that do not indicate that they are from a municipal source have likely been chlorinated—a sign that they are likely derived from a municipal source, even though one of bottlers' key selling points is the lack of chlorine taste and odor in their product. For example, tests of two different samples of Safeway Spring Water, sold in California, chemically resembled tap water, in that it contained substantial levels of trihalomethanes—common by-products of chlorine disinfection.*

In addition, some cities recently have announced that they plan to enter the bottled water market by selling their water untreated in bottles.[70] Houston, for instance, has announced that it will sell its self-proclaimed "Superior Water"—city water taken straight from the tap and pumped into bottles.[71] Other cities including Kansas City and North Miami Beach are said to be evaluating plans to sell their water in bottles.[72]

Recent FDA rules now in force do require that if water is taken from a municipal source and not treated further, the bottle label must indicate that it is "from a municipal source" or "from a community water system."[73] However, if the water is treated using any of several common technologies (some of which could fail to filter out certain contaminants, depending upon the treatment used), there is no requirement to label its municipal source.[74] Apparently, Pepsi is permitted to not mention on the Aquafina® label that its water derives from municipal tap water, because it considers its water "purified water" under this exception.‡

Government and industry estimates indicate that about 25 percent to 30 percent of the bottled water sold in the United States comes from a city's or town's tap water—sometimes further treated, sometimes not.

* It is possible, albeit unlikely, that true spring water could have been chlorinated prior to bottling.

‡ No quantitative data are publicly available regarding whether this practice is in widespread use beyond the Aquafina® label. Moreover, due to the lack of state and FDA resources dedicated to monitoring the bottled water industry, the prevalence of the now unlawful practice of bottling untreated tap water from a public water system without labeling its municipal water source is unknown.

CHAPTER 3

Bottled Water Contamination: An Overview of NRDC's and Others' Surveys

Setting aside the question of whether bottled water is as pure as advertised, is the public's view that bottled water is safer than tap water correct? Certainly the aggressive marketing by the bottled water industry would lead us to believe so.

NRDC undertook a four-year, detailed investigation to evaluate the quality of bottled water. We reviewed published and unpublished literature and data sources, wrote to and interviewed by phone all 50 states asking for any surveys of bottled water quality they have conducted or were aware of, and interviewed experts from FDA. In addition, through three leading independent laboratories, we conducted "snapshot" testing of more than 1,000 bottles of water sold under 103 brand names.

What NRDC has found is in some cases reassuring and in others genuinely troubling. The results of all testing NRDC conducted is presented in Appendix A; Figure 4 on page 27 summarizes the results.

The bottled water industry generally has publicly maintained that there are no chemical contaminants in bottled water. For example, as noted in Chapter 2, a widely disseminated fact sheet on bottled water distributed by the International Bottled Water Association (IBWA)—the industry's trade association—states flatly that bottled water contains no chlorine or harmful chemicals.[75]

However, our investigation has found that potentially harmful chemical contaminants are indeed sometimes found in some brands of bottled water. (*The box on page 36 highlights a particularly troubling example.*) NRDC's testing of more than 1,000 bottles of water (for about half of FDA-regulated contaminants; see the *Technical Report*), found that at least one sample of 26 of the 103 bottled water brands tested (25 percent) contained chemical contaminants at levels above the strict, health-protective limits of California, the bottled water industry code, or other states* (23 waters, or 22 percent, had at least one sample that violated enforceable state limits). We found only two waters that violated the weaker federal bottled water standards for chemicals (in two repeat samples), and two waters that violated the federal

* For cost reasons, we did not test for any radiological contaminants.

TABLE 2
Selected Contaminants of Potential Concern for Bottled Water

Contaminant	Health Concern with Excess Levels
Coliform Bacteria	Broad class of bacteria used as potential indicator of fecal contamination; may be harmless of themselves. Harmful types of coliform bacteria (such as certain fecal coliform bacteria or *E. coli*) can cause infections with vomiting, diarrhea, or serious illness in children, the elderly, and immunocompromised or other vulnerable people.
Heterotrophic Plate Count (HPC) Bacteria	Potential indicator of overall sanitation in bottling and source water; may be harmless of themselves. In some cases may indicate presence of infectious bacteria; data show sometimes linked to illnesses. Can interfere with detection of coliform bacteria or infectious bacteria. Unregulated by FDA.
Pseudomonas aeruginosa bacteria	Possible indicator of fecal contamination or unsanitary source water or bottling. Can cause opportunistic infections. Unregulated by FDA.
Arsenic	Known human carcinogen. Also can cause skin, nervous, and reproductive or developmental problems.
Nitrate	Causes "blue baby" syndrome in infants, due to interference with blood's ability to take up oxygen. Potential cancer risk.
Trihalomethanes (i.e., chloroform, bromodichloromethane, dibromochloromethane, and bromoform)	Cancer of the bladder, colorectal cancer, possibly pancreatic cancer. Also concerns about possible birth defects and spontaneous abortions.
Phthalate (DEHP)	Cancer; possible endocrine system disrupter. Unregulated by FDA.

Source: NRDC

standards for coliform bacteria in one test (though another batch of both of those waters tested clean for bacteria). The *Technical Report* also discusses evidence provided by other investigators who in the past found that chemical contaminants were found in bottled water at levels violating the federal bottled water standards.[76]

Thus, in our limited bottled water testing, while strict health-protective *state* limits for chemicals sometimes were not met by about one fourth of the waters, the weaker *federal* bottled water standards generally were not violated. As noted in Table 2, among the chemical contaminants of greatest potential concern in bottled water are volatile organic chemicals, arsenic, certain other inorganic chemicals, and plastic or plasticizing compounds. Although most bottled water contained no detectable levels of these contaminants, or contained levels of the contaminants lower than those found in many major cities' tap water, we determined that one cannot assume on faith, simply because one is buying water in a bottle, that the water is of any higher chemical quality than tap water.

NRDC TESTING METHODOLOGY

NRDC began during the summer of 1997 to test bottled water quality and continued testing or retesting some brands through early 1999. Our testing methodology is

summarized in Table 3, and described in greater detail in the accompanying *Technical Report*. We conducted a four-pronged testing program, using three of the nation's most respected laboratories: two major independent commercial labs and one academic laboratory. In this four-pronged testing program, we tested water sold in the five states with the highest bottled water consumption in 1994 (California, Florida, Illinois, New York, and Texas), plus bottled water sold in the District of Columbia.[77] We tried to test major brands that held a significant percentage of the national or regional market share (for those brands for which market-share information was available), and we strove to purchase a variety of other brands and types of water, including the major bottled water products offered by some of the leading supermarket chains in the areas where the water was purchased.

The first prong of our survey was a preliminary screening of 37 California bottled waters in the summer and fall of 1997. The second involved detailed testing of 73 California waters in late 1997 and early 1998. The third was a survey of five bottled waters from each of five states other than California (a total of 25 waters) in late 1997 and early 1998. The final prong involved retesting more than 20 in which contamination had been found in earlier tests, which took place in mid- to late-1998 and early 1999.

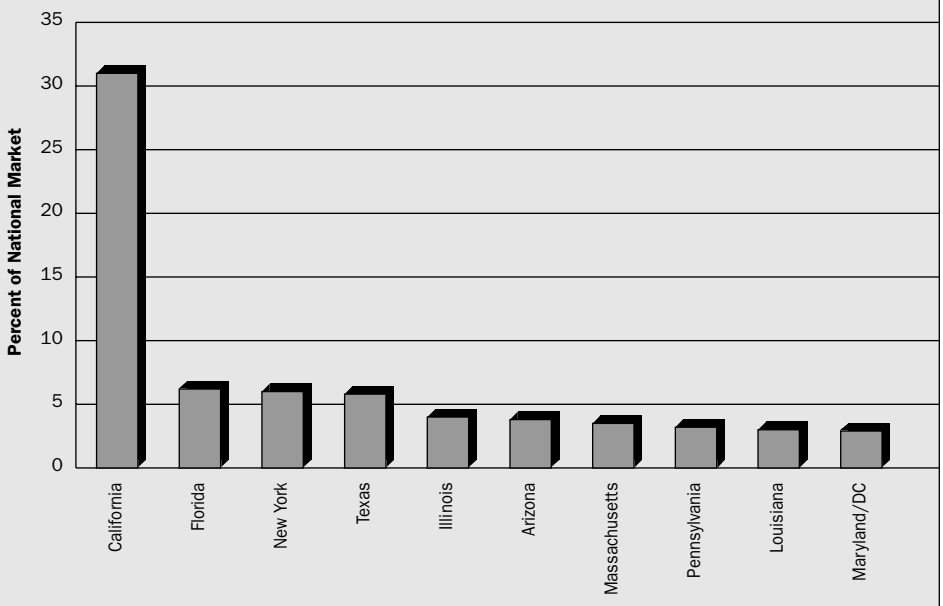
We sampled the most waters from California, whose residents are by far the greatest consumers of bottled water in the nation. More bottled water is purchased in California than in the next five largest consuming states combined (see Figure 3). California generally has the most stringent standards and warning levels applicable to bottled water in the nation.

All of the labs we contracted with used standard EPA analytical methods for testing water. We conducted "snapshot" testing—that is, we purchased several bottles of a single type of water, at a single location, and had those bottles tested. If

TABLE 3
Summary of Lab Testing Protocols

Lab	# of Brands of Water Tested	Number of Contaminants Tested	General Testing Protocol	Comments
Environmental Quality Institute (Univ. N.C.)	37	41 regulated, over 40 unregulated	EPA analytical methods, single bottle sampled per contaminant type	Initial screening of California Waters to determine whether more in-depth testing needed.
Sequoia Analytical	73	32 regulated, over 40 unregulated	EPA analytical methods, FDA protocol for sampling (test 1 composite sample of 10 bottles for chemical and microbial contaminants; 10 individual bottles tested for microbial follow-up if excess bacteria found in first round)	More extensive testing of California waters only.
National testing	25	57 regulated, over 200 unregulated	EPA analytical methods, FDA protocol for sampling (test 1 composite sample of 10 bottles; 10 individual bottles of all tested for bacteria)	Testing of waters from 5 states outside of California (NY, FL, TX, IL, and DC).

FIGURE 3
U.S. Bottled Water Market Share 1994 (%)



Source: Beverage Marketing Corporation, *Bottled Water in the United States, 1996 Edition*

we found a problem, we generally repurchased and then retested the water to confirm the earlier results.[78] Our testing methodology is summarized in Table 3, and described in greater detail in the accompanying *Technical Report*.

We asked the labs to use their standard contaminant test packages in order to control the total testing costs. In general, this meant that the labs tested for many of the most commonly found regulated contaminants, plus certain other contaminants that they could readily detect and quantify using the standard EPA methods and the analytical equipment they routinely use. Thus, some labs were able to detect more contaminants than others, though all tested for a core set of more than 30 regulated contaminants.

SUMMARY OF RESULTS OF NRDC TESTING

NRDC testing: the good news

First, the good news: Most brands of bottled water we tested were, according to our "snapshot" analyses of a subset of regulated contaminants, of relatively good quality (i.e., they were comparable to good tap water). Most waters contained no detectable bacteria, and the levels of synthetic organic chemicals and inorganic chemicals of concern for which we tested were either below detection limits or well below all applicable standards.

Caveats. This is not to say that all of these brands are without risk. One of the key limitations of the testing is that most tests were done just once or twice, so we could have missed a significant but intermittent problem. Numerous studies of source-

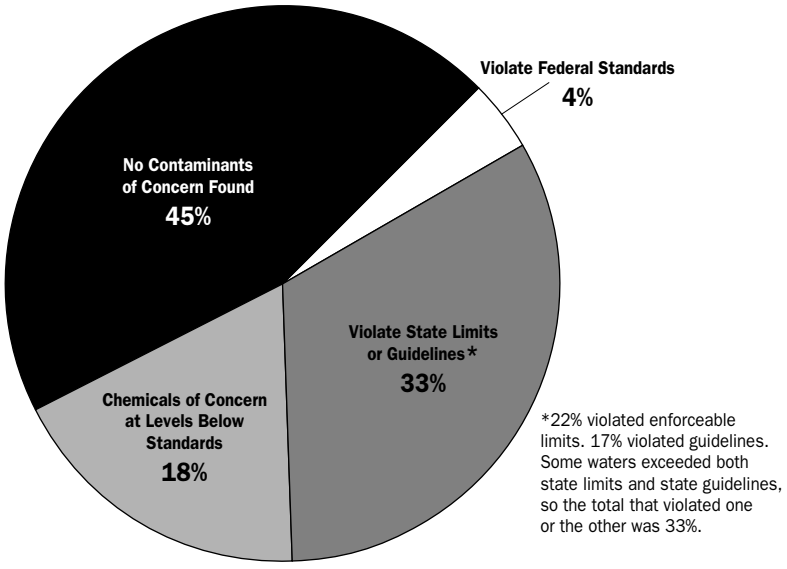
water quality—particularly surface-water sources and shallow groundwater sources—demonstrate that source-water quality may substantially vary over time.[79] Operation, maintenance, or other mishaps at a bottling plant may cause periodic water-contamination problems that would not be detected by such "snapshot" tests. Thus, depending upon the bottler's source water, treatment technology (if any), and manufacturing, operation, and maintenance practices, some bottled waters' quality may vary substantially with time and with different production runs.

In addition, while we did test for dozens of contaminants at a cost of from about $400 to about $1,000 per type of water per round of testing (depending on the intensity of the testing), we were unable to test for many contaminants that may be of health concern. Thus, as is discussed in the accompanying *Technical Report*, we were unable to test for many kinds of bacteria, parasites, radioactivity, and toxic chemicals regulated by EPA and FDA in tap water or bottled water because such testing would have been even more expensive or difficult. Still, with those caveats, many bottled waters do appear to be of good quality, based on our limited testing.

NRDC testing: the bad news

For some other bottled waters, the story is quite different. The independent labs that conducted testing for NRDC found high levels of heterotrophic-plate-count bacteria in some samples, and in a few cases coliform bacteria (no coliforms were found in retests of different lots of the same water). The labs also found that some samples contained arsenic (a carcinogen) and synthetic organic chemicals (SOCs, i.e., man-made chemicals containing hydrogen and carbon), such as those contained in gasoline or

FIGURE 4
Contaminants Found in Bottled Water



Percentages indicate % of waters for which at least one test found containment. Number of waters tested: 103.
Source: NRDC, 1997–1999

used in industry. SOCs found included the probable human carcinogen phthalate (likely from the plastic water bottles), and trihalomethanes (cancer-causing by-products of water chlorination, which have been associated with birth defects and spontaneous abortions when found in tap water at high levels).*

A detailed review of all our testing results and those of other investigators is presented in the accompanying *Technical Report*, and the actual results for each brand of bottled water we tested are presented in Appendix A. In summary, our testing of 103 types of water found:

▶ **Violations of state standards.** At least one sample of about one fourth of the bottled waters bought in California (23 waters, or 22 percent) violated enforceable state limits (either bottled water standards or mandatory warning levels).

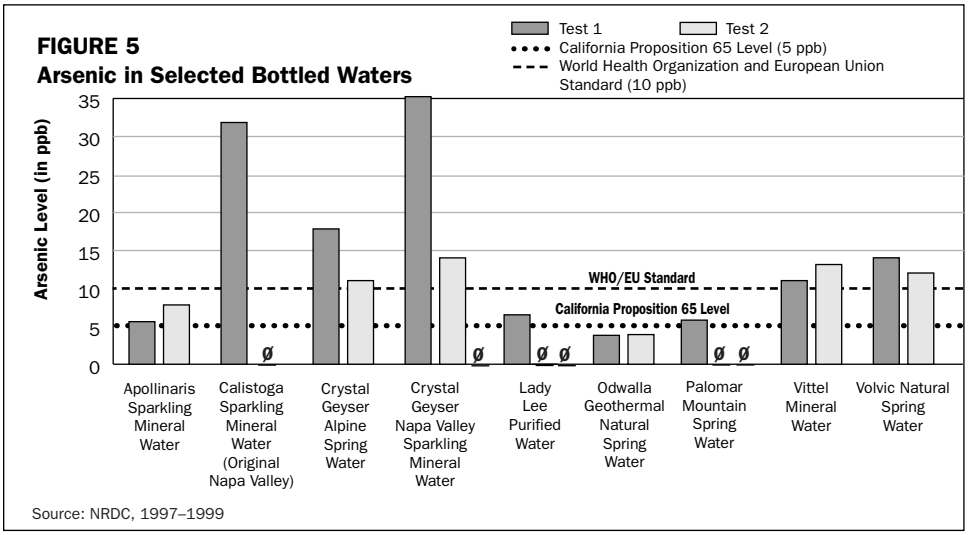
▶ **Violations of federal bottled water quality standards (coliform bacteria and fluoride).** Based on limited testing, four waters violated the weak federal bottled water standards (two for coliform bacteria that on retest contained no coliforms, and two for fluoride that were confirmed on retest to contain excessive fluoride). Coliform bacteria in water may not be dangerous themselves, but they are widely used as an indicator that may signal the presence of other bacteria or pathogens that could cause illness. Fluoride at excessive levels can cause mottling or dental fluorosis (pitting of teeth), skeletal fluorosis (adverse effects on bones), and cardiovascular and certain other health effects.[80]

▶ **Arsenic contamination.** Arsenic is a "known human carcinogen" when in drinking water; it also can cause many other illnesses, including skin lesions, nervous-system problems, and adverse reproductive and cardiovascular effects (the precise levels in drinking water necessary to cause these effects are the subject of heated debate).[81] Our testing found that one or more samples of eight waters (8 percent) purchased in California exceeded the 5 ppb warning level for arsenic set under California's Proposition 65, a law requiring public warnings if a company exposes people to excessive levels of toxic chemicals.‡ (See Figure 5.)

▶ **Trihalomethane violations.** Trihalomethanes (THMs) are a family of chemicals created when chlorine is used to disinfect water (chlorine reacts with organic matter

* Throughout this report and the attached *Technical Report* we refer to two categories of chemicals for which we tested, semivolatile synthetic organic chemicals and volatile organic chemicals (VOCs). Technically, synthetic organic chemicals (SOCs) include any man-made chemicals—including nonvolatile, semivolatile, and volatile—that contain hydrogen and carbon. We, EPA, and FDA refer to VOCs as a shorthand for volatile synthetic organic chemicals, and to semivolatile SOCs as separate types of chemicals, even though many VOCs are also a type of SOC. The reason for differentiating between these two categories of contaminants is that EPA standard methods for testing for them are different, and because both EPA and FDA rules tend to artificially distinguish between VOCs and SOCs—the later being shorthand for semivolatile SOCs.

‡ None of the waters we tested exceeded the FDA and EPA standard for arsenic in water of 50 ppb. That standard originally was set in 1942 and is 2,000 times higher than the level EPA recommends for ambient surface water for public-health reasons; it also is 5 times higher than the World Health Organization and European Union arsenic-in-drinking-water limit. Congress has required that the EPA standard be updated by the year 2001. For reasons discussed in the accompanying Technical Report, many public health, medical, and other experts believe that the current EPA/FDA standard is far too high.



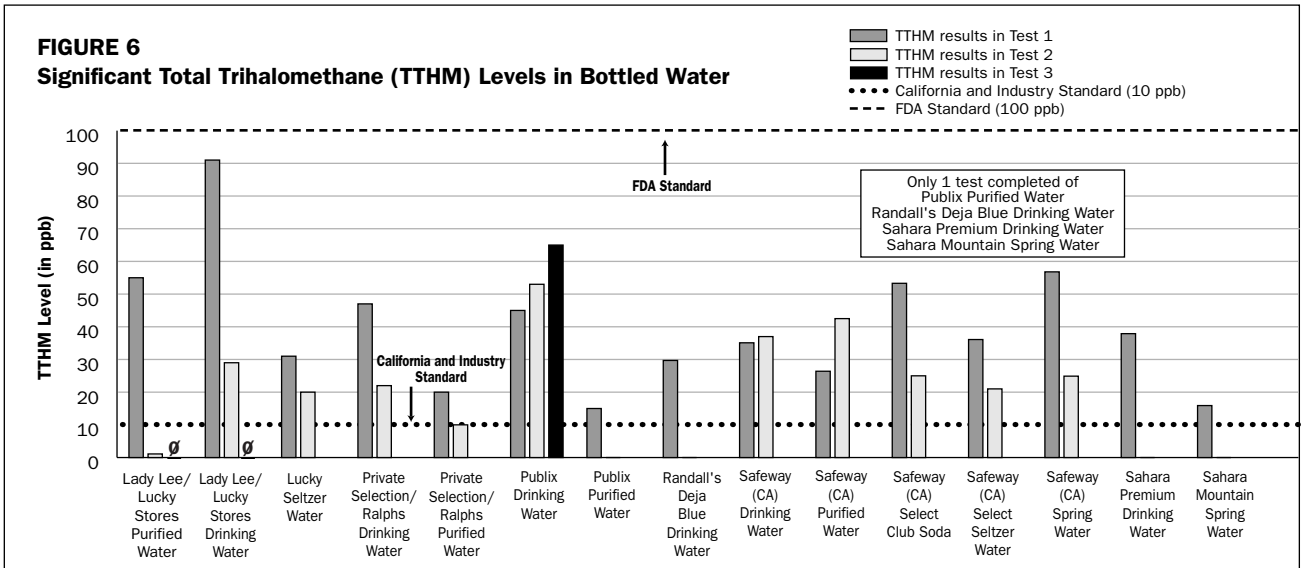
in the water to form THMs and other byproducts). Studies of people and animals exposed to THMs in their tap water have found elevated risks of cancer[82] and potentially a higher risk of spontaneous abortions and birth defects.[83] California has adopted a 10 ppb total THM limit, a standard recommended by the International Bottled Water Association (IBWA), the bottled water industry trade association. Twelve waters (12 percent) purchased in California had at least one sample that violated the state and IBWA bottled water standard for THMs. (See Figure 6.) Two waters sold in Florida exceeded the IBWA standard (Florida repealed its 10 ppb TTHM standard in 1997), and one sold in Texas violated the IBWA standard (Texas has not made the stricter 10 ppb standard enforceable). Chlorinated tap water also typically contains THMs (generally at levels above 10 ppb if the water is chlorinated), though many people who buy bottled water to avoid chlorine and its taste, odor, and by-products may be surprised to learn THMs are sometimes found in bottled water as well.

▶ **Excessive chloroform.** Chloroform is the most common THM found in tap and bottled water; it is of particular concern because it is listed by EPA as a probable human carcinogen. Twelve waters purchased in California had at least one sample that exceeded the warning level for chloroform (a trihalomethane) set by California under Proposition 65, but they were sold without the required health warning (see Appendix A).

▶ **Excessive bromodichloromethane (BDCM).** BDCM is another THM that EPA has listed as a probable human carcinogen. Ten waters we bought in California that contained unlawful TTHM levels also had at least one sample that exceeded the Proposition 65 warning level for bromodichloromethane. These waters all were sold with no health warning that they contained BDCM at a level above the Proposition 65 level.

▶ **Excessive heterotrophic-plate-count (HPC) bacteria.** HPC bacteria are a measure of the level of general bacterial contamination in water. HPC bacteria are not necessarily

FIGURE 6
Significant Total Trihalomethane (TTHM) Levels in Bottled Water



Source: NRDC, 1997–1999

harmful themselves, but they can indicate the presence of dangerous bacteria or other pathogens and are used as a general indication of whether sanitary practices were used by the bottler. Nearly one in five waters tested (18 waters, or 17 percent) had at least one sample that exceeded the unenforceable microbiological-purity "guidelines" adopted by some states for HPC bacteria (500 colony-forming units, or cfu, per milliliter). (See Figure 7.) These states use unenforceable HPC-bacteria "guidelines" to measure bacterial contamination and sanitation. These state guidelines actually are weaker than voluntary HPC guidelines used by the industry trade association to check plant sanitation (200 cfu/ml in 90 percent of samples taken five days after bottling), and are weaker than the European Union (EU) standard (100 cfu/ml, at bottling at 22 degrees Celsius).

▶ **Elevated nitrate, but at levels below standards.** Nitrate can be present in water as a result of runoff from fertilized fields or lawns, or from sewage; nitrate also may occur naturally, generally at lower levels. At elevated levels, nitrate can cause blue-baby

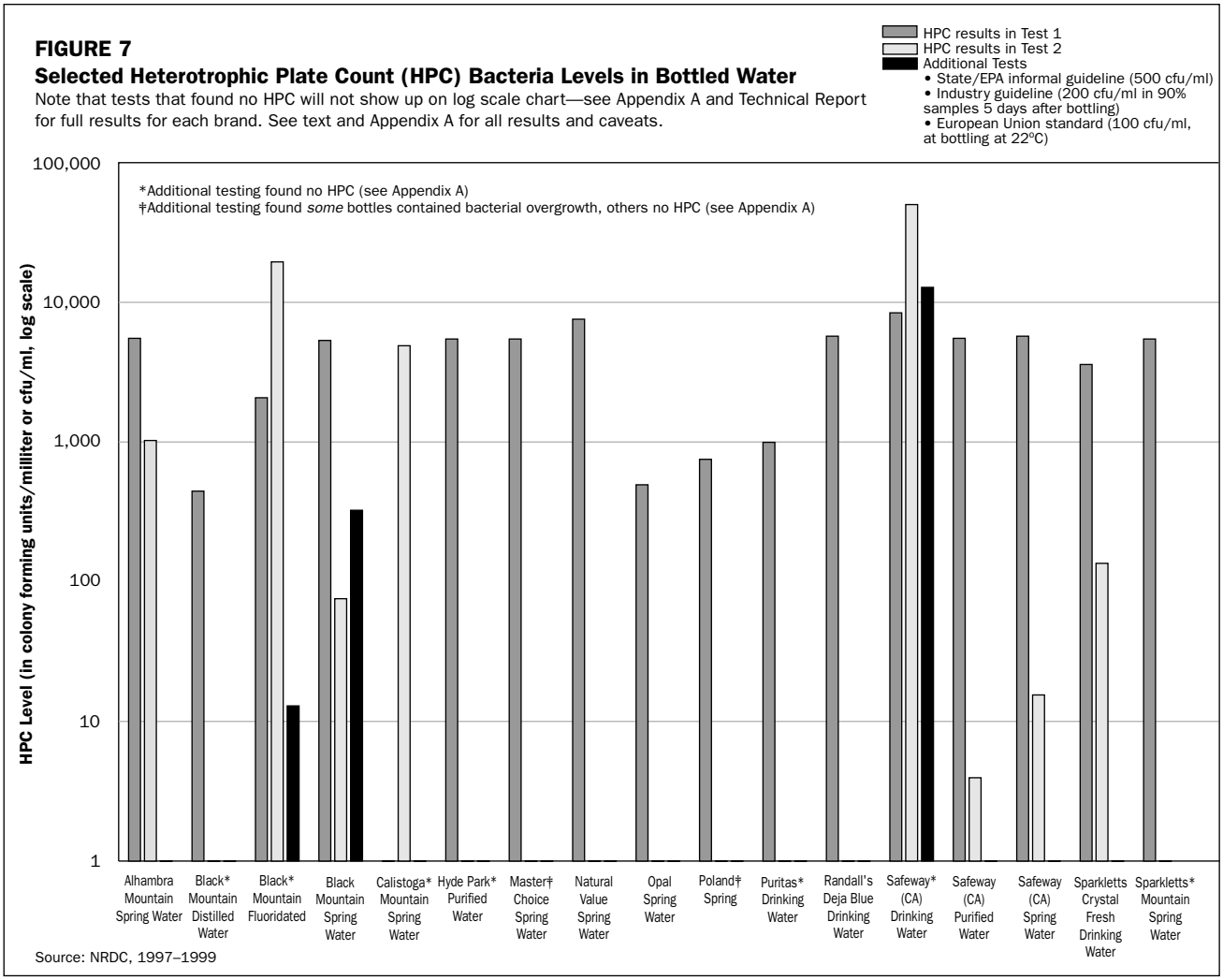
Table 4
Selected Nitrate Levels Found in Bottled Waters

Bottled Water Brand	Nitrate Level (as Nitrogen, in ppm) *(First Test)*	Nitrate Level (as Nitrogen, in ppm) *(Subsequent Tests, If Any)*
Fiuggi Natural Mineral Water	2.5	
Hildon Carbonated Mineral Water	5.6	5.4
Hildon Still Mineral Water	5.6	
Perrier Sparkling Mineral Water	2.8, 2.6	4.3, 4.1
Sahara Mountain Spring Water	2.5	
Sparkling Springs	3.1	

Source: NRDC, 1997–1999

syndrome—a condition in infants in which the blood has diminished ability to take up oxygen, potentially causing brain damage or death; according to some, nitrate may be linked to cancer in adults.[84] The EPA and FDA standard for nitrate is 10 parts per million (ppm). There is spirited debate about whether these standards are sufficient to protect all infants in light of some studies suggesting ill effects at lower levels,[85] but both EPA and the National Research Council maintain that the current standard is adequate to protect health.[86] We found six bottled waters that had at least one sample containing more than 2 ppm nitrate; four of these had at least one sample containing more than 3 ppm nitrate (two contained up to 5.6 ppm nitrate in at least one test). (See Table 4.) Four of the six waters containing higher nitrate levels were mineral waters. The U.S. Geological Survey says that nitrate levels in excess of 3 ppm may indicate human-caused nitrate contamination of the water,[87] although it may be that some mineral waters naturally contain higher nitrate levels. To be safe, babies probably should not be fed with mineral water containing elevated nitrate levels.

FIGURE 7
Selected Heterotrophic Plate Count (HPC) Bacteria Levels in Bottled Water
Note that tests that found no HPC will not show up on log scale chart—see Appendix A and Technical Report for full results for each brand. See text and Appendix A for all results and caveats.



Source: NRDC, 1997–1999

▶ **No fecal coliform bacteria or *Pseudomonas aeruginosa*.** Although, as noted previously, we did find total coliform bacteria in a few samples, no fecal coliform bacteria or *E. coli* bacteria were found. Earlier studies have found multiple species of the bacteria *Pseudomonas* in bottled water.[88] However, in an effort to control costs, we looked only for the species *Pseudomonas aeruginosa* and found none.

▶ **Synthetic organic chemicals at levels below enforceable standards.** About 16 percent of the waters (16 of 103) had at least one sample that contained human-made synthetic organic chemicals (SOCs) at levels below state and federal standards. The most frequently found SOCs were industrial chemicals (e.g., toluene, xylene, and isopropyltoluene), and chemicals used in manufacturing plastic (e.g., phthalate, adipate, and styrene). As discussed in the accompanying *Technical Report*, some of the chemicals found (such as phthalate) may pose health risks such as potential cancer-causing effects, even if present at relatively low levels. Generally, long-term consumption (over many years) is required to pose such chronic risks. The levels of these contaminants found in our testing are indicated in Table 5.

▶ **Overall contamination findings.** Overall, at least one sample of about one third of the tested waters (34 waters, or 33 percent) contained significant contamination (i.e., contaminants were found at levels in excess of standards or guidelines). This is not simply the sum of the waters that violate enforceable standards plus those that exceeded guidelines, as some waters violated both.

The detailed results of our testing for each type of water are presented in the *Technical Report*. As is discussed there, testing by states and by academic researchers have also sometimes found the contaminants we studied or other potentially toxic and infectious agents in some brands of bottled water.

OTHER SURVEYS OF U.S. BOTTLED WATER QUALITY

Relatively little information about bottled water quality is readily available to consumers. Few surveys of bottled water quality have been conducted in the United States during the past four years, and fewer still are widely available.

A handful of state governments have done surveys in recent years. Kansas has done a small survey of certain waters sold in the state,[89] Massachusetts prepares an annual summary of industry testing of waters sold in that state,[90] and New Jersey issues an annual summary, primarily of industry testing of water sold there.[91] In addition, Pennsylvania periodically issues a small state survey of waters sold locally,[92] and Wisconsin issues a small annual testing of about a dozen state waters.[93] In general, these states have reached conclusions similar to those we have reached: that most bottled water is of good quality but that a minority of the bottled water tested contains contaminants such as nitrate or synthetic organic chemicals, in a few cases at levels of potential health concern. These surveys are summarized in detail in the *Technical Report*.

A few academicians have published papers focusing on bottled water contamination from specific types of contaminants. For example, academic studies

TABLE 5
Selected Synthetic Organic Compounds (Other Than THMS) in Bottled Water

Bottled Water (and State of Purchase)	Xylene Level (ppb)	Toluene Level (ppb)	Other VOCs Found (in ppb)	Comments
Alhambra Crystal Fresh Drinking Water (CA)	2.7 (test 1) 0 (test 2)	12.5 (test 1) Not Detected (test 2)	Not Detected (tests 1 & 2)	Xylene and toluene below FDA & CA standards, but presence could indicate treatment standard violation.
Black Mountain Spring Water (CA)	Not Detected (tests 1–3)	8.9 (test 1) Not Detected (tests 2 & 3)	Not Detected (tests 1 & 2)	Toluene below FDA and CA standards but presence could indicate treatment standard violation.
Lady Lee Drinking Water (Lucky, CA)	2.9 (test 1) Not Detected (test 2)	11.0 (test 1) 0.5 (test 2)	Not Detected (tests 1 & 2)	Xylene and toluene below FDA & CA standards, but presence could indicate treatment standard violation.
Lady Lee Natural Spring Water (Lucky, CA)	3.0 (test 1) Not Detected (test 2) 0 (test 3)	13.9 (test 1) Not Detected (test 2) 0.5 (test 3)	Not Detected (tests 1 & 2)	Xylene and toluene below FDA & CA standards, but could indicate CA treatment standard violation.
Lady Lee Purified Water (Lucky, CA)	9.4 (test 1) Not Detected (test 2)	9.5 (test 1) Not Detected (test 2)	Ethylbenzene 2.0 ppb (test 1) Ethylbenzene not detected (test 2) Ethylbenzene not detected (test 3) Methylene Chloride 4.1 ppb (test 3)	Xylene , toluene, methylene chloride, and ethylbenzene below FDA & CA standards, but could indicate CA treatment standard violation. Methylene chloride standard is 5 ppb.
Lucky Sparkling Water (w/rasberry)(CA)	Not Detected	Not Detected	p-isopropyltoluene 5.4 ppb	Single test; no standard for p-isopropyltoluene.
Lucky Seltzer Water (CA)	Not Detected (tests 1 & 2)	Not Detected (test 1) 1.8 (test 2)	n-isopropyltoluenene at 230 ppb (test 2) n-butylbenzene at 21 ppb (test 2) Neither detected in test 1	Source of elevated level of n-isopropyl-toluenene and of n-butylbenzene contamination unknown; no standards apply.
Dannon Natural Spring Water (NY)	Not Detected (tests 1–3)	Not Detected (tests 1–3)	Methylene chloride at 1.5 ppb (test 3) Methylene chloride not detected in tests 1 & 2	FDA's Methylene chloride (dichlormethane) standard is 5 ppb.
Nursery Water (CA)	3.2 (test 1) Not Detected (test 2)	12.4 (test 1) 0.6 (test 2)	Styrene 3.0 (test 1) Not Detected (test 2)	Xylene, toluene, and styrene below FDA & CA standards, but could indicate CA treatment standards violation.
Perrier Mineral Water (CA)	Not Detected (tests 1–3)	Not Detected (tests 1–3)	2-Chlorotoluene 4.6 ppb (test 1)(test 1) 2-Chlorotoluene 3.7 ppb (test 2) 2-Chlorotoluene Not Detected (test 3)	No standard for 2-chlorotoluene; contamination from unknown source.
Polar Spring Water (DC)	Not Detected	2.5	Not Detected	Toluene detected at level below FDA standard (single test).
Publix Drinking Water (FL)	Not Detected (tests 1–3)	Not Detected (tests 1–3)	Acetone 11 ppb (test 1) Acetone 14 ppb (test 2) Acetone 16 ppb (test 3) Styrene 0.6 ppb (test 1) (No styrene found tests 2–3)	Styrene found at level well below EPA Health Advisory level; no standard or Health Advisory for acetone.
Publix Purified Water (FL)	Not Detected	Not Detected	Styrene 0.2 ppb	Styrene found at level well below EPA Health Advisory level (single test).
Safeway Purified Water (CA)	Not Detected (tests 1 & 2)	8.4 (test 1) Not Detected (test 2)		Toluene detected at level below FDA and state standard, but could indicate CA treatment standard violation.
Safeway Spring Water (CA)	3.1 (test 1) Not Detected (test 2)	14.2(test 1) Not Detected (test 2)		Xylene and toluene below FDA & CA Standards, but could indicate CA treatment standard violation.
Safeway Spring Water (DC)	Not Detected	4.7		Single test, toluene below FDA standard.

Source: NRDC 1997–1999

have focused on *Pseudomonas* bacteria in various brands of bottled water,[94] the leaching of chemicals from plastic manufacturing (such as phthalates)[95] from plastic bottles into the water, or contamination of bottled water with certain volatile synthetic organic compounds.[96] The researchers often tested only a relatively small number of brands of water, or failed even to name which bottled water was tested, making the information of limited value to consumers seeking to select a brand of water that is uncontaminated. Comprehensive studies of Canadian bottled waters also have been published—without naming the brands with problems. The results of many of these studies are in the *Technical Report*, which presents in greater detail the evidence of microbiological and chemical contamination of bottled water.

POTENTIAL FOR DISEASE FROM BOTTLED WATER

As is discussed in the accompanying *Technical Report*, there is no active surveillance for waterborne disease from tap water in the United States, nor is there active surveillance of potential disease from bottled water. There are certain "reportable" diseases, such as measles, which are reportable to CDC and state health departments, and for which there is active surveillance. Most diseases caused by organisms that have been found in bottled water, however, are not reportable, and in any event may come from a variety of sources, so the amount of disease from microbiologically contaminated bottled water (or tap water) is unknown. Thus, since no one is conducting active surveillance to determine if waterborne illnesses are occurring, even if waterborne illness from bottled water were relatively common, it would be unlikely that it would be noticed by health officials unless it reached the point of a major outbreak or epidemic.

There are cases of known and scientifically well-documented waterborne infectious disease from bottled water, but most have occurred outside of the United States (see *Technical Report* and Appendix B). However, there clearly is a widespread potential, according to independent experts, for waterborne disease to be spread via bottled water.[97]

BOTTLED WATER AND VULNERABLE POPULATIONS

Many people who are especially vulnerable to infection (such as the infirm elderly, young infants, people living with HIV/AIDS, people on immunosuppressive chemotherapy, transplant patients, etc.) use bottled water as an alternative to tap water out of concern for their safety. Some leading public-health experts, therefore, argue that bottled water should be of higher microbiological quality than most foods.[98] In fact, health-care providers and other professionals often recommend that people who are immunocompromised or who suffer from chronic health problems drink bottled water. Indeed, FDA's guidance for immunocompromised people (posted on the FDA Web site) recommends that people with lowered immunity should "drink only boiled or bottled water...."[99]

Immunocompromised people often are not aware of the need to ensure that they are drinking microbiologically safe water or are vaguely aware of this issue but

simply switch to bottled water on the assumption that it is safer than tap water. As discussed previously and in detail in the accompanying *Technical Report*, this may not be a safe assumption.

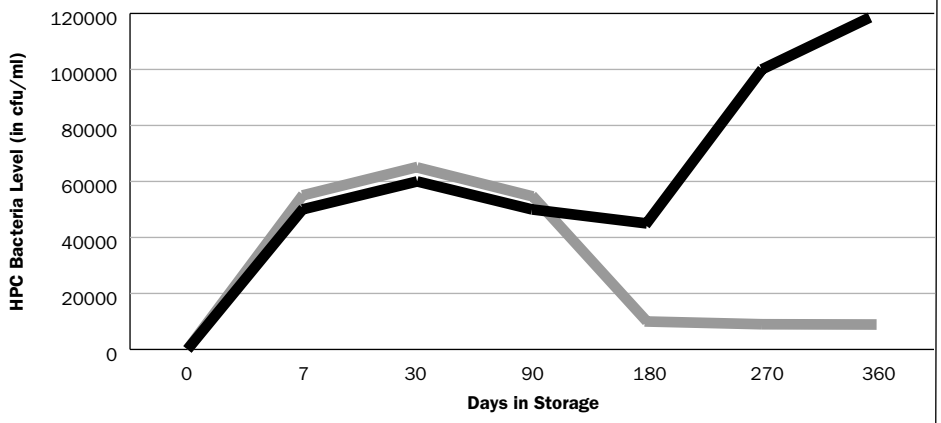
BOTTLED WATER STORAGE AND GROWTH OF MICROORGANISMS

Bottled water often is stored at relatively warm (room) temperatures for extended periods of time, generally with no residual disinfectant contained in it. As noted in the *Technical Report* and shown in Figure 8, several studies have documented that there can be substantial growth of certain bacteria in bottled mineral water during storage, with substantial increases in some cases in the levels of types such as heterotrophic-plate-count-bacteria and *Pseudomonas*[100] Studies also have shown that even when there are relatively low levels of bacteria in water when it is bottled, after one week of storage, total bacteria counts can jump by 1,000-fold or more in mineral water.[101]

CONCLUSIONS REGARDING BOTTLED WATER CONTAMINANTS

Our limited "snapshot" testing, and that published in a few other recent surveys of bottled water, indicate that most bottled water is of good quality. However, our testing also found that about one fourth of the tested bottled water brands contained microbiological or chemical contaminants in at least some samples at levels sufficiently high to violate enforceable state standards or warning levels. About one fifth of the brands tested exceeded state bottled water microbial guidelines in at least some samples. Overall, while most bottled water appears to be of good quality, it is not necessarily any better than tap water, and vulnerable people or their care providers should not assume that all bottled water is sterile. They must be sure it has been sufficiently protected and treated to ensure safety for those populations.

FIGURE 8
Bacterial Growth in Two Bottled Waters



Source: Adapted from P.V. Morais and M.S. Da Costa, "Alterations in the Major Heterotrophic Bacterial Populations Isolated from a Still Bottled Mineral Water," *J. Applied Bacteriol.* v. 69, pp. 750–757, Figure 1 (1990).

An Example of Industrial-Solvent Contamination of Bottled Water[102]

One particularly troubling case of industrial-chemical contamination of bottled water arose in Massachusetts. Massachusetts Department of Public Health files reveal that the Ann & Hope commercial well in Millis, Massachusetts, for years supplied several bottlers, including Cumberland Farms, West Lynn Creamery, Garelick Farms, and Spring Hill Dairy with "spring water" sold under many brand names.

According to state officials and records, this well is located literally in a parking lot at an industrial warehouse facility and is sited near a state-designated hazardous-waste site. Several chemical contaminants were found in the water, including trichloroethylene (an EPA-designated probable human carcinogen). On at least four occasions these chemicals were found at levels *above* EPA and FDA standards in the well water. Dichloroethane, methylene chloride, and other synthetic organic chemicals (industrial chemicals) were also found, though the source of these contaminants reportedly was not identified.

Contamination was found in the water in 1993, 1994, 1995, and 1996, but according to a state memo written in 1996, "at no time did Ann & Hope [the well operating company] do anything to determine the source of the contamination nor treat the source. Rather, they continued to sell water laced with volatile organic compounds, some of which were reported in finished product." The contamination levels depended on pumping rates from the wells. After a state employee blew the whistle on the problem and demanded better protection of bottled water in the state, she was ordered not to speak to the media or bottlers and was reassigned by Massachusetts Department of Public Health supervisors to other duties, in what she alleges was a retaliatory action. State officials deny that her reassignment was due to retaliation. The well reportedly is no longer being used for bottled water after the controversy became public.

CHAPTER 4

Gaping Holes in Government Bottled Water Regulation

The bottled water industry often makes the claim that it is far better regulated than tap water suppliers are. For example, the International Bottled Water Association (IBWA) testified in 1991 that "When compared to the level of regulation and scrutiny applied to tap water...bottled water consumers come out way ahead."[103] IBWA asserted that "If one considers the full range of FDA consumer protection standards, bottled water safeguards have been more complete and protective for a longer time than tap water standards."[104]

This continues to be the industry argument. In a 1998 fact sheet, for example, IBWA contends, "Quality is in every container of bottled water. It's consistent and it is inspected and monitored by governmental and private laboratories. Unfortunately, tap water can be inconsistent—sometimes it might be okay while other times it is not."[105] The IBWA further declares that "bottled water is strictly regulated on the federal level by the Food and Drug Administration (FDA) and on the state level by state officials. This *ensures* that *all bottled water sold in the United States meets these stringent standards*."[106]

FDA RULES FOR BOTTLED WATER ARE GENERALLY *LESS* STRICT THAN TAP WATER RULES

Our in-depth review indicates that, with few exceptions, federal bottled water regulation is *weaker* than the tap water regulations facing city water supplies. The bottled water industry is disingenuous in pointing out that there are significant flaws in the tap water regulatory scheme, since many more flaws exist in bottled water rules. Although smaller tap water utilities sometimes face less stringent controls than do bigger cities, it still is clear that federal rules for city tap water generally are *more* stringent than those for bottled water.

For many years, under the Federal Food, Drug, and Cosmetic Act (FFDCA), FDA was supposed to adopt and apply to bottled water all EPA tap water standards within 180 days after EPA issued those standards.[107] FDA was authorized

to refuse to apply the EPA tap water standards to bottled water in certain circumstances where it determined and published reasons explaining why they were inappropriate for bottled water.[108] What happened, however, was that rather than affirmatively making such determinations, FDA just could not seem to be able to get around to issuing bottled water standards or making determinations at all.

Historically, FDA has lagged in its obligation to apply the EPA standards to bottled water, having adopted only a fraction of EPA tap water standards and often being severely criticized for its inaction. For example, a 1995 Senate committee report noted:

> *FDA has been slow to act. FDA took 4 years to set standards for the 8 volatile organic chemicals (including benzene) regulated by EPA in 1989. FDA did not set standards for the 35 contaminants covered by EPA's 1991 Phase II rulemaking until December, 1994. Standards for bottled water have not been issued for those contaminants regulated by the [EPA] Phase V rule for tap water, although it was promulgated by EPA in 1992 and became effective for tap water on January 1, 1994.*[109]

Public and congressional criticism of FDA came to a head after benzene was found in Perrier in 1990, and congressional hearings and a General Accounting Office investigation in 1991 revealed widespread failures by FDA to adopt standards and to oversee the bottled water industry.[110] The industry suffered a temporary setback in its growth as a result of the public scrutiny, but ultimately both it and FDA weathered the storm.

The 1996 Safe Drinking Water Act (SDWA) amendments modified the FFDCA to provide that, by operation of law, if FDA does not adopt new EPA tap water rules for bottled water within 180 days, EPA standards will automatically serve as bottled water standards.[111] If FDA decides to adopt its own standards, they must be at least as stringent as EPA tap water standards, unless FDA finds that the contaminant does not occur at all in bottled water—in which case FDA can waive the requirement to have a bottled water standard.[112] The current legal status of bottled water standards for contaminants for which EPA had issued standards for tap water *before* the enactment of the 1996 SDWA amendments, but for which there were no FDA bottled water contaminant standards in effect, is being debated.

We find that although, from 1993 to 1998, FDA adopted some of the additional bottled water standards it was obliged to adopt, little else has changed.

NRDC has carefully evaluated the regulatory framework now, more than seven years after the 1990–1991 storm of controversy swirled around the industry, and more than two years after the enactment of the SDWA amendments of 1996. We find that although, from 1993 to 1998, FDA adopted *some* of the additional bottled water standards it was obliged to adopt (and either decided not to adopt others or simply has not completed rule-making on them), little else has changed.[113]

Gaping holes remain in the regulatory fabric for bottled water, and FDA and state resources dedicated to bottled water protection and enforcement

generally are thin to nonexistent. For example, FDA's head bottled water regulator estimates that FDA has just *one half* of a person (full-time equivalent or FTE) per year dedicated to bottled water regulation.[114] Similarly, bottled water compliance is a low priority for FDA, so specific figures are not kept for resources dedicated to ensuring it meets standards; the compliance office estimated in 1998 that a likely total of "less than one" FDA staff person (FTE) is dedicated to bottled water compliance.[115]

The problems created by this lack of regulatory attention are addressed in detail below. "Voluntary compliance" and "industry self-regulation" seem to be the watchwords for the bottled water industry. While such an approach can be effective with motivated members of an industry, the discussions of contamination problems documented in previous chapters and in the *Technical Report* make it clear that this approach leaves plenty of room for unscrupulous or careless members of the industry to provide substandard products, with little chance of being caught or subject to penalties.

This is *not* to say that bottled water quality is generally inferior to average tap water quality. We do not believe such a statement is warranted, and in fact NRDC has produced numerous reports documenting the contamination problems of tap water.[116]

Our evaluation does show, however, that the regulatory system intended to ensure bottled water quality has enormous gaps. The majority of bottled water, according to FDA, is not covered by federal regulations, and FDA does not regulate or monitor the bottled water that is covered by its rules particularly well.

GAPS AND LOOPHOLES IN FDA REGULATIONS

1. Water bottled and sold in a single state—the majority of bottled water sold in the United States—is not covered by FDA rules, according to FDA.

An estimated 60 to 70 percent of the bottled water sold in the United States is sold in "*intra*state commerce" (i.e., it is bottled and sold in the same state).[117] For example, the large delivered 5-gallon carboy bottles that are put in office or home water coolers are often intrastate waters, as are many of the brands sold in grocery, convenience, and other stores.

FDA says its bottled water regulations apply only to water "that is in, or is intended to be shipped in, *inter*state commerce."[118] (emphasis added) Thus, according to FDA's interpretation, 60–70 percent of the bottled water sold in the U.S.—all bottled water sold in intrastate commerce—apparently is not covered by the FDA rules. This leaves the government regulation of this water, if any, to state governments.

The position that intrastate bottled water is not covered by FDA's rules is based on FDA's interpretation of the limitations of the Federal Food, Drug, and Cosmetic Act,[119] which FDA says allows it to regulate only interstate commerce (i.e., water that crosses state lines). This interpretation of the FFDCA has been questioned by experts,

including some in the bottled water industry.* Indeed, the FDA interpretation of the FFDCA appears to be unduly narrow, in light of the clear nexus between virtually all intrastate bottled water sales and interstate commerce, as demonstrated, for instance, in the fact that packaging materials and consumers of the bottled water frequently come from out of state.

The impact of the narrow FDA interpretation cannot be overstated. Our survey of states, reviewed later in this chapter, found that often states have few if any resources dedicated to policing bottled water. Thus, in many states, compliance with federal and state bottled water standards essentially is discretionary for many bottlers, and the public's only protection is voluntary industry self-regulation. This offers little or no protection from fly-by-night bottlers in some states.

The problem of inadequate regulatory protection for intrastate sales of bottled water was identified in 1991 as a significant problem by the General Accounting Office in a report delivered to Congress.[120] Nothing has been done by FDA or Congress to remedy the federal regulatory gap.

If the product is declared on the bottle ingredient label simply as "water," or as "carbonated water," "disinfected water," "filtered water," "seltzer water," "soda water," "sparkling water," or "tonic water," it is not considered "bottled water" by FDA.

2. FDA's definition of "bottled water" covered by its standards irrationally exempts many types of bottled water.

FDA's rules exempt many forms of what most of us would consider bottled water from its definition of "bottled water," and therefore, according to FDA, exempts them from all of FDA's specific standards for bottled water testing and contamination. If the product is declared on the bottle ingredient label simply as "water," or as "carbonated water," "disinfected water," "filtered water," "seltzer water," "soda water," "sparkling water," or "tonic water," it is *not* considered "bottled water" by FDA.[121] FDA says it exempted these waters because they are "not understood by the public to be bottled water."[122] What *is* covered by FDA's rules? FDA says it regulates products labeled as "spring water," "mineral water," "drinking water," "bottled water," "purified water," "distilled water," and a few other specific categories of bottled water—creating enormous confusion for any consumer seeking to figure out whether FDA rules apply or do not apply to a specific water on the grocery store shelf.

* Some observers have noted that all of the bottled water sold in the United States today is part of a stream of interstate commerce that begins with the extraction of the raw material for the bottles, often out of state, continues with the manufacture of the bottles, labels, caps, and shipping materials, moves on to the bottling facilities and the water extraction itself, the shipping of the water, and ultimately the sale of the water. Each of these steps in producing, packaging, and shipping water generally involves interstate commerce, and individuals who buy water bottled and sold in one state may be from out of state. In addition, any problem with the water (such as illnesses) clearly could directly affect interstate commerce. Interestingly, the IBWA has implicitly argued that FDA's jurisdiction extends to intrastate sales of bottled water. At a congressional hearing at which the inapplicability of FDA rules to intrastate sales was noted, IBWA's then-CEO said:

> *a statement was made this morning which might be confusing, and that is that most bottled water is not in interstate commerce. To the contrary, most bottled water is, because most of the products that are used in the bottled water plants, the bottles, the resin, the coolers, the caps, and labels all come from somewhere else, so in the strictest interpretation, interstate commerce is involved in just about all of our products.*

Statement of William Deal, CEO, IBWA, in "Bottled Water Regulation," Hearing of the Subcommittee on Oversight and Investigations of the House Committee on Energy and Commerce, Serial No. 102-36, 102nd Cong., 1st Sess., p. 107 (April 10, 1991). Therefore, to the extent FDA has interpreted its jurisdiction over bottled water to include only water that crosses state boundaries, some have argued that FDA's interpretation is unduly narrow.

We doubt that most consumers would agree that water in a bottle listed on the ingredient label as "water" or "sparkling water" or "filtered water" should be exempted from the specific health-protection standards that cover any other bottled water. California and some other states have chosen a different course than FDA and regulate all water that comes in bottles likely to be ingested by people as bottled water.[123] We support this approach and recommend that FDA revise its rules to cover all water intended for drinking or culinary purposes that is likely to be ingested by people and that comes in a bottle, as California and some other states have done.

Industry data indicate that these waters that FDA exempts from the definition of bottled water represent a significant chunk of the overall bottled water industry. For example, a report in the beverage-industry trade press noted that in 1996 there were more than 152 million cases of sparkling water sold in the United States.[124] This of course does not include many nonsparkling exempted waters such as "filtered water" or "disinfected water."

For these "non-bottled water" bottled waters, FDA officials have said the specific FDA contamination standards and water-quality testing requirements, as well as the specific bottled water good-manufacturing-practice rules for bottled water, are *not* applicable.[125] Thus, no contamination monitoring is specifically required, and only a vague narrative standard applies, according to FDA, which states that the water cannot be "adulterated" and must be safe, wholesome, and truthfully labeled. These nebulous terms are not defined and, to date, apparently the FDA has never enforced the standard with any of these bottled products.

3. Even water defined as "bottled water" is not specifically required to meet treatment, contamination, or testing standards as strict as those applicable to city tap water.

Water that FDA does define as "bottled water" is not required by federal rules to meet many of the specific standards and testing requirements that apply to city tap water. Some of the important disparities between bottled water and tap water are noted in Table 1 (in Chapter 1), and in Tables 6 and 7. This seems to directly contradict the FFDCA's requirement[126] that bottled water is supposed to be regulated as stringently as tap water.

FDA argues that it retains the authority to act against "adulterated" water (which is not specifically defined) and that its general food-safety authorities give it broad latitude to act if it finds a problem.[127] However, there is no indication that FDA has ever acted—or has any intention of acting—aggressively to implement and enforce treatment standards akin to those applicable to tap water. Moreover, FDA does very little random monitoring on its own of bottled water quality, so there is little assurance that if a problem does exist, FDA would ever find out about it.

Some of the important incongruities between tap water and bottled water standards follow.

Weaker bacteria rules for bottled water. There is a clear prohibition under EPA rules against *any* confirmed *E. coli* or fecal coliform bacteria in *tap* water.[128] FDA has

adopted no such prohibition for *bottled* water.[129] Rather, FDA's rules set a maximum number of total coliform bacteria in bottled water, with no specific prohibition on fecal coliform bacteria or *E. coli* contamination of bottled water.[130] FDA's proposal over 5 years ago (in October 1993[131]) to issue a ban on all coliform bacteria in bottled water has languished. FDA has no specific plans to finalize this rule in the near future.[132]

Moreover, EPA's rules essentially treat excessive heterotrophic-plate-count (HPC) bacteria (i.e., HPC presence greater than 500/ml) in the absence of demonstrated disinfectant residual as a "positive" for total coliform bacteria for most big-city water supplies; no more than 5 percent of all monthly tap water samples can contain total coliform bacteria or HPC under such conditions.[133] FDA has adopted no rules for HPC in bottled water; the agency says if HPC levels exceed 10,000/ml (i.e. 20 times higher than the EPA benchmark for tap water), FDA "will *consider* conducting a follow-up inspection of domestic bottlers...."[134]

In addition, while we certainly do not endorse EPA's water-testing rules for tap water as a panacea for drinking water problems, at least a system serving a larger city (more than 100,000 people) has to test its tap water over 100 times each month for coliform bacteria, on average several times a day.[135] Yet bottled water—even at a huge bottling plant filling millions of water bottles a year—must be tested for coliform bacteria only *once a week* under FDA rules.[136] (IBWA's model industry code recommends daily testing of its members' water, though IBWA's recommendation is not binding unless adopted under state law—an action that most states have *not* taken, as noted in our review of state programs later in this chapter.)

FDA's failure to adopt these bacteriological standards contradicts FFDCA's requirement that FDA standards for bottled water must be at least as strict as tap water standards.[137]

No treatment requirements to remove or kill bacteria and parasites in bottled water. Under EPA's tap water rules, which are less than complete, cities using surface water generally must disinfect their water and filter it to remove not only bacteria (e.g., coliform bacteria and *Legionella*) and viruses, but also certain protozoa such as *Giardia* (unless they can document and obtain formal approval for a filtration waiver because their water is of very high quality and their source water is highly protected from contamination).[138] Yet, as shown in Tables 1 and 6, there are *no* specific FDA standards requiring bottled water to be disinfected or treated in any way to remove bacteria or parasites[139]—another apparent violation of FFDCA's comparability requirement for bottled water and tap water standards.

There are no specific FDA standards requiring bottled water to be disinfected or treated in any way to remove bacteria or parasites.

There is a maximum turbidity standard for bottled water of 5 units (the same as for tap water, though the new tap water maximum is 1 unit effective on December 17, 2001, under a recently issued rule).[140] There is no rule, however, requiring that bottled water average less than 0.5 units of turbidity each month—a requirement that currently applies to tap water and will be dropped (effective on the same date) to 0.3 units (for the 95th percentile level) under the same recent EPA rule. Moreover, while tap water must have ongoing turbidity sampling every four hours, no such

requirement applies to bottled water.[141] The weaker bottled water rule is of concern because turbidity is in many cases the only indication that water is contaminated with parasites.[142]

Despite these serious FDA regulatory gaps, the bottled water industry publicly proclaims, we believe without justification, that consumers should turn to bottled water if they want to avoid *Cryptosporidium* (the protozoan that sickened 400,000 people and killed more than 100 due to tap water contamination in Milwaukee in 1993[143]). IBWA states, for example, that FDA rules "ensure that surface water contaminants such as *Cryptosporidium* and *Giardia* are not present" in bottled water derived from wells and springs, and that it tells its members to use additional treatment if they produce tap-water-derived bottled water, to assure that *Cryptosporidium* cannot get into the bottled water.[144]

Such public proclamations seem to run contrary to the bottled water industry's own privately expressed concerns about the possibility of *Cryptosporidium* in bottled water supplies.[145] Candid internal communications admit that unless all water bottlers adopt adequate treatment to kill or remove *Crypto*, they will have a hard time convincing the public that bottled water is immune from such contamination. For instance, the following appeared in the IBWA's in-house publication, urging bottlers to upgrade their treatment to be sure it meets CDC guidelines for removing *Cryptosporidium*: "How can we expect health groups to endorse our product if we don't ALL meet the [CDC Cryptosporidium removal] guidelines!"[146] (emphasis in original). An excellent question, indeed.

No *Cryptosporidium* and *Giardia* testing for bottled water. EPA's Information Collection Rule has required that over the past couple of years, big cities that use surface water (systems which serve the majority of the U.S. population) generally must test for common parasites such as viruses, *Giardia* and *Cryptosporidium*.[147] By contrast, FDA rules do not specify that *any* water bottlers are *ever* required to do such testing.[148]

Weaker standards for some chemical contaminants in bottled water. The regulatory standards for several chemicals in bottled water are also weaker than the standards for city tap water (see Table 6). For example, FDA has refused to set standards or treatment techniques for acrylamide, asbestos, di(2-ethylhexyl)phthalate (DEHP), or epichlorohydrin,[149] all of which EPA regulates in tap water.*

It is a strange twist indeed that DEHP, a probable human carcinogen, possible endocrine-system disrupter, and agent produced in plastics manufacturing that migrates into water from plastic water bottles, is regulated under EPA tap water rules but not under FDA's bottled water rules.[150] Logic would suggest that if anything, it is more important to control phthalate in bottled water since, it is so

* Acrylamide and epichlorhydrin are chemicals sometimes used in drinking water treatment. EPA requires that any public water system using these chemicals must meet a "treatment technique" intended to ensure safe use of these chemicals. FDA has adopted no such requirement.

TABLE 6
Comparison of Health Standards: Tap Water Versus Bottled Water[a]

Contaminant	EPA Health Goal *(parts per billion)*	EPA Tap Water Standard *(parts per billion)*	FDA Bottled Water Standard *(parts per billion)*	Bottled Water ("BW") vs. Tap Water Standard
Bacteria and Microbial Quality				
E. Coli or Fecal Coliform	0	No confirmed samples of *E. Coli* or fecal coliform allowed	Up to 1 of 10 bottles tested may contain specified levels of any type of Coliform, subject to conditions	BW Weaker
Giardia lamblia	0	Treatment Technique	No Standard	BW Weaker
Legionella	0	Treatment Technique	No Standard	BW Weaker
Standard-Plate-Count Bacteria (Heterotrophic-Plate-Count)	Not Applicable	Treatment Technique	No Standard	BW Weaker
Total Coliform	0	No more than one sample/month may contain *any* total coliform (small systems). Cities: no more than 5% of samples may contain any coliform. No confirmed *E. Coli* or fecal coliform allowed	Specified levels of Total Coliform allowed in up to 1 in 10 bottles tested, subject to conditions; no ban on *E. Coli* or fecal coliform	BW Generally Weaker
Turbidity	Not Applicable	Treatment Technique; 5 NTU[b] maximum; less than 0.5 NTU 95% of time	5 NTU[b] EPA lowered to 1 NTU 12/16/98, effective in 3–5 years	BW Weaker
Viruses	0	Treatment Technique	No Standard	BW Weaker
Chemical Contaminants				
Acrylamide	0	TT	No Standard	BW Weaker
Adipate, (di(2-ethylhexyl))	400	400	400	Same
Alachlor	0	2	2	Same
Antimony	6	6	New standard effective Feb. 1999[c]	Same
Arsenic	50	50	50	Same
Asbestos (>10µm)	7 MFL[d]	7 MFL[d]	No Standard	BW Weaker
Atrazine	3	3	3	Same
Barium	2,000	2,000	2,000	Same
Benzene	0	5	5	Same
Beryllium	4	4	New Standard Feb. 1999[c]	Same
Cadmium	5	5	5	Same
Carbofuran	40	40	40	Same
Carbon Tetrachloride	0	5	5	Same
Chlordane	0	2	2	Same

TABLE 6 (continued)
Comparison of Health Standards: Tap Water Versus Bottled Water[a]

Contaminant	EPA Health Goal *(parts per billion)*	EPA Tap Water Standard *(parts per billion)*	FDA Bottled Water Standard *(parts per billion)*	Bottled Water ("BW") vs. Tap Water Standard
Chlorobenzene	100	100	100	Same
Chromium (total)	100	100	100	Same
Copper	1,300	Treatment Technique	1,000	BW Stricter
Cyanide	200	200	New Standard effective Feb. 1999[c]	Same
Dalapon	200	200	200	Same
2,4-D	70	70	70	Same
Dibromochloro-propane	0	0.2	0.2	Same
o-Dichlorobenzene	600	600	600	Same
p-Dichlorobenzene	75	75	75	Same
1,2-Dichloroethane	0	5	5	Same
1,1-Dichloroethylene	7	7	7	Same
cis-1,2-Dichloroethylene	70	70	70	Same
Trans-1,2-Dichloroethylene	100	100	100	Same
Dichloromethane	0	5	5	Same
1,2-Dichloropropane	0	5	5	Same
Dinoseb	7	7	7	Same
Dioxin	0	0.00003	New Standard effective Feb. 1999[c]	Same
Diquat	20	20	New Standard effective Feb. 1999[c]	Same
Endothall	100	100	New Standard effective Feb. 1999[c]	Same
Endrin	2	2	2	Same
Epichlorohydrin	0	Treatment Technique	No Standard	BW Weaker
Ethylbenzene	700	700	700	Same
Ethylene Dibromide	0	0.05	0.05	Same
Fluoride	4,000	4,000	Range from 800 to 2,400	BW Stricter
Glyphosate	700	700	New Standard effective Feb. 1999[c]	Same
Haloacetic[e] Acids (5)	0	60	None	BW Weaker
Heptachlor	0	0.4	0.4	Same
Heptachlor Epoxide	0	0.2	0.2	Same
Hexachloro-benzene	0	1	1	Same
Hexachlorocyclo-pentadiene	50	50	50	Same
Lead	0	Treatment Technique	5	BW Stricter
Lindane	0.2	0.2	0.2	Same
Mercury	2	2	2	Same
Methoxychlor	40	40	40	Same

TABLE 6 (continued)
Comparison Of Health Standards: Tap Water Versus Bottled Water[a]

Contaminant	EPA Health Goal *(parts per billion)*	EPA Tap Water Standard *(parts per billion)*	FDA Bottled Water Standard *(parts per billion)*	Bottled Water ("BW") vs. Tap Water Standard
Nitrate	10	10	10	Same
Nitrite	1	1	1	Same
Oxamyl	200	200	200	Same
PAHs (benzo(a)pyrene)	0	0.2	0.2	Same
Pentachlorophenol	0	1	1	Same
PCBs	0	0.5	0.5	Same
Phthlate, (di(2-ethylhexyl))	0	6	No Standard	BW Weaker
Picloram	500	500	500	Same
Selenium	50	50	50	Same
Simazine	4	4	4	Same
Styrene	100	100	100	Same
Tetrachloroethylene	0	5	5	Same
Thallium	0.5	2	New Standard effective Feb. 1999[c]	Same
Toluene	1,000	1,000	1,000	Same
Toxaphene	0	3	3	Same
2,4,5-TP (Silvex)	50	50	50	Same
1,2,4-Trichloro-benzene	70	70	70	Same
1,1,1-Trichloro-ethane	200	200	200	Same
1,1-2-Trichloro-ethane	3	5	5	Same
Trichloroethylene	0	5	5	Same
Trihalomethanes	0	80[f]	100	BW Weaker
Vinyl Chloride	0	2	2	Same
Xylenes (total)	10,000	10,000	10,000	Same
Radioactive Substances				
Alpha Emitters	0	15 pCi/L[g]	15 pCi/L[g]	Same
Beta/Photon Emitters	0	4 mrem/yr[h]	4 mrem/yr[h]	Same
Radium (Combined)	0	5 pCi/L[g]	5 pCi/L[g]	Same

[a] Standards for bottled water reported in this table are only those adopted for health reasons and thus do not include secondary "aesthetically based" standards (such as those for color, chloride, iron, aluminum, silver, and manganese) that FDA adopted for aesthetic rather than health purposes; these secondary standards (except those for aluminum and silver) do *not* apply to bottled mineral water.

[b] Nephelometric Turbidity Units (or NTU), is a measurement of turbidity, or water cloudiness.

[c] An explicit mandate adopted by Congress in 1996 would have automatically applied EPA's tap water standard for this contaminant to bottled water, unless FDA adopted a bottled water standard for the contaminant by August 6, 1998. On August 6, 1998, FDA confirmed a "direct final rule" that will apply the 1992 EPA tap water standard for this contaminant to bottled water, effective February 2, 1999. See 63 Fed. Reg. 42198. Until February 2, 1999, there is no bottled water standard for this contaminant.

[d] MFL means Million Fibers of Asbestos per liter of water.

[e] Tap water standard of 60 ppb for 5 haloacetic acids effective December 16, 2001 (except some small systems have until December 16, 2003). See 63 Fed. Reg. 69389 (December 16, 1998).

[f] On December 16, 1998, EPA reduced the tap water MCL for TTHMs to 80 ppb from 100 ppb, effective December 16, 2001 (except some small systems have until December 16, 2003). See Fed. Reg. 69389 (December 16, 1998).

[g] pCi/L means picocuries (a unit measuring radioactivity) per liter.

[h] mrem/yr means a manmade radioactivity annual dose equivalent to the whole body or any internal organ of 4 millirems per year.

Source: NRDC

often sold in plastic bottles that can leach this chemical.

In fact, FDA stated when it decided not to adopt a DEHP standard that it was the only chemical contaminant it had proposed to regulate in that package of standards that it was aware occurred in bottled water at levels over the EPA standard.[151] Some bottlers and members of the plastics manufacturing industry vigorously opposed a phthalate standard, arguing that it would cause some bottled water to be in violation after storage for long periods.[152] As one company put it, "bottled water tested immediately after packaging would meet the 6 ppb [FDA proposed] limit but with storage it is possible that levels might exceed this requirement...[so] the proposed amendment...[would] effectively ban the use of DEHP in closure sealants for bottled water...."[153] Although other members of the bottled water industry supported a phthalate standard,[154] FDA bowed to those who objected, and decided *not* to apply the EPA standard—or any other standard—for DEHP in bottled water.[155] FDA deferred further action on the DEHP standard indefinitely. This appears to be a clear violation of the Federal Food, Drug and Cosmetic Act, which requires bottled water rules to be at least as stringent as EPA's tap water rules.[156]

Similarly, in response to bottled water industry complaints about the burden of having to comply with too many standards (and in particular the costs of testing), in 1996 FDA decided to stay any bottled water standards for nine chemical contaminants that have been regulated in tap water since 1992. The nine were antimony, beryllium, cyanide, diquat, endothall, glyphosate, nickel, thallium, and 2,3,7,8-TCDD (dioxin).[157] In this case, however, the outcome appears as if it will be different. In August 1996, Congress mandated that FDA adopt bottled water standards for those nine chemicals within two years of enactment, or EPA's tap water rules for those contaminants would *automatically* apply to bottled water.[158] In response to that congressional mandate, in May 1998, FDA issued a "direct final rule" that would make EPA's tap water standards for these nine contaminants enforceable for bottled water by February 1999.[159] In August 1998, FDA confirmed that the new rules for the nine contaminants would finally be subject to regulation in bottled water as of February 2, 1999[160]—seven years after EPA issued standards for them in tap water.

There is a ray of light in the FDA bottled water regulatory program. FDA's bottled water standards for lead, copper, and fluoride are stricter than EPA's tap water standards (see Table 6).[161] The bottled water industry advocated stricter standards for these contaminants, on health grounds. A cynic might speculate that these standards enable the bottled water industry to claim that its water is more strictly regulated than tap water (a claim some in the industry routinely make) without much of a regulatory bite, since these contaminants are rarely a problem in bottled water. (Lead and copper generally exist in tap water due to leaching from pipes or faucets between the treatment plant and the consumer and should not be found in bottled water; fluoride generally is intentionally added to tap water, though it is sometimes found in bottled water.) However, there is no record of such a rationale influencing the bottled water industry's position.

Weaker chemical-contaminant testing requirements for bottled water. Under EPA rules, a city must test its tap water for many organic chemicals, generally at least *once a quarter*.[162] In some cases (such as for trihalomethanes), city tap water systems must test at several locations each quarter.*

Water bottlers, on the other hand, generally need only test for most chemicals *once a year* under FDA's rules.‡ Moreover, water bottlers currently are exempt from testing for asbestos or phthalate, though there are tap water testing and health standards for these. In addition, tap water supplies must test for 16 additional unregulated contaminants and report the test results to authorities, as noted in Table 7.[163] Thus, it is apparent that bottled water testing requirements for some contaminants are less extensive and in depth than those that apply to city water systems.

Bottlers self-test and do not have to use certified labs to test water; tap water suppliers may only use certified labs. Under EPA's regulations, in order to ensure that water test results submitted by drinking water suppliers are accurate and of the highest quality, most tests must be completed by laboratories certified by a state in accordance with EPA criteria.[164] This helps to ensure consistent quality assurance and quality control, and reduces the chances of inadvertent or intentional inaccuracies in water testing (although in many states, for some systems it is up to the water system to submit the water to the lab for testing, presenting potential opportunities for mischief).

FDA, on the other hand, relies upon water bottler self-testing and self-selection of laboratories, and has refused to require lab certification. This failure to require certified labs came under criticism from General Accounting Office (GAO) investigators. In a critical 1991 report, GAO noted:

> *FDA lacks assurance that such [bottled water] tests are done correctly or that the results are reliable. FDA regulations specify that either "qualified bottling plant personnel" or "competent commercial laboratories" use approved water quality test methods...[but] has not defined qualified personnel or competent laboratories, and it does not require that such personnel or laboratories be certified or otherwise establish their qualifications to do the required tests. In contrast, for public drinking water, EPA requires certified laboratories....*[165]

* 40 C.F.R. §141.30. These tap water monitoring requirements (except for THMs) can sometimes be reduced in frequency for some small systems, or others that the state finds have been demonstrated not to be vulnerable, and that did not detect the contaminant in initial rounds of monitoring. See 40 C.F.R. §§141.24 & 141.61(a); see also Safe Drinking Water Act §1418 (granting monitoring relief in certain cases to small public water systems).

‡Both EPA and FDA require annual or less frequent testing for most inorganic contaminants. See FDA rules at 21 C.F.R. §165.110, and EPA rules at 40 C.F.R. §141.23(c). Additionally, Congress mandated in 1996 that unless FDA issued standards for nine contaminants (antimony, beryllium, cyanide, dioxin, diquat, endothall, glyphosate, nickel, and thallium) by August 6, 1998, EPA's tap water standards for these chemicals (including testing requirements) would automatically apply to bottled water. In May 1998, FDA issued a direct final rule stating it would apply EPA tap water standards for these contaminants in response to this mandate. 63 Fed. Reg. 25764 (May 11, 1998). That rule said, however, that rather than tracking EPA's tap water *testing* regime, FDA would set the monitoring frequency at once per year (instead of following EPA's rules requiring quarterly testing for some organics, and annual or sometimes less frequent testing for inorganics). Because water bottlers objected to some of these monitoring requirements as burdensome, FDA stepped back, saying it could not finalize the monitoring provisions in light of "significant adverse comments," and instead allowed the law to automatically impose the monitoring by the EPA tap water rules. The EPA (and now FDA) testing rules also allow waivers—a provision FDA has not yet explained whether it will use. Thus, how FDA intends to implement the monitoring requirements for these contaminants is murky. See 63 Fed. Reg. at 42198-99 (August 6, 1998).

TABLE 7
Contaminants That Must Be Monitored in City Tap Water but *Not* in Bottled Water

Regulated Contaminants Currently Required to be Monitored in Tap But Not Bottled Water

Asbestos	Haloacetic acids (big cities past, soon all systems)
Bromate (big cities past, soon all systems)	
Di(2-Ethylhexyl)phthalate	

Unregulated Contaminants* Currently Required to be Monitored in Tap But *Not* Bottled Water

Dibromomethane	1,2,3-Trichloropropane
m-Dichlorobenzene	1,1,1,2-Tetrachloroethane
1,1-Dichloropropene	Chloroethane
1,1-Dichloroethane	2,2-Dichloropropane
1,1,2,2-Tetrachloroethane	o-Chlorotoluene
1,3-Dichloropropane	p-Chlorotoluene
Chloromethane	Bromobenzene
Bromomethane	1,3-Dichloropropene

Source: 40 C.F.R. § § 141.21-141.30, 141.40 and 21 C.F.R. § 165.110

* "Unregulated Contaminants" are contaminants not subject to enforceable Maximum Contaminant Levels or treatment requirements, but still required to be monitored for in tap water. "Regulated contaminants" are those subject to enforceable regulations currently, or under rules already promulgated but not enforceable until December 2001.

Even after this GAO report, FDA has twice refused to require that water bottlers use approved certified laboratories—even when the IBWA petitioned FDA to require them. In 1993, FDA argued:

> *the Act does not provide a basis for these [lab] approvals. Moreover, the act does not provide authority to the agency to require such approval. Further, even if such authority were provided by the Act, FDA lacks the resources to monitor analytical laboratories and personnel in the absence of a significant public health problem.*[166]

FDA reiterated this position in 1995.[167]

We disagree with FDA's narrow reading of the law as not authorizing such certification. For example, FFDCA Chapter IV and section 701 provide broad authority to FDA to promulgate such a requirement.[168] FDA takes the position that under its authority under the FFDCA, it can legally require bottlers to use competent commercial laboratories, but for reasons that are not supported, FDA contends that it lacks legal authority to dictate that bottlers must use a certified lab.

In addition, even if FDA did not enjoy the authority to mandate use of certified labs before 1996, Section 410 of the FFDCA as amended by the 1996 SDWA amendments seems to clearly support such a requirement. That newly revised provision of the FFDCA expressly authorizes FDA monitoring regulations for bottled water and makes EPA's tap water rules—apparently including the EPA's certified-lab requirements—automatically apply in the case of FDA inaction.[169] If, indeed, FDA still believes it lacks the legal authority to require certified labs, FDA should ask Congress for such authority.

With respect to resource constraints, FDA could ask Congress for additional resources for the bottled water program. As suggested in the recommendations in Chapter 1, a one-cent-per-bottle fee on bottled water would ease the FDA resource problem. In addition, it would require no expenditure of FDA resources whatsoever

for FDA simply to require that the labs used to test bottled water be EPA-certified (or state-certified with EPA approval) for drinking water testing. This is a common-sense solution that FDA apparently refuses to consider for reasons that are not entirely clear.

While tap water system operators must be trained and certified, bottlers need not be. Under the Safe Drinking Water Act amendments of 1996, tap water suppliers' operators must receive training and be certified as competent to treat water by EPA-approved state authorities, pursuant to federal guidelines for determining the level of competence needed.[170] This requirement is widely viewed as an important development, because it will begin to ensure that opportunities for operator error—often the cause of serious contamination problems and even disease outbreaks in tap water systems—will be reduced.

Although the IBWA petitioned FDA to require certification of bottling-plant supervisory personnel, FDA denied this petition in 1993.[171] FDA reiterated its denial in 1995.[172] As in the case of certifying labs, FDA argued that it lacked the authority and the resources to require such certification of bottling-plant personnel.

Again, we disagree on both points; FFDCA Chapter IV and in particular sections 410 and 701 provide FDA with ample authority to require plant personnel to be competent, particularly in light of the 1996 SDWA amendments' incorporation by reference of EPA's National Primary Drinking Water Regulations to bottled water in cases of FDA inaction. On the issue of resources, creative solutions are available, including asking Congress for funds, establishing a per-bottle fee, and/or using independent, FDA-certified trainers and certifiers (such as state or third-party certification organizations using FDA training and certification guidelines).

FDA's source water approval requirement is essentially meaningless. Theoretically, under FDA rules, the source of bottled water must be approved by state or local authorities.[173] FDA's description of what is required to be an approved source is sketchy: It "means a source of water...that has been inspected and the water sampled, analyzed, and found to be of a safe and sanitary quality according to applicable laws and regulations of state and local government agencies having jurisdiction."[174] There are no guidelines for what is required of these state and local rules, nor is there any explanation of what should be done if there are no state or local rules or jurisdiction.

In discussing why the public should feel comfortable with bottled water quality, the bottled water industry often cites this FDA regulatory requirement for source approval. For example, IBWA's widely disseminated fact sheet for consumers notes:

> *While bottled water originates from* protected sources *(75 percent from underground aquifers and springs), tap water comes mostly from rivers and lakes....*
>
> *[B]ottled water companies are required to use* approved sources*. There are two types of sources from which bottled water can be drawn: the first type is natural sources (i.e., springs and wells).* By law, these sources must be protected *from surface intrusion and other environmental*

influences. This requirement ensures that surface contaminants such as Cryptosporidium *and* Giardia *are not present.*

The second source water type is approved *potable municipal supplies....*[175]

This highly touted FDA-approved-source requirement is, however, in the words of one study, "a regulatory mirage."[176]

There are no specific requirements in FDA rules for protection of bottled water sources from pollution sources (such as setbacks from hazardous-waste dumps, industrial facilities, septic tanks, or underground gasoline storage tanks), nor are there any specific rules for disapproval of sources once they become contaminated. In fact, there are no requirements for bottlers or state or local authorities even to evaluate or document whether any such potential contamination sources may exist. In addition, in 1990, government investigators reviewing bottler records found that 25 percent of the bottlers audited had no documentation of source approval.[177]

This contrasts with requirements for city tap water. Under the 1996 SDWA amendments, states are required to conduct a source-water assessment for public drinking water supplies (i.e., tap water).[178] The assessment is required to delineate the boundaries of the assessment area that supplies the water system and to evaluate known or potential sources of contamination and the susceptibility of the drinking water source to contamination.[179] Millions of dollars in federal funding were made available to conduct these assessments.

There are no specific requirements in FDA rules for protection of bottled water sources from pollution sources.

In the case of bottled water source approvals, however, NRDC's investigation has noted cases in which the source of bottled water either was never assessed by authorities or the assessment overlooked important nearby contamination sources. In such cases, the source is anything but "protected" from contamination. Even in a state with a relatively well-developed bottled water program, like Massachusetts, the source-approval process apparently is essentially pointless. For example, as discussed in Chapter 3, the Millis well, in an industrial parking lot in Massachusetts near a state-designated hazardous-waste site, for several years supplied contaminated water to several major bottlers and was an approved source.[180] If even in an extreme case, such as the Ann & Hope well in Millis, the well meets the "approved source" requirement, the FDA rule appears to have no meaning. Indeed, in our review of scores of bottlers' files maintained by several states, we found *no case* in which source approval was denied or revoked. In the Millis well case, the state said it would allow continued use of the source, despite past contamination, if the water were subject to treatment; apparently the well no longer is used for bottling water.

4. Bottlers may violate FDA standards if the label notes that the water "contains excessive chemical substances."

The problem with FDA bottled water standards is not limited to the gaps in their coverage or lack of certified labs. Many people are stunned to learn that even if bottled water is more contaminated than FDA's standards would otherwise allow, FDA rules (and those of many states) explicitly still allow the water to be sold. The contaminated water may be marketed so long as it says on the label "contains

excessive chemical substances" or "contains excessive bacteria" or includes a similar statement on the label.[181] For example, as discussed in the accompanying *Technical Report*, the state of New Jersey found that Fuentes De Cutolo Spring Water contained nitrate at elevated levels that exceeded the FDA and state standards (as noted in our discussion of nitrate's health effects in Chapter 3 and the *Technical Report*, nitrate can cause blue-baby syndrome in infants if consumed at levels in excess of standards). Rather than taking an enforcement action, the state "requested that this firm either reduce the level of nitrate by treatment or change the product label to include a statement 'contains excessive nitrate'" on its label.[182]

In fact, in a 1996 *Federal Register* notice, FDA sent clear signals to the industry that if a bottler violates FDA standards, in some cases FDA is prepared to take no action so long as the bottle includes such a statement. Responding to industry concerns that bottled water that meets chemical-contamination standards in Europe might violate some proposed FDA rules, FDA pointed out that:

> *if a bottled water product...exceeds an allowable level for a particular contaminant...the bottler can still market that product, provided that the labeling bears a statement of substandard quality (e.g., if it exceeds the allowable level for thallium, the labeling shall state either "Contains Excessive Thallium" or "Contains Excessive Chemical Substances...." Therefore, should a European or American bottled water product exceed the allowable levels of contaminants, it still can be marketed in the United States if its labeling bears the prescribed statement of those contents.*[183]

FDA suggests that it *may* enforce against such labeled contaminated water if it finds that it is "injurious to health" and thus "adulterated"[184]—but there is no requirement that such contaminated bottles even be reported to FDA, and we have been able to find no cases of FDA having taken any enforcement action against any such bottlers.

5. Bottlers are not required to report test results or violations and may dispose of records after two years; tap water suppliers must report results and retain records.

Under EPA rules, tap water suppliers must report their monitoring results and any drinking water standards violations that occur to EPA or, if the state has obtained formal EPA approval to exercise "primary enforcement authority," the water system must report to the state.[185] If there is a serious violation, it must be reported to the state within 48 hours.[186] The state then must report results and violations to EPA,[187] and EPA then posts all violations on the Web for easy public access. In addition, tap water suppliers must keep on hand their bacterial testing results for 5 years, and their chemical tests for 10 years, to allow effective EPA and state inspections.[188]

In contrast, FDA rules include no provision obligating a bottler to notify FDA or a state of test results, contamination problems, or violations, even in the case of contamination that could pose a serious health threat. FDA has refused to require such reporting when called upon to do so during rule-making proceedings.[189]

Answering both criticism of this lack of reporting and questions about how it can effectively track bottler compliance without reporting of test results, FDA said it "does not have the resources to review bottled water test results except during FDA plant inspections."[190] As noted below, however, such FDA inspections are quite rare (every four to five years or less frequently). Moreover, FDA requires bottlers to retain their testing records for just two years[191]—unlike the 5 year/10 year EPA tap water supplier requirement.[192] This means that since FDA inspections are so rare, many contamination problems may never come to FDA's attention, because the record of the event can be discarded before FDA ever reviews the bottler's records.

As GAO has pointed out, such record retention can be critically important "to allow regulatory officials to (1) review historical test data to verify that the tests were done, (2) gain insight into a particular or recurring problem, and (3) learn of and respond to contaminated water problems."[193]

This lack of reporting combined with other shortcomings in FDA's program pose serious problems for enforcement and compliance monitoring. For example, FDA does not maintain an inventory of water bottlers or shippers, so it often must rely upon state authorities for such information.[194] But state programs vary widely, with some having few if any resources dedicated to tracking bottled water (see the state programs section, later in this chapter.) Without an inventory of bottlers or reporting of testing results or violations, it is logistically difficult, to say the least, for FDA to adequately track bottler compliance.

HPC bacteria, Pseudomonas aeruginosa*, algae, and other microbes that may be present only at very low (or nondetectable) levels immediately after bottling can bloom and grow after bottling.*

6. Bottlers are not required to test water after storage, when it may have increased contamination levels, nor are they required to list the bottling dates for their water.

FDA's rules require weekly bacteria testing and annual chemical testing, but this testing is generally done of water at the bottling plant.[195] There is no requirement that bottlers test water after shipping it to stores or after storage. Moreover, FDA has refused requests to require bottlers to place a bottling date on their bottled water, or to require a label suggesting that consumers refrigerate their water after opening to retard bacterial growth.

This is problematic in light of the investigations discussed in earlier chapters of this report indicating that HPC bacteria, *Pseudomonas aeruginosa*, algae, and other microbes that may be present only at very low (or nondetectable) levels immediately after bottling can bloom and grow after bottling. The "FDA acknowledges that some bacteria can grow in bottled water, and that bottled water, unless treated in some manner, is not sterile."[196] But such post-bottling microbial-growth problems are missed under standard "at the bottling plant" testing under FDA rules.

Moreover, if there is no bottling date for bottled water, and no consumer warning to refrigerate after opening, the regrowth in the bottle could become substantial. FDA admits that "[a]dditional bacteria may enter a bottle of water with exposure to air" but argues that bottled water "is not a good source of nutrients for most microorganisms" so no precautions such as date of bottling or refrigeration warnings are needed.[197] As discussed at length in the *Technical Report* on microbial contamination, however,

there are several studies documenting regrowth of *Pseudomonas* and other organisms occurring in bottled water after bottling that make it difficult to accept this unsupportable FDA reassurance.[198]

Similarly, as discussed in Chapter 3 and the *Technical Report*, several plasticizers and other plastic reactants or by-products can migrate from bottles into the water with time. Some studies indicate a steady increase with time of certain cancer-causing and other contaminants in bottles as the bottle slowly leaches out the chemical into the water. Again, if the water is tested only immediately after bottling, such problems will likely never be detected.

FDA PLACES A "LOW PRIORITY" ON BOTTLED WATER: RESOURCES ARE EXTREMELY LIMITED, INSPECTIONS AND ENFORCEMENT ARE RARE

FDA has repeatedly stated that bottled water is low on its priority list. FDA says that "bottled water products are a relatively low public health problem,"[199] and "[i]n this program bottled water plants generally are assigned low priority for inspection.... When compared to products such as low acid canned foods…bottled water products must take a back seat."[200]

In 1995, FDA refused an IBWA petition asking for annual FDA inspections of bottlers, citing low priority and lack of resources.

Indeed, according to FDA staff estimates, the agency has dedicated just *one half of a staff person* (full-time equivalent) to bottled water regulation, and less than one to ensuring bottled water compliance.[201] Because of this low priority, water bottlers can expect to be FDA inspected on average every four to five years or less frequently.[202] GAO found that "FDA inspected about half of 410 domestic bottlers only once in 5¾ years."[203] FDA recently has confirmed that inspections are no more frequent today than they were in 1991, although FDA funds occasional state "contract inspections."[204]

In 1995, FDA refused an IBWA petition asking for annual FDA inspections of bottlers, citing low priority and lack of resources.[205] As the GAO has pointed out, however, inspecting once every five years or less often is far too infrequent to detect certain possible problems. For example, contamination problems may come and go depending on conditions in the source water, on pumping patterns, bottling-plant operation and maintenance practices, etc. Since testing and other records are required to be kept only for two years, there is no requirement to report test results to FDA, and FDA inspects only once every four to five years or less often, it is quite possible that many contamination problems are never detected by FDA.

Moreover, GAO investigators found that when FDA does do inspections, often FDA relies upon the results of the bottlers' self-testing rather than doing independent testing of its own. Even when FDA does do independent testing, it often checks for just a handful of contaminants out of the scores for which FDA rules require monitoring. GAO found that FDA tested for five or fewer contaminants in 94 percent of the FDA tests they reviewed.[206] FDA staff recently admitted there likely has been no major change in testing and inspection practices since the GAO investigation.[207]

Finally, FDA does not inspect foreign bottlers, so the compliance of those bottlers with FDA testing and good-manufacturing-practice requirements is uncertain.[208]

STATE BOTTLED WATER PROGRAMS LACK RESOURCES AND REGULATORY STANDARDS, AND IN SOME CASES ARE VIRTUALLY NONEXISTENT

State programs range from well developed to nonexistent

NRDC conducted a detailed survey sent to all 50 states' bottled water programs, summarized in Appendix C. As a result, we have learned that while some states, such has California, Massachusetts, New Jersey, Texas and Washington have bottled water programs that are relatively well developed, other states have no or virtually no program. Most have not adopted the IBWA model code, some have not adopted all of FDA's standards, and most have few resources dedicated to implementing the program. This makes FDA's heavy reliance upon state programs subject to question.

States are under no legal obligation to adopt the FDA bottled water standards. In fact, FDA has no formal system to track the adequacy of state regulations, inspection results, enforcement, source-water approvals, or other aspects of state bottled water programs. In response to questions from NRDC, FDA could not answer even the most basic questions, such as how many states have adopted FDA standards, nor does FDA maintain its own inventory of all water bottlers. This means that often, if not most of the time, bottled water regulation falls to the states, some of which, as noted below, are ill equipped to take on this role.

State resources

The lack of state resources for bottled water is a major problem. Among the 50 states and the District of Columbia, 13 states told NRDC that they have *no* resources, staff, or budgetary allotments specifically earmarked to implement the state bottled water programs.[209] In addition, 26 states reported having *less than one* full-time staff equivalent (FTE) dedicated to running the state's bottled water program. Only seven states reported having one or more full-time staff people dedicated to implementing and maintaining the state's bottled water program.[210] This makes FDA's heavy reliance upon state programs problematic.

As is detailed in Appendix C, state bottled water programs range from being stricter than FDA's requirements in some areas (e.g., California, Georgia, Montana, New Jersey, New York, Pennsylvania, Texas and Vermont), to proudly proclaiming that they are less strict than federal rules. A few examples of states with less developed programs include:

▶ **Alaska,** which reports that it does not require bottlers to conduct annual testing for chemical and radiological contaminants[211]—despite FDA rules requiring such annual monitoring.

▶ **Arizona,** which reported to NRDC that "the State of Arizona does not currently regulate the bottled water industry."[212] The state says local county health departments have some authority to do so, and that it relies on FDA to deal with interstate water.

▶ **Delaware,** which conducts no active regulatory oversight of the FDA's requirements, nor does it have a permit program. Delaware has no separate state code addressing bottled water and says it has no bottlers in the state.

▶ **Illinois,** which has no state certification or permitting process. Moreover, the source of bottled water is inspected by the state only upon request by the bottler (i.e, no mandatory testing of source waters). Occasionally, however, health inspectors may inspect bottlers as part of an inspection of an otherwise-regulated facility (such as a restaurant or hotel).

▶ **Indiana,** which does not have a separate state code regulating bottled water processing, does not certify sources and does not have a state permit or licensing program.

▶ **Kansas,** which has no separate state regulations and no permit program. In a recent telephone interview, a Kansas state official reported that "Kansas has no statutory authority to issue permits, licenses, or certificates for bottled water processors, plants, or distributors."[213]

▶ **Missouri,** which regulates microbiological contaminants in bottled water and inspects bottled water plants but does not regulate chemical and radiological contaminants—despite FDA rules requiring such annual monitoring. [214]

▶ **North Dakota,** whose Health Department reported to NRDC that "State regulations are far less stringent tha[n] those administered by" FDA. The Health Department also reported that "no enforcement actions" have been taken by the state in the past four years, that "no documented violations or data [are] available," and that "very little, if any, bottled water is tested by our agency. I know of no other State agency that tests bottled water."[215] Additionally, the state does not require bottlers to submit source analysis prior to initiating bottling operations.

▶ **Texas,** whose bottled water program, while stronger overall than that of many states, has less than one FTE dedicated specifically to the state's bottled water program. Texas reports that there are currently more than 300 bottlers operating within its borders.[216]

▶ **Utah,** which does not currently approve sources and does not have a permitting program for water-bottling facilities.

▶ **Virginia,** which does not certify sources, nor does it have a permitting program. Virginia reports that it is not "empowered to permit or license."[217]

Thus, it is apparent that some states have put few if any resources into their bottled water program. FDA's reliance upon state programs to assure compliance is, in many states, misplaced.

There are noteworthy exceptions to our general finding that state programs lack the necessary resources and programs to justify FDA's reliance. Encouragingly, a handful of states seem to have placed a greater priority on making sure that bottled water is consistently safe, healthy and free of contaminants for consumers. In

addition, some states, while not necessarily imposing strict and comprehensive bottled water programs across the board, have adopted small but significant advances that may help to improve bottled water protection at least somewhat.

States that have adopted at least some progressive regulatory innovations include:

▶ **California,** which has adopted stricter regulations for many contaminants than FDA, including lower allowable THHM levels and tougher disinfection rules, and has a fairly well developed regulatory program. Moreover, California citizens have adopted Proposition 65, a law that requires, among other things, that those doing business in the state must provide a clear and reasonable warning if they or their products expose people to toxic chemicals. This law applies to bottled water as well as to other consumer products.

▶ **Florida,** which reports that it has two full-time staffers dedicated to its bottled water program and has its Food Laboratory collect and analyze random samples of bottled water off retail food shelves. However, the state does not routinely publish the results of its testing to consumers.

▶ **Louisiana,** which samples end product every three months, from both in- and out-of-state bottlers. As in Florida, however, Louisiana does not publish its test results to inform consumers.

▶ **Maine,** which, in addition to following FDA labeling rules requiring that finished-product bottled water violating FDA standards must say so on the label, also requires that contaminants that exceed maximum contaminant levels (MCLs) in the *source water* be listed on the label. Although the state does not require that bottlers list analytical results on the labels (making this optional at the prerogative of the bottler), it does require that a bottler list on its label any altered water quality.

▸ **Maryland,** which requires that bottlers conduct an EPA primary drinking water analysis of its source.

▶ **Massachusetts,** which publishes an annual public report that summarizes the bottler-filed bottled water quality testing results. The report can be misleading, however, because in many cases it does not mention known contamination incidents.

▶ **Mississippi,** which tries to sample each bottled water product sold in the state on a monthly basis for *E. coli*. and other bacteria.

▶ **Montana,** which requires that all in-state bottlers become Public Water Systems and meet EPA drinking water standards prior to start-up.

▶ **Nevada,** which requires that a bacteriological analysis be submitted every week to the Department of Human Resources, Health Division, if a plant is in full operation.

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▶ **New Jersey,** unique in its requirement that a bottler list a two-year expiration date (from time of bottling) on its label, also mandates by state statute that an annual enforcement/violation report be compiled and submitted to the state legislature. New Jersey also conducts a limited number of "spot checks" of bottled water sold and produced within the state.

▶ **Ohio,** which requires that any additives to bottled water be listed on labels.

▶ **Texas,** which in addition to having stricter standards and more frequent inspections than FDA, also requires source labeling and certification of operators under its unique Bottled Water Certification Program. Under the program, bottlers are required to attend training/awareness courses sponsored by the state and earn different "grade" levels (grade A being the most stringent) based upon number of classes attended and years in operation. Texas also requires that bottlers resubmit a water-quality analysis annually to an EPA certified lab in order to renew licenses (unless source is municipal).

▶ **Vermont,** which has more stringent testing regulations and labeling requirements than FDA. Vermont requires that the source, the name and address of the bottler, and finished-product levels of arsenic, lead, sodium, and nitrate be listed on bottled water labels.

▶ **West Virginia,** which has more stringent reporting requirements than FDA: Bottlers must test weekly for bacteriological contaminants and submit their reports to the state agency by the 10th of each month. Additionally, West Virginia requires that the source be protected from outside contamination at the point of discharge and the draw area.

▶ **Wisconsin,** which requires, by statute, publication of an annual bottled water quality analysis report. This report evaluates only about a dozen waters sold in the state, however. There are about 24 bottlers in Wisconsin and many more waters imported from out of state.

State regulatory programs, such as those just listed, that have attempted to innovate or to "put some teeth" into both federal and state regulations are to be applauded. Not all state regulatory agencies are provided the resources or legislative authority to implement all of the innovations just described, and many agencies are constantly being challenged to make less do more. Yet, several of the innovations require a relatively low investment of time and state funds, and could be adopted with minimal additional demands on state resources.

One good example of a low-cost, high-return regulatory innovation is the requirement adopted by several states that bottlers submit copies of state and/or federally mandated water-quality tests to the appropriate state agency on a weekly, monthly, or yearly basis rather than merely requiring that bottlers keep copies on hand at the

plant. Similarly, additional contaminant disclosure labeling requirements to require public information about contaminants in the water, have a beneficial effect and carry out the public's right to know. Such requirements, while not compelled under federal regulations, would go a long way in flagging potential health risks early on, while at the same time would provide an obvious incentive for bottlers to remain in compliance with the regulations. Certainly, some of these or similar types of programs are worth consideration by other states when the payoffs are less risk to the consumer and more compliance with the law.

No guarantee of compliance with FDA requirements

Even in states that have adopted FDA standards, there is no assurance that the states are actively enforcing those standards. For example, Alaska has adopted bottled water standards that generally are equal to EPA drinking water standards, in addition to codifying IBWA and FDA standards. Curiously, however, the state of Alaska has unilaterally decided it will not require annual bottlers to conduct chemical and radiological contaminant testing as required under FDA's regulations. Calling such tests "expensive and not necessary,"[218] Alaska has decided it will not require these tests. While it is commendable that the state of Alaska generally has adopted strict regulations for its bottled water, we fail to see the logic (or legality) in openly flaunting a critical portion of the FDA's bottled water regulatory requirements.

It is unclear how many states have unwritten policies of not enforcing part or all of their own or FDA's rules. Such disregard for a federal requirement is unsettling and sets a poor example for other states, which may, in the same spirit as Alaska, simply choose to disregard other vital parts of the federal requirements. FDA relies upon voluntary compliance with federal requirements and has dedicated no resources to auditing or evaluating state-program performance. Unfortunately, in light of the minimal FDA resources dedicated to the bottled water program, we cannot afford to allow the states to pick and choose which federal requirements they are willing to comply with.

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Nonregulated bottled waters

State adoption of FDA regulations becomes especially important when one considers that even the FDA regulations for bottled water have huge gaps through which contaminated waters can easily flow. FDA says its rules do not apply to *intra*state bottled waters (water that is bottled, sold, and distributed entirely within the borders of any one state), nor do they apply to seltzer water, carbonated water, flavored water, and certain other waters noted earlier. There are currently no specific standards (i.e., no required contaminant testing or water-quality standards) that cover the processing, testing, or distribution of these categories of bottled waters.

While many states have adopted their own standards to cover intrastate bottled waters, either by separate state code or by voluntarily extending the FDA regulations to intrastate bottlers, three states (Delaware, Indiana, and Kansas) and the District of Columbia have not adopted their own regulations to cover such water. Moreover, only 35 percent (18 out of 51 states and the District of Columbia) regulate seltzer, carbonated, and/or flavored waters under either the FDA standards or their own

state standards. The undeniable conclusion from these statistics is that, although some states have taken the "extra" steps to ensure that all bottled water is subject to crucial contaminant testing (even where not required under *federal* law), many states have not. There remains an entire category of bottled water actively being distributed to and consumed by the general public that is not subject to any required testing at all in most states.

Source listing and labeling requirements

Only 14 states currently require source listing on the labels of bottled water products.[219] Other states reported having various other labeling requirements in addition to the FDA requirements, mostly aimed at prevention of misbranding.[220] Interestingly, Maine and Texas require bottlers to list contaminants if the source or end product exceeds maximum contaminant levels (MCLs). With the exception of the states just mentioned, no other states have *any* requirements for source or contaminant listing on the labels of bottled water beyond FDA requirements.

Few enforcement actions

FDA generally relies on the states to enforce federal bottled water regulations. Information gathered by NRDC over the last several years from FDA and state agencies charged with enforcing the federal regulations, however, indicates that few, if any, serious enforcement actions have actually been instituted by the states. Of the 50 states and District of Columbia, only about half[221] report having taken *any* enforcement action in the past four years, and most of those were in the form of warning letters from the appropriate state agency requesting that bottlers come into compliance with regulatory requirements. Only a handful of states reported having to shut down bottlers or enforce involuntary recalls in the last four years.

Optimistically, the lack of enforcement actions could mean that all bottled water processors are virtually always in full compliance with all federal and state testing and health requirements. Yet experience and common sense, as well as our review of state records in some states that gave us access under freedom-of-information laws, point toward a different, less optimistic reality. The scarcity of state resources dedicated to implementation and enforcement of federal and state bottled water regulatory programs lends significant support to the suspicion that the lack of serious enforcement actions is due, in large part, to extreme shortages in state resources for enforcement purposes, rather than lack of violations.

Violation data "unavailable"

Unfortunately, it is nearly impossible to confirm or deny such suspicions. This is predominantly because data on the number and scope of bottled water violations are either not reported or are unavailable to the public in all but 10 of the states.[222] If such violation data were available, a truer picture of the enforcement-to-violation ratio could be compiled, by conducting a relatively simple comparison between the number and scope of enforcement actions in any given state with the number and scope of reported violations.

Without violation data, we are left in somewhat of a void when it comes to rating the quality of enforcement, having only half of the story on which to base our conclusions. Computerized databases would greatly facilitate both record keeping and public access to violation data, and, subsequently, increase accountability of violating bottlers and state enforcement divisions alike. Some states (such as Georgia, Missouri) are to be applauded for developing databases or working toward that end. Most states, however, are unable or unwilling to provide summaries of violations.

State permit programs

It is encouraging that most states report that they have developed and maintain a state permitting or licensing program for bottled water processors. State licensing programs can vary widely from state to state but serve an important function in the battle against compromised bottled water quality. State-issued permits can be a powerful regulatory tool (oftentimes the only enforcement tool used).

As one state official observed, state licensing programs "provide control and leverage both administratively and to the regulatory scheme."[223] Nearly all the states require that bottlers, prior to being issued a license or permit, submit a water quality analysis for both source and end product that is at least as stringent as the FDA requirements. While most permits must be renewed annually, some do not need to be renewed or have renewal periods of three or more years. Notably, California, New Hampshire, New Jersey, New York, Ohio, Rhode Island, Texas, and West Virginia require that a water-quality analysis be resubmitted every year as a prerequisite to license renewal. Yet, even though state licensing is one of the few tools states have at their disposal with proven compliance-forcing clout, nine states and the District of Columbia have not adopted permitting or licensing programs for bottled water processors (Delaware, Illinois, Indiana, Kansas, Michigan, North Carolina, South Dakota, Utah, and Virginia).

Data on the number and scope of bottled water violations are either not reported or are unavailable to the public in all but 10 of the states.

State programs may bend to bottlers' political influence

In addition, even a state that has a well developed program apparently may bend to political pressure from major bottlers. For example, in Massachusetts, Dr. Elizabeth Bourque, a biochemist who for many years ran the state's bottled water program, made a name for herself as an aggressive bottled water regulator.

As noted earlier, the Ann & Hope company's well in Millis, which provided water for several brands of bottled water, became contaminated with industrial chemicals, including trichloroethylene at a level above EPA and FDA standards. Dr. Bourque insisted that strict controls be imposed.[224] She also demanded that when a product from major bottlers, such as Perrier's Poland Spring water, contained high levels of HPC bacteria or chlorine, that action be taken.[225]

After many such aggressive interventions, Dr. Bourque was asked by her supervisors to stop working on these important problems and to instead focus on other work. She did not relent. However, after industry complaints to the Massachusetts Department of Public Health (MDPH) management, and a December 5, 1996, meeting of Nancy Ridley, MDPH Assistant Commissioner, attorneys from a blue-chip Washington, DC,

law firm (representing Perrier), and an official from a bottler that used Ann & Hope water, Dr. Bourque was reassigned to other duties.[226] She also received a written "gag order" that prohibited her from speaking about bottled water to the press, water-analysis labs, federal, state, or local agencies, or bottlers.[227] She and the union that represents state employees protested, alleging that the reassignment was punitive, but got nowhere.[228] State officials maintain that the reassignment was not punitive and was unrelated to any discussions with bottled water companies. Dr. Bourque recently retired.

An investigation by Senator Cheryl Jacques, a state senator who represents Millis, ensued. Senator Jacques' request for all state records relating to the Ann & Hope affair was responded to incompletely, with several key documents apparently not provided to the senator.[229]

It is difficult to know or to document how widespread the bottled water industry's political arm-twisting may be. Still, it appears clear that even in states with relatively comprehensive programs for bottled water, there may be serious limitations to state regulators' ability to vigorously implement the law.

Conclusions about state bottled water programs

A close look at the results of the NRDC surveys of states' bottled water programs makes it difficult to share FDA's confidence in the states' ability to ensure compliance with federal requirements, especially when some states lack even rudimentary permit programs. The reality is that, with few exceptions, state programs lack the necessary resources to provide adequate oversight and enforcement of the state and federal regulatory scheme.

By and large, most state programs appear to be afterthoughts, tacked onto the backs of other state regulatory programs, with little, if any, staff and resources dedicated to ensuring acceptable, healthful bottled water quality. Without the deterrent of consistent, tough rules and meaningful enforcement, water bottlers have little incentive to comply with either federal or state requirements.

Our review of bottled water quality in previous chapters suggests that some bottled water is not of the highest quality. It is likely that a significant amount of bottled water is being consumed without having been subjected to proper and adequate quality testing, putting consumers' health at potential risk. This might not be occurring if states in fact had sufficient resources dedicated to bottled water programs. Moreover, even in states with resources dedicated to bottled water, such as Massachusetts, it is important that meaningful outside oversight take place so powerful political interests or bottlers cannot bend the state agencies to their advantage.

VOLUNTARY INDUSTRY STANDARDS, WHILE COMMENDABLE, ARE NO SUBSTITUTE FOR ENFORCEABLE HEALTH PROTECTION STANDARDS

The International Bottled Water Association (IBWA) has long sought to encourage the industry—particularly the self-proclaimed 85 percent of the industry IBWA claims as its members—to comply with the IBWA model code, and to accept annual inspections by IBWA's contractor NSF International.

While these voluntary industry efforts are commendable, they cannot be viewed as an effective substitute for a strong and enforceable federal regulatory program. IBWA itself seems to have recognized this fact in that it has often petitioned FDA to adopt the IBWA Model Code and other important regulations.

The problems with FDA's and the industry's heavy dependence and faith in the effectiveness of the IBWA voluntary standards are many:

- Voluntary standards apply only to those who agree to them—that is, members of the industry who choose to be IBWA members. By IBWA's count, about 15 percent of the industry does not belong to the organization.
- Industry members who choose to leave IBWA to avoid compliance with the IBWA standards suffer no real consequence.
- Many companies bottle water (such as seltzer, sparkling, or other water) that is not covered under the narrow definition of "bottled water" adopted by FDA rules and the IBWA Model Code. Thus, these waters are exempt from the voluntary industry standards and are not subject to the specific FDA contaminant standards that apply only to "bottled water" (as that term is narrowly defined).
- While some states (according to IBWA, about 16) have adopted the IBWA standards as binding and enforceable, most states have not done so.
- The inspection results after NSF inspections are not shared with regulators or the public, so it is impossible to determine how effective these inspections and IBWA standards truly are.

Thus, while the voluntary industry efforts are helpful, they cannot be a substitute for regulatory controls.

CHAPTER 5

Misleading Bottled Water Labeling and Marketing

In 1995, FDA issued "standards of identity"—essentially labeling rules, in response to a petition from the International Bottled Water Association (IBWA).[230] These rules were widely acclaimed as a breakthrough that would prohibit misleading claims by unscrupulous water bottlers. While the rules do prohibit some of the most egregiously deceptive labeling practices by bottlers, they have by no means eliminated the problem.

SOME BOTTLED WATER LABELS REMAIN MISLEADING TO CONSUMERS

The Institute of Medicine, an arm of the National Academy of Sciences, found in a 1992 study that deceptive bottled water labeling was a widespread practice, with state authorities exasperated about FDA inaction in the face of frequent statements and vignettes indicating or implying that the bottled water was far purer than tap water or came from specific sources or had purity levels that may not have been justified.[231]

Many of these practices continue. For example, FDA rules allow bottlers to call their product "spring water"—which seems to carry cachet with consumers as being especially natural and pure—even though it may be brought to the surface using a pumped well, and even though it may be treated with chemicals. FDA merely requires that the geologic formation that is tapped by the well must come to the surface somewhere, sometimes, to allow the water pumped to the surface in a well to be called spring water.[232] Among the more interesting labels we have run across:

FDA rules allow bottlers to call their product "spring water" even though it may be brought to the surface using a pumped well, and even though it may be treated with chemicals.

▶ **"Spring water" (with mountains and a lake on the label) actually from an industrial parking lot next to a hazardous waste site, ruled not misleading.** A well located in the middle of an industrial warehouse facility and next to a state-designated industrial waste site in Millis, Massachusetts, produced this water, contaminated with industrial solvents including trichloroethylene at levels above EPA and FDA standards. The label gracing at least one of the many brands that used this water depicted a beautiful mountain in a reflection off a lake and was called "spring water." In response to a request from the state of Massachusetts, FDA opined that

this label was acceptable so long as the water does come to the surface sometimes (it sometimes does in an unpaved area near the parking lot), and as long as "there is no claim to the effect that the location pictured in the vignette is the actual spring, we would not consider the label vignette to be in violation of our requirements."[233] Apparently, after public disclosure of the true source of the water and contamination problems, this well is no longer being used for bottled water.

▶ **"Alasika™—Alaska Premium Glacier Drinking Water: Pure Glacier Water From The Last Unpolluted Frontier, Bacteria Free" apparently from a public water supply.** This water actually came from "Public Water System #111241" (a public water system in Juneau, Alaska), according to documents in Washington State files. The bottler evidently was told that when it reordered its labels, it had to state that the water is "from a municipal source" or "from a community water system," in keeping with FDA rules; the phrase "pure glacier water" was, per documents in state files, "considered false and misleading." The bottler was required to drop the "bacteria free" claim, as this was "considered synonymous with sterile and false." This water no longer claims to be "glacier water" or "bacteria free." However, NRDC has found several *other* brands sold as "glacier" water even though they apparently come from groundwater nowhere near any current glacier.[234]

▶ **Vals Water "Known to Generations in France for its Purity and Agreeable Contribution to Health…Reputed to Help Restore Energy, Vitality, and Combat Fatigue."** While the IBWA voluntary code prohibits health claims, some bottlers still make such claims.

In addition to these instances of bottled water labels, far more common—in fact exceptionally widespread—is the use of descriptive terminology that suggests bottled water is extraordinarily pure and uncontaminated. As an example, our review of the labels and Web site vignettes and advertising of about 50 IBWA members found the following terms used:

▶ "Pure"—eight bottlers.
▶ "Purest" or "Purity"—three bottlers.
▶ "Pristine"—five bottlers.
▶ "Glacial"—two bottlers.
▶ "Natural" or "Prepared by Nature"—eight bottlers.
▶ "Naturally Purified" or "Naturally Occurring"—three bottlers.
▶ "Premium"—five bottlers.
▶ "Mountain Water"—seven bottlers.
▶ "Clean"—two bottlers.
▶ "Good Health" or "Healthy"—two bottlers
▶ "For Health Conscious"—two bottlers

Thus, representations about bottled water purity, premium and natural sources, and healthfulness remain extremely widespread. The FDA rules seem to have little effect on bottlers' claims of water purity and cleanliness.

BOTTLED WATER MARKETING IS OFTEN FALSE OR MISLEADING

Bottled water marketing seeks to emphasize the supposed purity of bottled water, in many cases contrasting "pure" and "protected" bottled water with "inconsistent" or unpredictable tap water quality. In the words of a leading industry consultant, "Water bottlers are selling a *market perception* that water is 'pure and good for you....'"[235]

This effort to create a "market perception" of purity is an advertising mandate for the industry, notwithstanding the fact that just because water comes from a bottle does not mean that it is any purer than tap water, as we have seen in previous chapters. Among the common industry claims about bottled water that are of questionable veracity or that are clearly incorrect are:

▶ **Bottled water contains "no" chlorine or harmful chemicals.** This claim is boldly featured on IBWA fact sheets and its Web site.[236] It clearly is false, as previous chapters have shown.

▶ **Bottled water is always high quality, whereas tap water is of inconsistent quality.** IBWA often points out that "unfortunately, tap water can be inconsistent—sometimes it might be okay and other times it is not." On the other hand, IBWA says, "quality is in every container of bottled water. It's consistent and it is inspected and monitored by governmental and private laboratories."[237] What IBWA neglects to point out, however, is that in many cases bottled water does contain contaminants, that most tap water is required to be monitored *more* often than bottled water (and testing must be done by government-certified labs, which is not the case for bottled water), and that about one fourth or more of the bottled water sold in the United States is derived from the same tap water IBWA says is of inconsistent quality.

▶ **No waterborne illness has been traced to bottled water.** IBWA claims that "According to the Centers for Disease Control and Prevention (CDC), bottled water has never been responsible for an outbreak of waterborne illness."[238] In fact, as discussed in the *Technical Report* and Appendix B, there have been waterborne-disease outbreaks traced to bottled water. For example, a bottled water-related cholera outbreak in U.S. territory in the Pacific was written up in 1996 in CDC's flagship journal, *Morbidity and Mortality Weekly Report*, and other outbreaks traced to bottled water in Portugal and elsewhere have been documented.[239]

▶ ***Cryptosporidium* cannot get into bottled water.** The IBWA's fact sheets and Web site make the repeated claim that FDA rules "ensure that surface water contaminants such as *Cryptosporidium* and *Giardia* are not present" in bottled water derived from groundwater, and that all IBWA members using municipal water "reprocess this water [and] employ methods such as reverse osmosis, deionization, distillation, and filtration," implying this eliminates any risk. IBWA also implies that bottled water is safe for the immunocompromised.[240] There is no evidence that bottled water is truly immune from Cryptosporidium or Giardia unless it is fully protected and treated with EPA-CDC recognized best available technologies, and

FDA's Good Manufacturing Practices, source approval, and source-water-testing requirements apply at the source or bottling facility and are impossible for FDA to enforce when such facilities are outside of the United States.

much bottled water does not receive this treatment. Indeed, internal industry communications highlight that IBWA is well aware that some bottlers do not use these treatment technologies.[241]

▶ **Imported bottled water must meet all U.S. rules.** IBWA states that "any bottled water sold in the United States must meet all of the same regulations as domestically produced water."[242] But what is not mentioned is that FDA's Good Manufacturing Practices, source approval, and source-water-testing requirements apply at the source or bottling facility and are impossible for FDA to enforce when such facilities are outside of the United States. FDA does not conduct any foreign inspections of bottlers, so the degree to which foreign bottlers comply with these FDA rules is not known. What is clear, however, is that these FDA rules do not apply equally to foreign bottlers.

Although these claims may not be the most exaggerated of those made by the industry, they are troubling in that all of them are made by the leading industry trade association.

Also of concern is a major IBWA public relations campaign intended to persuade the public to drink more bottled water. The campaign, funded by IBWA members, is aimed to be "a comprehensive campaign to educate third-party groups and the media about the safety and quality of bottled water." The campaign includes slick advertising and fact sheets. Also central are briefings of the media, nonprofit health organizations, and groups representing the immunocompromised and retired persons. The campaign has also taken other steps, such as the sponsorship of an American Dietetic Association meeting. Mailings have been made to thousands of advocacy groups, members of the media, environmental and health groups. Several news stories have been placed, and expanded briefings in more cities were planned.

Thus, in a well-orchestrated effort, the bottled water industry has made major inroads into the public psyche, reinforcing perceptions about the purity of bottled water. While this clearly is within the industry's rights, it is important that bottlers not overstate their case or mislead the public into believing that bottled water is safer or better protected than is the case.

CHAPTER 6

Ensuring Consumers' Right to Know About Bottled Water

Under the 1996 SDWA amendments, *tap* water suppliers are required to issue annual reports to all of their consumers, which many call "right-to-know reports." These reports inform consumers of all contaminants found in their tap water and the standards and health goals for those contaminants, information on the system's compliance with EPA rules, and details on their water source.[243]

After a pitched battle in which consumer and environmental groups fought to get a similar requirement adopted for bottled water, water bottlers were successful at killing a measure that would have required such right-to-know information from bottlers to be provided to consumers.

RIGHT-TO-KNOW INFORMATION FOR TAP WATER, AND INDUSTRY'S OPPOSITION TO IT FOR BOTTLED WATER

The bottled water industry's opposition to a right-to-know requirement applying to bottled water is particularly disturbing in light of the industry's frequent citation of tap water quality problems as a rationale for switching to bottled water. It also is galling because of the industry's open admission that it has substantially benefited from labelling requirements for beverages such as diet soda, which have caused concern among many consumers about the ingredients in these drinks. The IBWA's primary spokeswoman recently noted, for example, that the recent burst in industry sales is linked in part to soda labels, which revealed to consumers just what they were drinking. "The more people realize what's in some of these drinks, the more they turn to water for what it doesn't have...."[244]

An internal communication from the IBWA executive director, obtained by NRDC, bragged about the industry's successful effort to keep consumers in the dark about the quality of the bottled water they are buying:

> *During the [House-Senate SDWA] conference some members wanted the same "right-to-know" provision enacted for bottled water. Although IBWA vociferously opposed any type of right-to-know for bottled water, we were informed by Congressional staff that it was a non-negotiable part of the*

If the bottler finds coliform bacteria, Cryptosporidium, *cancer-causing solvents, or other contaminants in the water, but no violation of FDA's standards is triggered, there is no specific requirement in the FDA rules that such information be provided to consumers.*

> *discussion. Nevertheless, we then met with the House and Senate conference staff to communicate the industry's concerns to this type of notification and were successful in getting...a draft study [evaluating the feasibility of requiring bottled water right-to-know, rather than instituting a requirement] into the bill.... This has been a great victory for the IBWA and the entire bottled water industry!*[245]

Thus, if the bottler finds coliform bacteria, *Cryptosporidium*, cancer-causing solvents, or other contaminants in the water, but no violation of FDA's standards is triggered (either because there is no standard for the contaminant or because it was found at a level below the standard), there is no specific requirement in the FDA rules that such information be provided to consumers.[246]

Neither is the bottler required by FDA rules to disclose information about the source of the water, how well protected that source may be from contamination, or whether an assessment has been performed to determine its vulnerability to contamination. The bottler also has no obligation to disclose how and whether the water is treated.

Therefore, as a result of a successful vigorous lobbying campaign by the bottled water industry against right-to-know requirements for consumers of bottled water, the public likely will know little or nothing about what contaminants are in their bottled water. The FDA "feasibility study" to evaluate requiring right-to-know information for bottled water consumers, referred to by IBWA in the internal communication just quoted, was included in the SDWA essentially as a consolation prize to consumer and environmental groups.[247] It has not yet been issued, even in draft, although the law required FDA to publish a draft by February 1998. FDA issued a *Federal Register* notice late in 1997 asking for public comment on the feasibility of requiring some kind of disclosure for bottled water.[248] The study must be finalized by February 1999,[249] but FDA considers this study to be a low priority and has no firm date for its completion.[250]

The bottled water industry has continued to fight against applying right-to-know rules to its product. When FDA asked for comments on the feasibility of providing information to consumers about bottled water on labels, via the Internet or otherwise, they were inundated by complaints from IBWA and many individual bottlers.[251] IBWA opposed any right-to-know rules and charged that FDA had "exceeded its Congressional mandate" by even asking for comments on the type and contents of reports that might be provided to consumers about bottled water contaminants.[252] One bottler argued that "only the EPA can think up something as dopey as applying" right-to-know requirements to a "discretely-packaged, easily identified, pure food product"[253] like bottled water.

As discussed next, NRDC contends that the time has come for bottled water right-to-know labeling. If right-to-know requirements are good enough for the tap water industry, they're good enough for the bottled water industry, which is charging consumers hundreds of times more for their water per gallon and claiming that consumers should switch from "unreliable" tap water to safer bottled water.

THE NEED FOR RIGHT-TO-KNOW REQUIREMENTS FOR BOTTLED WATER

As President Bill Clinton stated in signing into law the 1996 Safe Drinking Water Act (SDWA) amendments,[254] the public has a right to know about what is in their drinking water, and whether it may pose a risk to their health. NRDC asserts that this right to know applies equally to bottled water as it does to tap water. The National Drinking Water Advisory Council (the congressionally chartered advisory body to EPA on federal drinking water policy) concurs. In its November 1998 recommendations, the council urged that EPA and FDA work together to ensure that information about bottled water be made available in as complete and readily accessible a form to bottled water consumers as tap water information is now available to tap water users.[255]

Millions of Americans rely upon bottled water as an alternative or substitute for tap water—often as a result of the advertising campaigns of bottlers that tout the purity of their water and occasionally denigrate the quality of tap water. The 1996 SDWA amendments require consumers to be directly informed by their tap water supplier about all contaminants in their water (and the health goals and standards for those contaminants), their supplier's compliance with applicable standards, and the source of their water.[256]

NRDC strongly concludes that similar information must be made available to bottled water consumers *on the label* so they can make an intelligent choice as to what water to drink, considering their own and their family's health needs. For example, immunocompromised persons clearly could make use of label information on the microbiological quality of the water, its source, the treatment processes used, if any, and other relevant information. The label should include information about contaminants in the water found at levels above health goals and what health effects those contaminants have, the health goals and acceptable levels of those contaminants, bottler compliance, fluoride and sodium levels, key information on the source and treatment of the water, and a note on how consumers can get more information.

Only if the information is available on the label will consumers be able to make informed choices among the many brands of bottled water, or between bottled water and tap water. To put it bluntly, if, as the industry argues, bottled water is so pure and there is nothing for consumers to be concerned about, why not prove it with full disclosure on the label?

METHODS FOR CONVEYING INFORMATION TO CONSUMERS

Several methods should be used to inform consumers about their bottled water, but the backbone of the effort must be label information.

1. Labels should be used to provide consumer information.

To make information useful to consumers, it must be placed on the label. The label on bottled water is the most important means for communicating information, to consumers. The label should be of sufficient size and contain sufficient information presented in a simple, understandable way, to enable those most at risk from waterborne disease, such as parents of infants, the elderly, and the immunocompromised (or

those wishing to reduce or eliminate their intake of carcinogenic or otherwise toxic chemicals) to make informed decisions when choosing a particular brand of water.

Making information available in a usable and understandable form *on the label* is the most effective way to provide informed consumer choice. After all, bottlers devote an enormous effort and spend millions of dollars to create the wording and appearance of their labels and bottles, precisely because they know that often this is the factor that can most effectively influence consumer choice. The point at which most consumers evaluate products and make final purchasing decisions generally is at the store when the bottle is purchased.

If the information on contaminants is not included on the bottles, it will not add much to consumer awareness or better-informed buying. This is precisely the reason that nutrition information is required by the Nutrition Labeling and Education Act of 1990 to be prominently placed on food labels.

The alternative methods for providing information to consumers suggested by FDA in a recent *Federal Register* notice[257] other than label disclosure—such as including a phone number or address that the consumer can use to contact the bottler for more information—are unlikely to result in any significant additional information reaching the vast majority of consumers. If the information is not available on the label when the consumer is making a purchase, it is far less likely to inform or influence consumer decision making.

If the information on contaminants is not included on the bottles, it will not add much to consumer awareness or better-informed buying.

To make this point another way, how many bottlers would be satisfied with selling their water in plain, unadorned generic bottles and having their florid vignettes, eye-catching graphics, label language, and attractive bottle shapes available to consumers only upon request to a toll-free number? The answer is virtually none, because this would eliminate the impact of the information and advertising on consumer decision making.

Mere reference to a toll-free number or address of the bottler also will be of little value, in part due to the pervasive consumer view (fueled by heavy industry advertising) that bottled water is extremely pure, and thus most consumers rationally may assume there is no reason to expend the time to learn what is contained in the bottled water they are about to purchase. If consumers have no reason to believe there may be contaminants in their water, they will have little or no motivation to make the extra effort necessary to contact their bottler.

Therefore, we urge that bottled water labels should include the following information:

▶ The level, expressed in whole numbers (as required by EPA tap water right-to-know rules), of any contaminant found in the water at a level in excess of a health goal,* plus the fluoride level (because of this element's asserted public-health

* The term "health goal" refers to an EPA Maximum Contaminant Level Goal (MCLG), see SDWA §1412(b)(4)(A)), if any, or, if there is no MCLG, the lowest EPA Health Advisory Level (HAL), see SDWA §1412(b)(1)(F)), or if there is no MCLG or HAL, the lowest EPA human health-based water quality criteria for that contaminant (see Clean Water Act §§303–304). For contaminants with an MCL but no MCLG, it is particularly important for the health-based water quality criteria to be noted on the label (until an MCLG is published), since such standards (like arsenic) have not been revised since 1942 and thus do not reflect up-to-date science.

benefits at low levels and, at high levels, its detrimental effects), sodium level (to assist those seeking to reduce their sodium intake for health reasons).

▶ The health goal and allowable level for those contaminants, and fluoride and sodium, found in the water, in the same units.

▶ A statement as to whether the bottler is in substantial compliance with state and federal regulations (based upon an annual certification sent to the state and FDA and not disagreed with in writing by either), and, if not, what violations occurred.

▶ A one-sentence layperson-readable summary of the health effects associated with any contaminant found at a level in excess of a health goal (taken from model language written by FDA and EPA).

▶ A simplified restatement of the EPA-CDC advice to immunocompromised consumers about the types of bottled water treatment necessary to avoid *Cryptosporidium* contamination, and whether the bottled water meets those criteria.

▶ The specific source (e.g., "Houston public water system") and treatment (e.g., "reverse osmosis and ozonation") of the water.

▶ An FDA toll-free number for consumers to obtain more information (or a referral to EPA's drinking water hot line);

▶ The bottler's street address, phone number, and Web or e-mail address (if any), for further information.

2. Information should also be available on request and on the Internet.

In addition to labeling, but not as a substitute for it, a more detailed consumer brochure should be available from bottlers. It should include a summary of all contaminants tested for and the range of levels found, detailed information on water treatment and on any source-water assessment and protection, and further information on the items noted in the first six bullets, above, as well as all other information that would be required to be provided by a public water system in public-notification and consumer-confidence reports required under section 1414(c) of the SDWA.

Such brochures could be disseminated on the Internet (World Wide Web and e-mail response) and in response to written requests or telephone inquiries (e.g., via a menu-driven phone mail that provides automated mail or faxed responses). These methods of providing information could be a useful *supplement* to labeling but, for the reasons previously discussed, would *not* be an effective substitute for product labels.

3. Brochures and labels are needed for delivered water.

Water that is delivered to homes or businesses should include the same information on a label on the carboy (large bottle), because many people consuming it (e.g., in an office, school, hospital, or other workplace setting) may not have access to a mailed or hand-delivered brochure. For example, an immunocompromised person visiting or working at such a location could benefit from being able to review that information even if a brochure has been misplaced or is no longer available.

We do believe, however, that mailing or delivering a detailed water report to the person responsible for the bill would also be advisable, as that person has the

most influence over which water to purchase and may make important use of the information.

FEASIBILITY OF APPROPRIATE METHODS

It is quite clear that labeling of bottled water to include the information previously noted is feasible. Labels on currently sold bottled water have ample space available to include such information, and previous industry experience with nutrition-label information has shown the ability to include more information on such labels.

We are aware that there may be concerns expressed by the industry about the feasibility of including such information on the labels of bottled water due to space limitations, costs, or other problems. However, several other factors demonstrate the feasibility of such labeling:

▶ Our informal survey of the bottles of water commonly sold in major local stores indicates that such information clearly could fit on the label. On all bottles now on the market that we have seen, there is ample free space for additional label information. In the vast majority of cases, substantially less than half of the bottle's surface area that could be used to provide written information is used to provide this under current labeling practices. For every brand we have seen, at least 50 percent of the bottle's surface area, and generally a far greater percentage of the surface area (our estimate is that on average, less than 25 percent of the surface area of the average bottle of water is covered with label information), is available for additional label information.

▶ In unusual cases in which for some reason labels could not be immediately changed, temporary stickers could be used, or bottlers could use a bottle neck hanger (as is currently used by Apollinaris), so long as the sticker or hanger contains all required information and is required to remain on the bottle until sale.

▶ If industry assertions of the general purity of bottled water are correct, there should be very few contaminants found at levels above health goals that would need to be noted on the label, so little additional space would be required for such information, or for health-effects information regarding such contaminants. For example, the International Bottled Water Association says flatly that there are "no" harmful chemicals in bottled water. If so, little or no label space will be required for information on contaminants.

▶ Many bottlers already include substantial information (albeit generally without the important contextual explanation consumers need to understand the data) on the levels of total dissolved solids, the minerals found in their water, and the levels of those minerals in their water. For example, detailed information on the levels of total dissolved solids, as well as levels of sodium, potassium, calcium, magnesium, chlorides, sulfate, nitrate, bicarbonate, silica, and pH are included *on the labels* for Evian, Naya, Strathmore Mineral Water, Vittel, Volvic, Spa, Aqua Cool, and many other waters. Other bottlers include selected water-quality information *on their bottle labels*, for example: S. Pellegrino (total-dissolved-solid, sodium, and calcium levels); Fountainhead (lead, arsenic, sodium, and nitrate levels); Gerber Baby Water

(fluoride, arsenic, lead, sodium, and nitrate levels); Quibell (calcium, magnesium, sodium, pH, and total-dissolved-solid levels); Apollinaris (magnesium, sodium, and total-dissolved-solid level); Vals (sodium and total-dissolved-solids); and Solé (total-dissolved-solids, sodium, and pH levels).

▶ In Europe, mineral water already must include such total-dissolved-solids and mineral-composition information. It is therefore clearly possible to identify on the label the levels of what are hoped to be at most a small number of contaminants found at levels over health goals.

▶ Some states already require information on the source of the water (e.g., Massachusetts) and on arsenic and lead levels (e.g., Vermont), etc., on the label, and many bottlers already include such information on their labels, so a national requirement for such information would not add to the burden of many bottlers.

▶ Many bottlers making claims about low- or no-sodium content include nutritional information already, information that rivals or exceeds the space requirements necessary to include the information previously noted.

▶ The costs of relabeling will be trivial when compared with the profit margin in the industry. The food-nutrition label has not been a significant burden on the food industry, and profit margins in this industry are greater. For example, a bottler selling water taken from a public water supply and then filtered is likely to sell that water for hundreds of times more per liter than the bottler paid the water supply for the water, and will have spent a small amount per gallon for treatment.

▶ If public water suppliers, who are charging far less per gallon of water, can supply such information to consumers, it is imperative and feasible for bottlers to do so as well.

Some states already require information on the source of the water and on arsenic and lead levels on the label, so a national requirement for such information would not add to the burden of many bottlers.

CONCLUSIONS REGARDING RIGHT-TO-KNOW INFORMATION FOR BOTTLED WATER

Consumers have a right to know about what is in their drinking water and whether it poses any risk to their health. For this reason, water bottlers should be required to disclose information about bottled water contaminants, bottler compliance, water treatment, the source of the water, and health issues on the label. Without such label disclosure, informed consumer decision making about whether to purchase bottled water will be seriously undermined.

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1 Beverage Marketing Association, 1998 data cited in "Advertising & Marketing: Waterlogged," *Los Angeles Times* p. D5 (April 23, 1998); Tim Madigan, *Fort Worth Star-Telegram*, August 24, 1997, page 1.

2 The bottled water NRDC purchased ranged in price from a low of about $0.70 per gallon to more than $5.00 per gallon for more expensive imports sold in smaller bottles. The average cost of bottled water in California has been reported to be $0.90 cents per gallon, though that appears to be a low estimate compared to most of our purchases. Tap water generally costs from a low of around $0.45 cents per *thousand* gallons to about $2.85 per *thousand* gallons, with an average cost of about $1.60. L. Allen & J.L. Darby, "Quality Control of Bottled and Vended Water in California: A Review and Comparison of Tap Water," *Journal of Environmental Health*, vol. 56, no. 8, pp. 17–22 (April 1994); "Bottled Water Regulation," Hearing of the Subcommittee on Oversight and Investigations of the House Committee on Energy and Commerce, Serial No. 102–36, 102nd Cong., 1st Sess. 5, (April 10, 1991). Thus, the ratio for bottled water to tap water ranges from a low of about 240 times more expensive (cheap bottled water: expensive tap water), to over 10,000 times more expensive (expensive bottled water: cheap tap water).

3 See Chapter 3 on bottled water contamination, and for more details see attached Technical Report on bacterial and chemical contamination of bottled water.

4 D. Warburton, B. Harrison, C. Crawford, R. Foster, C. Fox, L. Gour, and P. Krol, "A Further Review of the Microbiological Quality of Bottled Water Sold in Canada: 1992-1997 Survey Results," *International Journal of Food Microbiology*, vol. 39, pp. 221–226 (1998).

5 See www.epa.gov/enviro/html/sdwis/sdis_ov.html.

6 See, e.g. NRDC, USPIRG, and Clean Water Action, *Trouble on Tap: Arsenic, Radon, and Trihalomethanes in Our Drinking Water* (1995); NRDC, *Your Are What You Drink* (1995); NRDC, *Think Before You Drink* (1993); NRDC, *Think Before You Drink: Urgent Release: 1992–1993 Update* (1994); EWG & NRDC, *Just Add Water* (1996).

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8 See, e.g. NRDC, *Think Before You Drink* (1993); NRDC, *Think Before You Drink: Urgent Release: 1992–1993 Update* (1994); EWG & NRDC, *Just Add Water* (1996).

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10 See, e.g., D.W. Warburton, "A Review of the Microbiological Quality of Bottled Water Sold in Canada, Part 2: The Need for More Stringent Standards and Regulations," *Canadian J. of Microbiology*, vol. 39, p. 162 (1993); H. Hernandez-Duquino, and F.A. Rosenberg, "Antibiotic-Resistant *Pseudomonas* in Bottled Drinking Water," *Canadian J. of Microbiology*, vol. 33, pp. 286–289 (1987); P.R. Hunter, "The Microbiology of Bottled Natural Mineral Waters," *J. Applied Bacteriol.*, vol. 74, pp. 345–352 (1993); see also, F.A. Rosenberg, "The Bacterial Flora of Bottled Waters and Potential Problems Associated With the Presence of Antibiotic-Resistant Species," in *Proceedings of the Bottled Water Workshop*, September 13 and 14, 1990, A Report Prepared for the Use of the Subcommittee on Oversight and Investigations of the Committee on Energy and Commerce, U.S. House of Representatives, Committee Print 101-X, 101st Cong., 2d Sess. pp. 72–83 (December 1990).

11 See, e.g., W. R. MacKenzie, et al., "A Massive Outbreak in Milwaukee of Cryptosporidium Infection Transmitted Through the Public Water Supply," *New Engl. J. of Med.* vol. 331, no. 3, pp. 161–167 (July 21, 1994); Marilyn Marchione, "Silent Disaster: Crypto Has Killed 104—And Counting," *Milwaukee Journal*, p. 1 (March 27, 1994).

12 Personal Communication with Terry Troxel and Shellee Davis, FDA, September 18, 1997; Personal Communication with Ron Roy, FDA, compliance programs, November 20, 1998.

13 21 C.F.R. §165.110(a)(1).

14 21 C.F.R. part 110 (1997).

15 21 U.S.C. §349(b)(3).

16 See 40 C.F.R.§141.63(b), prohibiting any confirmed fecal coliform bacteria or *E. Coli* (i.e. confirmed with a repeat sample).

17 21 C.F.R. §165.110(b)(2).

18 40 C.F.R. §141.40.

19 Interview with Terry Troxel, FDA, September 18, 1997.

20 *Ibid.*; 60 Fed. Reg. 57076, at 57117 (November 13, 1995).

21 European Union, Council Directive of 15 July 1980 on the Approximation of the Laws of the Member States Relating to the Exploitation and Marketing of Natural Mineral Waters, Article 5 §1 (80/777/EEC: OJ No. L 229, 30.8. 1980 p. 1), as amended (available in consolidated text form at www.europa.eu.int); EU, Council Directive 98/83/EC of 3 November 1998 on the Quality of Water Intended for Human Consumption [available at same web site]).

22 *Ibid.* Directive 80/777/EEC Article 5 §2.

23 *Ibid.* Article 7 §2.

24 *Ibid.* Article 8 §2.

25 *Ibid.* Article 9 §2.

26 EU, Council Directive 98/83/EC, *supra*; The WHO provisional guideline for arsenic in drinking water for human consumption is 10 ppb. World Health Organization, *Guidelines for Drinking Water Quality* (2nd Edition, Geneva, 1993). The FDA standard for arsenic (and the EPA tap water standard, required to be updated in 2001), based on an outdated 1942 U.S. Public Health Service guideline, is 50 ppb.

27 Constance Hayes, "Now, Liquid Gold Comes in Bottles," *New York Times*, p. D4 (January 20, 1998).

28 IBWA, "What is IBWA?" available at www.bottledwater.org/about.html (printed 11/20/1998).

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30 This troubling case arose in Massachusetts. Massachusetts state files reveal that the described well in Millis, Massachusetts for years supplied several bottlers, including Cumberland Farms, West Lynn Creamery, Garelick Farms, and Spring Hill Dairy for sale as "spring water" under many brand names. Massachusetts Department of Public Health, Ann & Hope Water Incident Files, 1993–1997; MDPH Memoranda Provided to NRDC Pursuant to Freedom of Information Request; Personal Communication with Dr. Liz Bourque, MDPH, August 1997.

31 According to State of Washington files, bottled water called "Alaska Premium Glacier Drinking Water: Pure Glacier Water From the Last Unpolluted Frontier, Bacteria Free" actually was derived from"Public Water System #111241," apparently a public water system (in Juneau, Alaska), according to the files. The bottler apparently was told that when it reordered its labels, it had to state that the water is "from a municipal source" or "from a community water system" in accordance with FDA rules; the phrase "Pure Glacier Water" was, according to State files, "considered false and misleading." Also, the bottler was required to drop the "bacteria free" claim, as this was "considered synonymous with sterile and false." Washington State Department of Agriculture Food Establishment Inspection Report 4/17/97 and attachments; WSDA Food Establishment Inspection Report 10/4/96 and attachments; WSDA Food Processor Licensing Worksheet and Attachments, and WSDA Food Establishment Inspection Report and Attachments, 3/20/96. State officials report that the required label changes have been made after the intervention of FDA and state regulators. Personal communication with Shelly Haywood, USDA (January 1999).

32 L. Allen & J.L. Darby, "Quality Control of Bottled and Vended Water in California: A Review and Comparison of Tap Water," *Journal of Environmental Health*, Vol. 56, No. 8, p. 19 (April 1994), citing FDA; accord, "Bottled Water Regulation," Hearing Before the Subcommittee on Oversight and Investigation of the House Committee on Energy and Commerce, 102nd Cong., 1st Sess., p. 3, Serial No. 102-36 (April 10, 1991); accord, *ibid.* at 152 (Statement of William F. Deal, CEO, International Bottled Water Association). In a recent interview with the head of the FDA bottled water program, FDA confirmed that they have no reason to believe that this percentage has changed substantially since 1991. Interview with Terry Troxel, FDA, September 18, 1997.

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40 In 1997, there was a 9.6 percent increase in bottled water sales over 1996, for example, according to Beverage Marketing Association 1998 data cited in "Advertising & Marketing:Waterlogged," *Los Angeles Times*, p. D5 (April 23, 1998); see also, Harry Berkowitz, "Wading in Water: As Sales Soar, Bottlers Try to Distinguish Their Products," *Newsday*, p. 1 (August 31, 1997).

41 *Ibid.*, quoting Casey Alexander, securities analyst at Gilford Securities.

42 According to an industry consulting company:

"If the bottler installs the equipment the price per gallon may be as low as 0.0125 cents per gallon. If the property installs the equipment the price range, depending on volume and market proximity, is 0.02 to 0.06 cents per gallon. The proximity of the source to the bottling facility has a significant fiscal impact on the raw product costs. According to Mike Cullis formerly of Hidell-Eyster Technical Services, Inc., 'Total operating costs of a dedicated tanker is $1.10 per mile. Therefore the difference between a source 100 miles and a source 200 miles from the bottling plant translates to $220 per load or a laid in cost of 0.04 cents per gallon.'"

"The higher the volume, the lower the cost per gallon. Filling a 5,000 gallon tanker truck per week from a supplier with his own pumping equipment can cost 0.05 cents per gallon. If the volume increases the cost drops considerably. According to Roy Christensen of Black Mountain Spring Water some of the biggest cost of raw water is negotiating the contract. Besides owning their own sources, Black Mountain has leases and agreements with spring water property owners. 'Entrepreneurs have developed spring sources in our area and there are now more sources available than ever before,' said Christensen. The price per gallon in Northern California has remained consistent over the past few years because, unlike fossil fuels, spring sources are not a diminishing resource, even with increasing demand.

"Road access is a primary problem along with water quality. Lower total dissolved solids (tds) is most desirable for spring bottlers but the threshold of acceptability varies from State to State. A source in the Western U.S. may have upwards of 150 parts per million (ppm) tds [total dissolved solids] and be acceptable, while in the Northeast bottlers prefer 100 or less tds.

"The Perrier Group developed a pumping station at a Boys Scout Camp south of Waco, Texas for their Oasis and Ozarka brands. The cost of the pumping station was approximately $300,000 which Perrier supplied. Today Perrier pays an annual fee of $25,000 to draw the water from the source and average 10,000 gallons per day.

"Bill Egan, owner of Mountainwood Springs in Blairstown, New Jersey, bought property with a large 5–6 million gallon per day spring, twelve years ago. He built a stainless steel pumping facility and developed a bulk water business selling water to bottlers like Great Bear, Cumberland Farms and General Foods. "It is very competitive,' said Egan. 'A lot of people think that if you get a spring you'll be an instant millionaire. They don't do their homework. There are not a lot of big users for bulk water," Egan said. He tests his water every hour and it is certified by the National Sanitation Foundation. In the summer season Egan says he fills over ten 6200 gallon tanker trucks per day, each one taking about 45 minutes to load.

"The raw spring water supplier is often tempted to enter the business himself and build a bottling facility. Ultimately this may undermine the relationship with other bottlers who he supplies to, as they compete for supermarket shelf space and route sales. Being a bulk water supplier is not as capital intensive as becoming a bottler and still has a lot of appeal. As Bill Egan said, 'The business is glamorous. Water is a topic of conversation."

"What is water worth? Today water is sold from spring owners to bottlers from a few pennies to almost 10 cents a gallon."

THE BOTTLED WATER WEB, (c) 1997 Best Cellar Communications, www.bottledwaterweb.com/indus.html.

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68 Coke already sells its brand "Bon Aqua®" in 30 countries overseas, but not in the United States. Constance Hayes, "Now, Liquid Gold Comes in Bottles," *New York Times*, p. D4 (January 20, 1998).

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123 See California Health and Safety Code § 111070(a); see also Appendix C (summarizing state programs and noting whether they regulate seltzer, etc. as bottled water).

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131 58 Fed. Reg. 52042, at 52045 (October 6, 1993).

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134 58 Fed. Reg. 52042, at 52047 (October 6, 1993), (emphasis added).

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140 21 C.F.R. §165.110(b)(3)(i); under a negotiated rule issued in late 1998, the turbidity standard will drop to a maximum of 1 NTU, with a 95 percentile level of 0.3 NTU. 63 Fed. Reg. 69477 (December 16, 1998).

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149 Compare, 40 C.F.R. part 141 with 21 C.F.R. §165.110(b)(4).

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151 61 Fed. Reg. 13258, at 13260 (March 26, 1996).

152 *Ibid.*; Comments of Grace Container Products, dated May 11, 1995, FDA Docket 93N-0085, Document C11.

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185 40 C.F.R. §§141.31 & 142.15.

186 *Ibid.*

187 *Ibid.* §142.15.

188 40 C.F.R. §141.33.

189 60 Fed. Reg. 57076, 57118 (November 13, 1995).

190 60 Fed. Reg. 57076, 57118 (November 13, 1995).

191 21 C.F.R. §129.80(h).

192 40 C.F.R. §141.33.

193 General Accounting Office, *Food Safety and Quality: Stronger FDA Standards and Oversight Needed for Bottled Water, GAO/RCED-91-67*, p. 8 (March 1991).

194 Personal Communication with Terry Troxel and Shellee Davis, FDA, September 18, 1997.

195 21 C.F.R. §129.80(g).

196 60 Fed. Reg. 57076, at 57108 (November 13, 1995).

197 *Ibid.* at 57108.

198 L. Moreira, P. Agostinho, P.V. Morais, and M.S. da Costa, "Survival of Allochthonous Bacteria in Still Mineral Water Bottled in Polyvinyl Chloride (PVC) and Glass," *J. Applied Bacteriology*, vol. 77, pp. 334–339 (1994); P.V. Morais, and M.S. Da Costa, "Alterations in the Major Heterotrophic Bacterial Populations Isolated from a Still Bottled Mineral Water," *J. Applied Bacteriol.*, vol. 69, pp. 750–757 (1990); P.R. Hunter, "The Microbiology of Bottled Natural Mineral Waters," *J. Applied Bacteriol.*, vol. 74, pp. 345–52 (1993); F.A. Rosenberg, "The Bacterial Flora of Bottled Waters and Potential Problems Associated With the Presence of Antibiotic-Resistant Species," in *Proceedings of the Bottled Water Workshop*, September 13 and 14, 1990, A Report Prepared for the Use of the Subcommittee on Oversight and Investigations of the Committee on Energy and Commerce, U.S. House of Representatives, Committee Print 101-X, 101st Cong., 2d Sess. pp. 72–81 (December, 1990); .D.W. Warburton, B. Bowen, and A. Konkle, "The Survival and Recovery of *Pseudomonas aeruginosa* and its effect on Salmonellae in Water: Methodology to Test Bottled Water in Canada," *Can. J. Microbiol.*, vol. 40, pp. 987–992 (1994); D.W. Warburton, J.K. McCormick, and B. Bowen, "The Survival and Recovery of *Aeromonas hydrophila* in Water: Development of a Methodology for Testing Bottled Water in Canada," *Can. J. Microbiol.*, vol. 40, pp. 145–48 (1994); D.W. Warburton, "A Review of the Microbiological Quality of Bottled Water Sold in Canada, Part 2: The Need for More Stringent Standards and Regulations," *Canadian J. of Microbiology*, vol. 39, p. 162 (1993); A. Ferreira, P.V. Morais, and M.S. Da Costa, "Alterations in Total Bacteria, Iodonitrophenyltetrazolium (INT)-Positive Bacteria, and Heterotrophic Plate Counts of Bottled Mineral Water," *Canadian J. of Microbiology*, vol. 40, pp. 72–77 (1994).

199 60 Fed. Reg. 57076, at 57117 (November 13, 1995).

200 Statement of Frank Shank, Director, FDA Center for Food Safety and Applied Nutrition, reprinted in "Bottled Water Regulation," *Hearing of the Subcommittee on Oversight and Investigations of the House Committee on Energy and Commerce, Serial No. 102-36*, 102nd Cong., 1st Sess. 65, p. 76 (April 10, 1991).

201 Personal Communication with Terry Troxel and Shellee Davis, FDA, September 18, 1997; Personal Communication with Ron Roy, FDA, compliance programs, November 20, 1998.

202 *Ibid.*; 60 Fed. Reg. 57076, p. 57117 (November 13, 1995).

203 General Accounting Office, *Food Safety and Quality: Stronger FDA Standards and Oversight Needed for Bottled Water, GAO/RCED-91-67*, p. 7 (March 1991).

204 Personal Communication with Terry Troxel and Shellee Davis, FDA, September 18, 1997.

205 60 Fed. Reg. 57076, at 57117 (November 13, 1995).

206 General Accounting Office, *Food Safety and Quality: Stronger FDA Standards and Oversight Needed for Bottled Water, GAO/RCED-91-67*, p. 2 (March 1991).

207 Personal Communication with Terry Troxel and Shellee Davis, FDA, September 18, 1997.

208 *Ibid*; General Accounting Office, *Food Safety and Quality: Stronger FDA Standards and Oversight Needed for Bottled Water, GAO/RCED-91-67*, at p. 7 (March 1991).

209 Alaska; Arkansas; Delaware; District of Columbia; Georgia; Idaho; Illinois; Iowa; Kentucky; Maryland; Minnesota; Nebraska; and Pennsylvania. Four states—Michigan, New Mexico, North Carolina, and Tennessee—either did not respond to this query or chose not to comment.

210 California (2 FTE, 9 investigators state-wide); Florida (2 FTE); New Jersey (1 FTE); New York (1–1½ FTE); Ohio (Approximately 1 FTE); Oklahoma (1 FTE); and Virginia (1–2 FTE).

211 Personal communication with Nancy Napolli, Program Manager, Environmental Sanitation and Food Safety, State of Alaska, April 7, 1998.

212 Letter from Brock Marlin, Program Manager, Arizona Department of Health Services, to NRDC, November 27, 1995.

213 Personal communication with Mr. James Pyles, Consumer Product Safety Officer, Kansas Department of Health and Environment, April 21, 1998.

214 General Accounting Office, *Food Safety And Quality: Stronger FDA Standards And Oversight*

Needed For Bottled Water, GAO/RCED-91-67, at p. 17 (March 1991).

215 Letter from Kenan L. Bullinger, Director, North Dakota Department of Health Services, to NRDC, November 13,1995.

216 Personal communication with Joe Dixon, Evaluations Auditor, Manufactured Foods, Texas Department of Health, June 12, 1998.

217 Personal communication with Bryan Davis, Program Supervisor, Virginia Department of Agriculture, Consumer Services, June 3, 1998.

218 Personal correspondence with Ms. Nancy Napolilli, Program Manger, Environmental Sanitation and Food Safety, Department of Environmental Conservation, State of Alaska, April 7, 1998; accord, Ms. Nancy Napolilli, Comments of the Alaska Department of Environmental Conservation, Division of Environmental Health, Environmental Sanitation and Food Safety, on FDA Feasibility Study of Appropriate Methods of Informing Consumers of the Contents of Bottled Water (dated December 12, 1997), (FDA Docket 97N-0436).

219 California (including whether municipal), Maryland, Massachusetts, Michigan, Nevada, New Hampshire, New Jersey, New York, Ohio (unless municipal), Pennsylvania (must also list name of public water system), Rhode Island (but only municipal waters without deionization process must list source), Texas, Vermont, and Wyoming (municipal water must be listed as "drinking water") reported requiring source listing on bottled water labels.

220 Connecticut ("separate state regulations" for labeling); Hawaii (prohibition against misbranding); Idaho (intrastate labeling law prohibits misbranding); Maine (if source or end-product exceed MCLs, must be listed on label; must also list if "altered water quality"); Michigan (declaration of identity & carbon dioxide content); Minnesota (state rules); Montana (if labeled "organic" must be verified by third party "Organic Certification" group); Nevada (if making any claims such as low sodium or fluoride content, must list levels found in product); New Hampshire (no misleading brand names); New Jersey (two year expiration date); New York (nutritional claims must be consistent with FDA regulations; variances must be listed on label); Ohio (any additives must be listed); Oklahoma (separate state regulations); Texas (chemicals or bacteria that exceed MCLs must be listed and must state on label "contains excessive bacteria"); and Vermont (must list finished end-product levels of arsenic, lead, sodium, and nitrate).

221 California, Colorado, Georgia, Illinois, Iowa, Kentucky, Louisiana, Maryland, Massachusetts, Montana, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, Texas, Utah, Vermont, Virginia, Washington, and West Virginia.

222 Hawaii (available through FOIA request); Maine (listed in database; would require approximately ½ hour to gather); Nebraska (but data available would have more to do with sanitation violations than analytical results); New Jersey (annual summary of test results and enforcement & violation data mandated by state statute); Oklahoma (inspection reports); Oregon (summary report of violations for period 1/1/94–12/31/97); South Dakota (computerized database of violations); Vermont (computerized data base of violations); Virginia (information kept in database; will provide for fee); and Wyoming (violation data stored in computer database).

223 Elizabeth Watkins, Food Processing Coordinator, Illinois Department of Health. Telephone interview with NRDC, April 27, 1998.

224 Massachusetts Department of Public Health , Ann & Hope Water Incident Files, 1993-1997; see, e.g. Bourque Memoranda of 10/31/1996; 12/13/1996; 12/26/1996; 1/28/1997; Bourque Letters of 7/11/1996; 7/19/1996; 7/22/1996; 8/7/1996; 9/16/1996; 9/20/1996; 10/16/1996; 10/21/1996; MDPH Memo of 12/9/1996; D. Talbot, "Bottled Water Flows from a Troubled Well," *The Boston Herald*, p. 1 (December 16, 1996).

225 Mass. DPH, Poland Spring HPC file, and Poland Spring excess Chlorine Contamination File; see also Chemical Contamination and Microbial Contamination chapters.

226 Massachesetts Department of Public Health, Ann & Hope Water Incident Files, 1993–1997; see, e.g. Ridley desk calendar and agenda for 12/5/1996; Memo of 12/4/1996; Massachusetts Organization of State Engineers and Scientists 12/23/1996 and 3/4/1997 Letters to Milligan and Ridley, respectively; Memo from Richard Waskiewicz. MDPH, 12/9/1996; Bourque Memoranda of 10/31/1996; 12/13/1996; 12/26/1996; 1/28/1997; Bourque Letters of 7/11/1996; 7/19/1996; 7/22/1996; 8/7/96; 9/16/1996; 9/20/1996; 10/16/1996; 10/21/1996; MDPH Memo of 12/9/1996; D. Talbot, "Bottled Water Flows from a Troubled Well," *The Boston Herald* p. 1 (December 16, 1996).

227 Waskiewicz Memo to Bourque, 12/9/96.

228 Massachusetts Organization of State Engineers and Scientists Letter to Mulligan, 12/23/96; MOSES Letter to Ridley 3/4/97; personal communication with Dr. Bourque, August 1997.

229 Compare Letter from Mulligan to Sen. Jacques, January 3, 1997 and attached list of documents, with, MDPH Ann & Hope files.

230 Codified at 21 C.F.R. Part 165.

231 IOM, Committee on State Food Labeling, Food and Nutrition Board, National Academy of Sciences, *Food Labeling: Toward National Uniformity* (1992); 58 Fed. Reg. 389, p. 406 (January 5, 1993).

232 21 C.F.R. §165.110(a)(vi).

233 Letter from Shellee Davis, FDA, to Dr. Liz Bourque, MDPH, June 6, 1996.

234 Washington State Department of Agriculture Food Establishment Inspection Report April 17, 1997, and attachments; WSDA Food Establishment Inspection Report October 4, 1996, and attachments; WSDA Food Processor Licensing Worksheet and Attachments, and WSDA Food Establishment Inspection Report and Attachments, March 20, 1996. Personal communication with Shelly Haywood, USDA, Jan. 1999. For other waters claiming to be "glacier" water, see e.g., "Bottled Water/Carbonated Beverage Files: Current Permitholders," MDPH (January 1999).

235 H.R. Hidell, "Water: The Search for a Global Balance," *Bottled Water Reporter*, p. 53 (June/July 1995), (emphasis added).

236 See, e.g., IBWA's Bottled Water FAQs, "www.bottledwater.org/faq."

237 *Ibid.*

238 *Ibid.*

239 CDC, "Surveillance for Waterborne-Disease Outbreaks—United States, 1993–1994, *Morbidity and Mortality Weekly Report* vol. 45, no. SS-1 (April 12, 1996). See also Appendix B regarding waterborne disease outbreaks.

240 *Ibid.*, and "www.bottledwater.org/facts/immuno.html."

241 As noted in a previous chapter, for example, an article in the IBWA's in-house organ that urged bottlers to upgrade their treatment to be sure it meets CDC guidelines for removing *Crypto*, pointed out: "How can we expect health groups to endorse our product if we don't ALL meet the [CDC *Crypto* removal] guidelines!" Sylvia Swanson, "IBWA in the Forefront," *Bottled Water Reporter*, p. 37 (December/January 1996).

242 See, e.g., IBWA's Bottled Water FAQs, "www.bottledwater.org/faq."

243 SDWA §1414(c)(4).

244 Constance Hayes, "Now, Liquid Gold Comes in Bottles," *The New York Times*, p. D1 (January 20, 1998).

245 Sylvia Swanson, IBWA Executive Director, "Safe Drinking Water Act Becomes Law," reprinted in *Aqua News: Northeast Bottled Water Association*, p. 5 (Summer 1996).

246 While theoretically bottlers are obliged to include on the label a statement that their product "Contains Excessive Chemical Substances [or Bacteria]" *if it violates* an FDA standard, the bottler's obligations to disclose under the FDA rules about end there.

247 SDWA Amendments of 1996, Pub. L. No. 104-182, §114(b).

248 62 Fed. Reg. 60721 (November 12, 1997).

249 SDWA Amendments of 1996, Pub. L. No. 104-182, §114(b).

250 Personal Communication with Henry Kim, FDA Center for Food Safety and Applied Nutrition, November 20, 1998.

251 See, e.g.Sylvia Swanson, IBWA Comments on Bottled Water Study: Feasibility of Informing Consumers of the Contents of Bottled Water, November 12, 1997 (comments dated December 12, 1997); Kim Jeffrey, Perrier Group of America, Comments on Bottled Water Study: Feasibility of Informing Consumers of the Contents of Bottled Water, November 12, 1997 (comments dated December 12, 1997); Jack West, Puro Water Group, Comments on Bottled Water Study: Feasibility of Informing Consumers of the Contents of Bottled Water, November 12, 1997, (comments dated December 11, 1997) [FDA Docket 97N-0436].

252 Sylvia Swanson, IBWA Comments on Bottled Water Study: Feasibility of Informing Consumers of the Contents of Bottled Water, November 12, 1997 (comments dated December 12, 1997).

253 Jack West, Puro Water Group, Comments on Bottled Water Study: Feasibility of Informing Consumers of the Contents of Bottled Water, November 12, 1997 (comments dated December 11, 1997) [FDA Docket 97N-0436].

254 Pub. L. No. 104-182 (August 6, 1996).

255 Recommendations of the National Drinking Water Advisory Council, November 1998.

256 SDWA §1414(c).

257 62 Fed. Reg. 60721 (November 12, 1997).

Bottled Water Contaminants Found

Brand[a]	Test #	Water Type	Purchase Location	Source of Water (if listed)	Contaminant & Level Found[b]									Number of Bottles Tested	Lab Rep. #	Comments
					HPC Bacteria[c] (Guidelines 500 cfu/ml; no enforceable standard) in cfu/ml	Arsenic[d] (CA Prop. 65 Level 5 ppb) in ppb	TTHMs[e] (CA & industry bottled water standard 10 ppb) in ppb	Chloroform (CA Prop. 65 level l0 ppb) in ppb	BDCM[f] (CA Prop. 65 level 2.5 ppb) in ppb	DBCM[g] (CA Prop. 65 level 3.5 ppb) in ppb	Phthalate (DEHP) (Tap water standard 6 ppb) no bottled water standard	Nitrate (Fed. & CA standard 10 ppm) in ppm	Other			
365	1	Natural Spring Water (1.5 liters)	Berkeley, CA	Bottled in Austin, TX	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Results not received		10 (composited)	SA-711-1402	
Albertson's A+	1	Natural Spring Water (1 liter)	San Diego/ San Marcos, CA	Palomar Mtn. Spring	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.8		10 (composited)	SA-712-0390	
Alhambra	1	Crystal Fresh Drinking Water, (1 gal.)	San Francisco	McKesson Water Prod., Pasadena, CA	45	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.1	Toluene detected at 12.5 ppb o-xylene at 2.7 ppb	3 (1 for each contaminant type)	EQI-1-27-29	Toluene and o-Xylene are industrial chemicals found at levels below standards. Bottle claims "purified using ... filtration, ozonation, reverse osmosis, and/or deionization."
Alhambra	2	Crystal Fresh Drinking Water (1 liter)	San Francisco	McKesson Water Prod., Pasadena, CA	56	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Results not received	No toluene or xylene detected	10 (composited)	SA-711-1403	

Note: These tests used established FDA- or EPA-approved test methods, but are not necessarily statistically representative of all bottled water of the brand listed. See text for further discussion.

[a] Row with bold name indicates level exceeding standard or guideline: asterisk {*} indicates exceeds enforceable standard; dagger {†} indicates exceeds unenforceable guideline. See text and accompanying *Technical Report*.

[b] As discussed in the text, the California Proposition 65 ("Prop. 65") levels noted in this table are derived from the "No Significant Risk" levels established by the California Department of Health Services, and are based on the CDHS's rules' assumption that people drink 2 liters of water per day (the same assumption used by the U.S. EPA). Thus, for example, the Arsenic Proposition 65 level is 10 micrograms per day, so assuming 2 liters of water consumed per day, the Prop. 65 Arsenic level is 5 ppb.

[c] There is no enforceable FDA standard for HPC bacteria. We use 500 cfu/ml as an informal guideline. HPC bacteria are not necessarily harmful themselves but are often used as an indicator of overall sanitation during bottling. The European Union (EU) has adopted an enforceable bottled water standard of 100 colonies per 100 ml (at 22°C) at bottling. EPA's tap water rules provide that water containing over 500 cfu/ml is treated as a coliform-positive sample absent proof of adequate disinfectant residual. The International Bottled Water Association recommends plants meet a level of <30 cfu/ml at bottling, and <200 cfu/ml in 90% of samples tested 5 days after bottling. Massachusetts and New York have an informal bottled water guideline (unenforceable) of 500 cfu/ml. Other states (such as RI) also have informal guidelines.

[d] Federal tap water and bottled water standards for arsenic, originally set in 1942 and not revised since, is 50 ppb. Congress has required updated standard by 2001. International (WHO/EU) standard is 10 ppb (see text).

[e] TTHMs are "total trihalomethanes," potentially cancer-causing chemicals created when organic matter reacts with chlorine. Recent studies also indicate TTHMs may also be linked to birth defects and spontaneous abortions. While California and International Bottled Water Association (industry trade association) standard is 10 ppb, new Federal tap water standard is 80 ppb, and FDA bottled water standard is 100 ppb (see text).

[f] BDCM is bromodichloromethane, a type of trihalomethane (see above).

[g] DBCM is dibromochloromenthane, a type of trihalomethane (see above).

Bottled Water Contaminants Found (continued)

Brand[a]	Test #	Water Type	Purchase Location	Source of Water (if listed)	Contaminant & Level Found[b]									Number of Bottles Tested	Lab Rep. #	Comments
					HPC Bacteria[c] (Guidelines 500 cfu/ml; no enforceable standard) in cfu/ml	Arsenic[d] (CA Prop. 65 Level 5 ppb) in ppb	TTHMs[e] (CA & industry bottled water standard 10 ppb) in ppb	Chloroform (CA Prop. 65 level 10 ppb) in ppb	BDCM[f] (CA Prop. 65 level 2.5 ppb) in ppb	DBCM[g] (CA Prop. 65 level 3.5 ppb) in ppb	Phthalate (DEHP) (Tap water standard 6 ppb) no bottled water standard	Nitrate (Fed. & CA standard 10 ppm) in ppm	Other			
Alhambra	1	Sport Top Crystal Fresh Drinking Water (16.9 fl. oz.)	San Francisco	McKesson Water Prod., Pasadena, CA	Not detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.1		3 (1 for each contaminant type)	EQI-1 -33a-f	
Alhambra*†	1	Mountain Spring Water, "prepared using filtration and ozone" (1 gal.)	San Francisco	McKesson Water Prod., Pasadena, CA	>5700†	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not detected	Coliforms found at >200*	3 (1 for each contaminant type)	EQI-1-30-32	HPC Bacteria in excess of guideline, and coliforns in excess of FDA standards.
Alhambra†	2	Mountain Spring Water (1 gallon)	San Francisco	McKesson Water Prod., Pasdena, CA	1100†	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Results not received	No coliforms detected	10 (composited)	SA-711-1404	HPC Bacteria in excess of guideline.
Apollinaris*	1	Sparkling Mineral Water (1 liter)	Berkeley, CA	Bad Neuenahr-Ahrweiler, Germany	Not Detected	5.6*	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Results not received	Fluoride found at 0.37 ppm, below std.	10 (composited)	SA-711-1405	Arsenic level exceeds CA Prop. 65 level.
Apollinaris*	2	Sparkling Mineral Water			No test	7.8*	No test	No test	No test	No test	No test	No test		10 (composited)	SA-806-2078	Arsenic level exceeds CA Prop. 65 level.
Aquafina	1	Purified Drinking Water–"Purity Guaranteed" Non-Carbonated (1 liter)	Los Angeles		Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		3 (1 for each contaminant type)	EQI-1-LA6-LA8	
Aquafina	1	Purified Drinking Water–"Purity Guaranteed" (1 liter)	Berkeley, CA	Laurel Bottling Co, Fresno CA	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Results not received		10 (composited)	SA-711-1406	
Aquafina	1	Purified Drinking Water	Houston, TX	City of Houston Water Supply	Not Detected	Not Detected	4.1	3.5	0.6	Not Detected	5 ppb (just below 6 ppb tap water standard)	Not Detected	Di(2-ethyl-hexyl) adipate found at 0.9 ppb (below standard of 400 ppb)	10 (composited)	298808-965 (944-949)	Phthalate (DEHP) is often present as a result of migration from the bottle to the water. The level detected is just below the EPA tap water standard for this chemical, though there is no bottled water standard (see text).

Aquafina	2	Purified Drinking Water	Houston, TX	City of Houston Water Supply	Not Detected	No test	No test	No test	No test	No test	No test	No test		10 bottles, individually	298-808-965 (934-943)	HPC Bacteria test, none found in 10 bottles.
Arrowhead	1	Mountain Spring Water	San Francisco	Arrowhead MSW Co., LA, CA	Not Detected	3.2	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	1.2		3 (1 for each contaminant type)	EQI-1-37a-f	
Arrowhead	2	Mountain Spring Water (1.5 liter)	Berkeley, CA	Arrowhead MSW Co., LA, CA	5	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Results not received		10 (composited)	SA-711-1407	
Arrowhead	3	Mountain Spring Water (5 gallon)	Los Angeles	Not noted	Not Detected	Not Detected	4.3	1.9	1.6	0.8	Not Detected	1.0		10 (composited)	SA 712-0807	
Arrowhead	1	Sparkling Mountain Spring Water (1.5 liter)	San Francisco	Arrowhead MSW Co., L.A., CA	Not Detected	3.1	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.8		3 (1 for each contaminant type)	EQI-1-34-36	
Arrowhead	2	Sparkling Mountain Spring Water (1.5 liter)	Berkeley, CA	Arrowhead MSW Co., L.A. , CA	Not Detected	Not Detected	1.1	1.1	Not Detected	Not Detected	Not Detected	Results not received		10 (composited)	SA-711-1408	
Beechnut	1	Water, Fluoride Added (1 gallon)	San Dimas, CA	Palomar Mountain, bottled by Famous Ramona, Ramona, CA	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Fluoride at 0.71 ppm	10 (composited)	SA-712-0392	
Black Mountain†	1	Distilled Water (1 gallon)	Berkeley, CA	Black Mtn. Wtr.Co., San Carlos, CA	1000†	Not Detected	4	1.4	1.8	0.8	Not Detected	Results not received		10 (composited)	SA-711-1409	Level of HPC bacteria exceeds guideline.
Black Mountain	2	Distilled Water			Not Detected	No test	No test	No test	No test	No test	No test	No test	No total coliforms	10 (tested individually)	SA 806-2079	No HPC bacteria detected.
Black Mountain†	1	Fluoridated Water (1 gallon)	Berkeley, CA	Black Mtn Wtr.Co., San Carlos, CA	2100†	Not Detected	2.4	1.1	1.3	Not Detected	Not Detected	Results not received	Fluoride found at 0.93 ppm* (exceeds standard in warm areas)	10 (composited)	SA-711-1410	Fluoride above standard of 0.8 ppm for added fluoride in areas with average high temp of 79.3°F. HPC bacteria over guideline level of 500 cfu/ml.
Black Mountain†	2	Fluoridated Water			18,000† (1bottle) 30 (1 bottle) Not Detected (8 bottles)	No test	No test	No test	No test	No test	No test	No test	No total coliforms	10 (individualy)	SA 806-2080	1 bottle of 10 contained HPC level well over guideline level.
Black Mountain	3	Fluoridated Water			No test	No test	No test	No test	No test	No test	No test	No test	Fluoride found at 1.3 ppm (exceeds standard in warm areas)	4 (composited)	901-079	Fluoride above standard of 0.8 ppm for added fluoride in warm weather areas (average high over 79°F)
Black Mountain	1	Purified Water (1 gallon)	Berkeley, CA	Black Mtn Wtr.Co., San Carlos, CA	Not Detected	Not Detected	2.3	1.1	1.2	Not Detected	Not Detected	Results not received		10 (composited)	SA-711-1411	

Bottled Water Contaminants Found (continued)

Brand[a]	Test #	Water Type	Purchase Location	Source of Water (if listed)	Contaminant & Level Found[b]									Number of Bottles Tested	Lab Rep. #	Comments
					HPC Bacteria[c] (Guidelines 500 cfu/ml; no enforceable standard) in cfu/ml	Arsenic[d] (CA Prop. 65 Level 5 ppb) in ppb	TTHMs[e] (CA & industry bottled water standard 10 ppb) in ppb	Chloroform (CA Prop. 65 level 10 ppb) in ppb	BDCM[f] (CA Prop. 65 level 2.5 ppb) in ppb	DBCM[g] (CA Prop. 65 level 3.5 ppb) in ppb	Phthalate (DEHP) (Tap water standard 6 ppb) no bottled water standard	Nitrate (Fed. & CA standard 10 ppm) in ppm	Other			
Black Mountain *†	1	Spring Water (1 gallon)	San Francisco	Black Mtn Wtr.Co., San Carlos, CA	>5,700†	3.6	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.2	Total coliform count 27*; Toluene found at 8.9 ppb	3 (1 for each contaminant type)	EQI-1-19-20	Levels of HPC bacteria exceeds guidelines. Coliforms exceed FDA standards. Toluene is a component of gasoline or industrial chemicals.
Black Mountain	2	Spring Water (5 gal.)	San Francisco	Black Mtn Wtr.Co., San Carlos, CA	330	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	No total coliforms or toluene detected	10 (composited)	SA-712-0846	
Black Mountain	3	Spring Water (1 gallon)	Berkeley, CA	Black Mtn Wtr.Co., San Carlos, CA	80	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	No total coliforms or toluene detected	10 (composited)	SA-711-1577	
Calistoga	1	Distilled Water (1 gallon)	Berkeley, CA	Calistoga MW Co., Calistoga, CA	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		10 (composited)	SA-711-1578	
Calistoga	1	Mountain Spring Water (0.5 liter)	San Francisco	Calistoga MW Co, Calistoga, CA	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.8		3 (1 for each contaminant type)	EQI-1-1a-f	
Calistoga†	2	Mountain Spring Water (6 gal.)	Oakland, CA	Calistoga MW Co., Calistoga, CA	4900†	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.6		10 (composited)	SA-712-0847	HPC bacteria found at levels substantially exceeding guideline.
Calistoga	3	Mountain Spring Water (1 liter)	San Francisco	Calistoga MW Co., Calistoga, CA	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.5		10 (composited)	SA-711-1579	
Calistoga	4	Mountain Spring Water			Not Detected to 1 cfu/ml	No test	No test	No test	No test	No test	No test	No test	No total coliforms	10 (individually)	SA 806-2081	HPC bacteria within guidelines in all bottles tested.
Calistoga*	1	Sparkling Mineral Water, Original Napa Valley (1 liter)	San Francisco	Napa Valley	3	31.8*	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.1		3 (1 for each contaminant type)	EQI#1-2-4	Arsenic level exceeds CA Prop. 65 limit.
Calistoga		Sparking Mineral Water, Original Napa Vallet	San Francisco	Napa Valley	No test	Not Detected	No test	No test	No test	No test	No test	No test		8 (composited)	SA-901-0797	Arsenic retest found none
Calistoga	1	Sparkling Mineral Water (1 liter)	San Francisco	Calistoga MW Co., Calistoga, CA	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		10 (composited)	SA-711-1580	

Calistoga	2	Sparkling Mineral Water			No test	Not Detected	No test	No test	No test	No test	No test	No test		10 (composited)	SA 806-2078	
Canada Dry	1	Club Soda (1 liter)	Berkeley, CA	Cadbury Beverages Stamford, CT	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.6		10 (composited)	SA-711-1581	
Canada Dry	1	Sparkling Water (1 liter)	San Francisco	Cadbury Beverages Stamford, CT	1.0	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Fluoride found at 0.13 ppm, well below std.	10 (composited)	SA-711-1582	
Castle Rock	1	"Spring Water Bottled at the Source" (1 liter)	San Francisco	"The Cascade Mountains"	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		3 (1 for each contaminant type)	EQI#1-16-18	
Cobb Mountain	1	Natural Spring Water (1.5 liter)	Berkeley, CA	Cobb Mtn Spring Water Co., Cobb, CA	Not Detected	Not Detected	1.2	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Bromoform (a trihalo-methane) found at 1.2 ppb,, below standard	10 (composited)	SA-711-1583	
Crystal Geyser*	1	Alpine Spring Water (16.9 oz)	San Francisco	Roxane Source, Eastern Sierra, bottled at Calistoga, CA	460	17.8*	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected			3 (1 for each contaminant type)	EQI-1-26a-f	Arsenic Level exceeds Prop. 65 limit.
Crystal Geyser*	2	Alpine Spring Water (1 liter)	San Francisco	Roxanne Source, Eastern Sierra, Bottled at Calistoga, CA	Not Detected	11*	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Fluoride found at 0.82 ppm	10 (composited)	SA-711-1585	Arsenic level exceeds CA Prop. 65 limit; fluoride level is below standard of 1.4 ppm in warm areas (if natural) but above the warm area standard of 0.80 ppm if added.
Crystal Geyser*	3	Alpine Spring Water			No test	12*	No test	No test	No test	No test	No test	No test		10 (composited)	SA 806-2078	Arsenic exceeds CA Prop. 65 limit and WHO/EU standard.
Crystal Geyser*	1	Napa Valley Sparkling Mineral Water Bottled at the Source (12 fl. oz)	San Francisco	Napa Valley	1	35.2*	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.2		3 (1 for each contaminant type)	EQI-1-25a-f	Arsenic exceeds Prop. 65 limit.
Crystal Geyser	2	Napa Valley Sparkling Mineral Water			No test	Not Detected	No test	No test	No test	No test	No test	No test		10 (composited)	SA 806-2078	No arsenic detected.
Crystal Geyser*	3	Napa Valley Sparkling Mineral Water			No test	14 ppb	No test	No test	No test	No test	No test	No test	No test	10 (composited)	SA-901-0798	Arsenic exceeds CA Prop 65 limit and WHO/EU standard
Crystal Geyser	1	Sparkling Mineral Water (1 liter)	Berkeley, CA	Calistoga MW Co, Calistoga, CA	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		10 (composited)	SA-711-1584	

Bottled Water Contaminants Found (continued)

Brand[a]	Test #	Water Type	Purchase Location	Source of Water (if listed)	Contaminant & Level Found[b]									Number of Bottles Tested	Lab Rep. #	Comments
					HPC Bacteria[c] (Guidelines 500 cfu/ml; no enforceable standard) in cfu/ml	Arsenic[d] (CA Prop. 65 Level 5 ppb) in ppb	TTHMs[e] (CA & industry bottled water standard 10 ppb) in ppb	Chloroform (CA Prop. 65 level l0 ppb) in ppb	BDCM[f] (CA Prop. 65 level 2.5 ppb) in ppb	DBCM[g] (CA Prop. 65 level 3.5 ppb) in ppb	Phthalate (DEHP) (Tap water standard 6 ppb) no bottled water standard	Nitrate (Fed. & CA standard 10 ppm) in ppm	Other			
Crystal Geyser	1	(1 liter)	Chicago, IL		Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		10 (composited)	297719-48 (43-48)	
Crystal Geyser	1	(1 liter)	Chicago, IL		Not Detected	No test	No test	No test	No test	No test	No test	No test		9 (individually)	297790-836 (810-818)	
Dannon	1	Natural Spring Water (1.05 pint)	San Francisco	Piedmont, Quebec, Canada	6	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.8		3 (1 for each contaminant type)	EQI-1-24a-f	
Dannon	2	Natural Spring Water (1 liter)	San Francisco	Piedmont, Quebec, Canada	330	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.8		10 (composited)	SA-711-1696	
Dannon	3	Natural Spring Water	New York City	Piedmont, Quebec, Canada	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	1.2	Di-n-butyl-phthalate at 7.5 ppb; Methlene chloride at 1.5 ppb (below 5ppb standard)	10 (composited)	299863-942 (911-916)	Phthalate may be from leaching from bottle top or other packaging materials; methylene chloride of unknown origin, and at 30% of FDA standard.
Dannon†	4	Natural Spring Water	New York City	Piedmont, Quebec, Canada	2 of 10 bottles tested contained HPC bacterial overgrowth†	No test	No test	No test	No test	No test	No test	No test		10 (individually)	299 863-942 (917-926)	Bacterial overgrowth was observed in 2 of the 10 bottles tested. The presence of a large number of non-coliform HPC bacteria may be inhibiting the detection of coliform bacteria during the testing. See text for discussion of HPC bacteria.
Deer Park	1	Spring Water (1 liter)	New York City	Valley View Spring, Hegins Twp., PA	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		10 (composited)	299 863-942 (879-884)	
Deer Park	2	Spring Water (1 liter)	New York City	Valley View Spring, Hegins Twp., PA	Not Detected	No test	No test	No test	No test	No test	No test	No test		10 (individually)	299 863-942 (885-894)	
Deer Park	3	Spring Water (1.5 liter)	Washington, DC	Hegin Township, PA	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		10 (composited)	298 808-965 (879-884)	
Deer Park	4	Spring Water (1.5 liter)	Washington, DC	Hegin Township, PA	Not Detected	No test	No test	No test	No test	No test	No test	No test		10 (individually)	298 808-965 (869-878)	
Dominick's	1	Natural Spring Water (1.5 liter)	Chicago, IL		Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.6		10 (composited)	297719-48 (31-36)	

Dominick's	2	Natural Spring Water (1.5 liter)	Chicago, IL		Not Detected	No test	No test	No test	No test	No test	No test	No test		9 (individually)	297 790-836 (828-836)	
Evian	1	Natural Spring Water (1 liter)	San Francisco, CA	Cachat Springs, Evian, France	21	2.0	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.7		3 (1 for each contaminant type)	EQI-1-21-23	
Evian	2	Natural Spring Water (1 liter)	San Francisco, CA	Cachat Springs, Evian, France	63	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.8		10 (composited)	SA-711-1697	
Fiuggi	1	Natural Mineral Water (1 liter)	Berkeley, CA	A.S.T.I.F., Fiuggi, Italy	7	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	2.5		10 (composited)	SA-711-1698	
Gerber	1	Baby Water with Fluoride (1.5 liter)	Berkeley, CA	AquaPenn Springs, Graysville, PA	2	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.6	Fluoride found at 0.46 ppm, below standard	10 (composited)	SA-711-1699	
Gerolsteiner	1	Sprudel Sparkling Mineral Water (1 liter)	Berkeley, CA	Gerolstein, Germany	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	1.0		10 (composited)	SA-711-1700	
Glacier Springs	1	Purified Water (1 gallon)	Miami, FL		Not Detected	Not Detected	1.6	1.6	Not Detected	Not Detected	Not Detected above blank	Not Detected	Aluminum found at 180 ppb (std. is 200 ppb)	10 (composited)	304085-165 (150-155)	Aluminum found at 180 ppb, just below the 200 ppb FDA bottled water standard, set based on taste, odor, and aesthetic concerns. FDA's standard for aluminum is not applicable to mineral water, but is applicable to purified water.
Glacier Springs†	2	Purified Water	Miami, FL		HPC Bacterial Overgrowth detected in 1 of 10 bottles tested†	No test	No test	No test	No test	No test	No test	No test		10 (individually)	304085-165 (304156-304165)	Bacterial overgrowth was observed in 1 of the 10 bottles tested. The presence of a large number of non-coliform HPC bacteria may be inhibiting the detection of coliform bacteria during the testing. See text for discussion of HPC bacteria.
Hawaii	1	Purified Drinking Water (1.5 liters)	Berkeley, CA	Menehune Water Co, Aiea, HI	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		10 (composited)	SA-711-1701	
Hildon	1	Mineral Water-Carbonated (750 ml)	Berkeley, CA	Broughton, Hampshire, England	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	5.6		10 (composited)	SA-711-1702	Elevated nitrate level, though below FDA standard, of potential concern—see text.

Bottled Water Contaminants Found (continued)

Brand[a]	Test #	Water Type	Purchase Location	Source of Water (if listed)	Contaminant & Level Found[b]									Number of Bottles Tested	Lab Rep. #	Comments
					HPC Bacteria[c] (Guidelines 500 cfu/ml; no enforceable standard) in cfu/ml	Arsenic[d] (CA Prop. 65 Level 5 ppb) in ppb	TTHMs[e] (CA & industry bottled water standard 10 ppb) in ppb	Chloroform (CA Prop. 65 level 10 ppb) in ppb	BDCM[f] (CA Prop. 65 level 2.5 ppb) in ppb	DBCM[g] (CA Prop. 65 level 3.5 ppb) in ppb	Phthalate (DEHP) (Tap water standard 6 ppb) no bottled water standard	Nitrate (Fed. & CA standard 10 ppm) in ppm	Other			
Hildon	2	Mineral Water-Carbonated (750 ml)	Berkeley, CA	Broughton, Hampshire, England	No test	No test	No test	No test	No test	No test	No test	5.4		10 (composited)	SA 808-1663	Retest of elevated nitrate level; below FDA standard, of potential concern—see text.
Hildon	1	Mineral Water-Still (750 ml)	Berkeley, CA	Broughton, Hampshire, England	200	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	5.6		10 (composited)	SA-711-1703	Elevated nitrate level, though below FDA standard, of potential concern—see text.
Hinckley Schmidt	1	(1 gallon)	Chicago, IL		Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	1.9		10 (composited)	297719-48 (25-30)	
Hinckley Schmidt	2	(1 gallon)	Chicago, IL		Not Detected	No test	No test	No test	No test	No test	No test	No test		10 (individually)	297 790-836 (790-799)	
Hyde Park†	1	Purified Water (1 gallon)	Miami, FL		>5700†	Not Detected	2.2	2.1	0.1	Not Detected	Not Detected	Not Detected		10 (composited)	304085-165 (101-106)	Level of HPC bacteria substantially exceeded guideline.
Hyde Park	2	Purified Water	Miami, FL		Not Detected	No test	No test	No test	No test	No test	No test	No test		10 (individually)	304085-165 (304107-304116)	Retest for HPC bacteria in 10 bottles found none.
Ice Age	1	"Glacial Water" (1 liter)	Berkeley, CA	Alpine Creek, Manitoba Inlet, Canada	67	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		10 (composited)	SA-711-1704	
Janet Lee	1	Drinking Water (1 gallon)	San Diego/ San Marcos, CA	Albertsons, Boise, ID-distrib.	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.7		10 (composited)	SA-712-0393	
Janet Lee	1	Purified Water (1 gallon)	San Diego/ San Marcos, CA	Albertsons, Boise ID-distrib.	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		10 (composited)	SA-712-0394	
Janet Lee	1	Spring Water (1 gallon)	San Diego/ San Marcos, CA	Albertsons, Boise ID-distrib.	41	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		10 (composited)	SA-712-0395	
Jewel	1	Artesian Water (1 gallon)	Chicago, IL		Not Detected	1.1	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		10 (composited)	297719-48 (19-24)	
Jewel	2	Artesian Water (1 gallon)	Chicago, IL		Not Detected	No test	No test	No test	No test	No test	No test	No test		10 (individually)	298 808-965 (800-809)	
Kroger	1	Utopia Spring Water (1 liter)	Houston, TX	Indian Springs, Franklin County, TX	1	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.9		10 (composited)	298 808-965 (928-933)	

Kroger	2	Utopia Spring Water (1 liter)	Houston, TX	Indian Springs, Franklin County, TX	Not Detected	No test	No test	No test	No test	No test	No test	No test		10 (individually)	298 808-965 (918-927)	
Lady Lee	1	Natural Spring Water (1 gallon)	San Francisco		Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Toluene at 13.9 ppb; o-xylene at 3.0 ppb	3 (1 for each contaminant type)	EQI-1-53-55	Toluene and xylene are constituents of gasoline and also used in some industrial chemicals.
Lucky (aka Lady Lee)	2	Natural Spring Water (1 gallon)	San Francisco	Plant #06-21	20	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	No toluene or xylene detected	10 (composited)	SA-712-0025	
Lady Lee	3	Natural Spring Water			No test	No test	Not Detected	Not Detected	Not Detected	Not Detected	No test	No test	Toluene at 0.55 ppb, no xylene detected	10 (composited)	SA-806-2086	
Lady Lee*	1	Purified Water purified by deionization (1 gallon)	San Francisco		Not Detected	6.5*	54.8*	54.8*	Not Detected	Not Detected	Not Detected	0.1	Toluene at 9.5 ppb; ethyl-benzene at 2.0 ppb; m/p-xylene at 3.1 ppb; o-xylene at 6.3 ppb	3 (1 for each contaminant type)	EQI-1-50-52	Arsenic and chloroform at levels above CA Prop. 65 levels. TTHMs above California and industry standard of 10 ppb. Toluene and xylene are gasoline constituents and also used in some industrial chemicals.
Lucky (aka Lady lee)	2	Purified Water (1 gallon)	San Francisco	Plant #06-21	1	Not Detected	1.1	1.1	Not Detected	Not Detected	Not Detected	Not Detected		10 (composited)	SA-712-0026	
Lady Lee	3	Purified Water purified by deionization (1 gal.)	San Francisco		Not Detected	Not detected	Not detected	Not detected	Not Detected	Not Detected	No test	No test	Methylene chloride at 4.1 ppb (std. is 5 ppb)	3 (1 for each contaminant type)	SA-808-1666	Methylene chloride at level just below federal standard
Lady Lee*	1	Drinking Water (1 gallon)	San Francisco		Not Detected	3.2	91.6*	88.9*	2.7*	Not Detected	Not Detected	0.1	Toluene at 11.0 ppb; o-xylene at 2.9 ppb	3 (1 for each contaminant type)	EQI-1-56-58	THM levels in excess of CA & industry standards; chloroform and bromodichloromethane in excess of CA Prop. 65 level. Toluene and xylene are gasoline constituents and also used in industrial chemicals.
Lady Lee*	2	Drinking Water			No test	No test	29*	29*	Not Detected	Not Detected	No test	No test	Toluene at 0.5 ppb; no xylene found	10 (composited)	SA-806-2085	THM levels in excess of CA & industry standards; chloroform in excess of CA Prop. 65 level. Toluene is a gasoline constituent and used in industrial chemicals.

Bottled Water Contaminants Found (continued)

Brand[a]	Test #	Water Type	Purchase Location	Source of Water (if listed)	Contaminant & Level Found[b]									Number of Bottles Tested	Lab Rep. #	Comments
					HPC Bacteria[c] (Guidelines 500 cfu/ml; no enforceable standard) in cfu/ml	Arsenic[d] (CA Prop. 65 Level 5 ppb) in ppb	TTHMs[e] (CA & industry bottled water standard 10 ppb) in ppb	Chloroform (CA Prop. 65 level 10 ppb) in ppb	BDCM[f] (CA Prop. 65 level 2.5 ppb) in ppb	DBCM[g] (CA Prop. 65 level 3.5 ppb) in ppb	Phthalate (DEHP) (Tap water standard 6 ppb) no bottled water standard	Nitrate (Fed. & CA standard 10 ppm) in ppm	Other			
Lucky (aka "Lady Lee")	3	Drinking Water (1 gallon)	San Francisco	Plant #06-21	8	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	No toluene or xylene detected	10 (composited)	SA-711-1705	
Lucky*	1	Seltzer Water (2 liters)	San Francisco	Salt Lake City, UT, distrib., Am Procurement & Logistics	Not Detected	Not Detected	30.7*	29*	1.7	Not Detected	Not Detected	Not Detected	Fluoride found at 0.84 ppm*	10 (composited)	SA-712-0027	THM level exceeds CA & industry industry standards, and chloroform level exceeds CA Prop. 65 level. Fluoride level slightly over CA warm weather area standard of 0.8 ppm if fluoride added (if fluoride is natural, warm weather area standard is 1.4 ppm); identical FDA standard does not apply to seltzer (not defined as "bottled water").
Lucky*	2	Seltzer Water			No test	No test	20*	20*	Not Detected	Not Detected	No test	No test	n-isopropyl-toluene at 230 ppb; n-butyl-benzene at 21 ppb; Toluene at 1.8 ppb		SA-806-2087	Chloroform level CA Prop. 65 warning level; THM-level exceeds CA & industry standards. High level of n-isopropyl toluene and elevated level of n-butyl-benzene of unknown origin; CA law generally prohibits levels over 1 ppb of these VOCs in source water, but may have been added in processing.
Lucky	1	Sparkling Water, Sugar Free Rasberry Bev. (1 liter)	San Francisco		Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.2	p-isopropyl-toluene found at 5.4 ppb	3 (1 for each contaminant type)	EQI-1-41-43	
Master Choice†	1	Spring Water	New York City (1.5 liters)	Stockbridge, VT	>5700†	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	1.7		10 (composited)	299863-942 (863-868)	Level of HPC bacteria substantially exceeded guideline.

Master Choice†	2	Spring Water (1.5 liters)	New York City		1 of 10 bottles had HPC bacterial overgrowth†	No test	No test	No test	No test	No test	No test	No test		10 (individually)	299869-878	Bacterial overgrowth was observed in 1 of the 10 bottles of water tested. The presence of a large number of non-coliform HPC bacteria may be inhibiting the detection of coliform bacteria during the testing. See text for discussion of HPC bacteria.
Mendocino	1	Sparkling Mineral Water (1 liter)	Berkeley, CA	Mendocino Bev., Comptche, CA	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		10 (composited)	SA-712-0028	
Natural Value†	1	Spring Water (1 gallon)	Berkeley, CA	Nat. Value, Sacramento, CA-distrib.	7,300†	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		10 (composited)	SA-712-0029	Level of HPC bacteria substantially exceeded guideline applied to bottled water by some states.
Naya	1	Canadian Natural Spring Water (1 liter)	Los Angeles	Revelstroke, BC, Canada	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		3 (1 for each contaminant type)	EQI-1-LA 15-LA 17	
Naya	2	Canadian Spring Water (1 liter)	San Diego, CA	Revelstroke, BC, Canada	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		10 (composited)	SA-712-0396	
Naya	3	Canadian Spring Water (1.5 liter)	New York City	Revelstroke, BC, Canada	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		10 (composited)	299863-942 (927-932)	
Naya	4	Canadian Spring Water (1.5 liters)	New York City	Canada	Not Detected	No test	No test	No test	No test	No test	No test	No test		10 (individually)	299 863-942 (933-942)	
Niagara*	1	Drinking Water (1 gallon)	San Diego, CA	Irvine, CA	35	Not Detected	8.5	3.7	3.1*	1.7	Not Detected	Not Detected		10 (composited)	SA-712-0397	Bromodichlormethane found above CA Prop. 65 level.
Niagara	2	Drinking Water			No test	No test	3.1	1.5	1.1	0.5	No test	No test		1 (individual)	SA-901-0800	
Niagara	3	Drinking Water			No test	No test	1.6	0.9	0.7	Not Detected	No test	No test		8 (composited)	SA-901-0800	
Nursery	1	Drinking Water, sodium free fluoride added, not sterile, use as directed by physician or by labeling directions for use in infant formula (1 gallon)	San Francisco		Not Detected	4.5 ppb	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Toluene found at 12.4 ppb, o-xylene at 3.2 ppb, styrene at 3.0 ppb	3 (1 for each contaminant type)	EQI-1-47-49	Toluene and xylene are constituents of gasoline and also used in some industrial chemicals.

Bottled Water Contaminants Found (continued)

Brand[a]	Test #	Water Type	Purchase Location	Source of Water (if listed)	Contaminant & Level Found[b]									Number of Bottles Tested	Lab Rep. #	Comments
					HPC Bacteria[c] (Guidelines 500 cfu/ml; no enforceable standard) in cfu/ml	Arsenic[d] (CA Prop. 65 Level 5 ppb) in ppb	TTHMs[e] (CA & industry bottled water standard 10 ppb) in ppb	Chloroform (CA Prop. 65 level 10 ppb) in ppb	BDCM[f] (CA Prop. 65 level 2.5 ppb) in ppb	DBCM[g] (CA Prop. 65 level 3.5 ppb) in ppb	Phthalate (DEHP) (Tap water standard 6 ppb) no bottled water standard	Nitrate (Fed. & CA standard 10 ppm) in ppm	Other			
Nursery	2	Drinking Water			No test	No test	Not Detected	Not Detected	Not Detected	Not Detected	No test	No test	Toluene at 0.57 ppb	10 (composited)	SA-807-0079	
Odwalla*	1	Geothermal Natural Spring Water (1 liter)	Berkeley, CA	Trinity Springs, Davenport, CA	1	3.8	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Fluoride found at 1.5 ppm*	10 (composited)	SA-712-0030	FDA and CA bottled water regulations impose a maximum iof 1.4 ppm fluoride in areas with annual average high temperatures of >79.3 °F.
Odwalla*	2				No test	3.9	No test	No test	No test	No test	No test	No test	Fluoride at 1.6 ppm*	10 (composited)	SA-807-0080	FDA and CA bottled water regulations impose a maximum of 1.4 ppm fluoride in areas with annual average high temperatures of >79.3 °F.
Opal†	1	Spring Water (1.5 liter)	Berkeley, CA	Culver, OR	510†	2.4	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Fluoride found at 0.16 ppm	10 (composited)	SA-712-0031	Level of HPC bacteria exceeded guideline applied to bottled water by some states.
Ozarka	1	Drinking Water	Houston, TX	Houston Municipal Water Supply	1	Not Detected	2.2	1.8	0.4	Not Detected	Not Detected	Not Detected		10 (composited)	29808-965 (960-965)	
Ozarka	2	Drinking Water	Houston, TX	Houston Municipal Water Supply	Not Detected	No test	No test	No test	No test	No test	No test	No test		10 (individually)	298950-959	
Palomar*	1	Mountain Spring Water (1 liter)	Los Angeles	Palomar Mountain, Escondido, CA	2	5.8 ppb	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.6		3 (1 for each contaminant type)	EQI-1-LA3-5	Arsenic level exceeds CA Proposition 65 warning level.
Palomar	2	Mountain Spring Water (1.5 liters)	Venice, CA	Palomar Mountain, Escondido, CA	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.6		10 (composited)	SA-712-0398	
Palomar	3	Mountain Spring Water (1.5 liters)	Los Angeles	Palomar Mountain, Escondido, CA	No test	Not detected	No test	No test	No test	No test	No test	No test		10 (composited)	SA-808-1664	
Pathmark	1	Spring Water (1.5 liters)	New York City	Guelph, Canada	1	Not Detected	2.4	Not Detected	Not Detected	0.1	Not Detected	Not Detected	Bromoform (a trihalomethane) was found at 2.2 ppb	10 (composited)	299863-942 (895-900)	

Pathmark†	2	Spring Water (1.5 liters)	New York City	Guelph, Canada	1 of 10 bottles tested contained HPC bacterial overgrowth†	No test	No test	No test	No test	No test	No test	No test		10 (individually)	299 863-942 (901-910)	Bacterial overgrowth was observed in 1 of the 10 bottles of water tested. The presence of a large number of non-coliform HPC bacteria may be inhibiting the detection of coli-form bacteria during the testing. See text for discussion of HPC bacteria.
Pathmark	3	Spring Water (1.5 liters)	New York City	Guelph, Canada	Not detected	No test	No test	No test	No test	No test	No test	No test		10 (individually)	299 863-942 (879 & 885-893)	
Perrier	1	Sparkling Mineral Water (25 fl oz)	San Francisco	Vergeze, France	19	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	2.8	2-Chloro-toluene found at 4.6 ppb	3 (1 for each contaminant type)	EQI-1-44-46	Chlorotoluene of unknown origin
Perrier	2	Sparkling Mineral Water (25 fl oz)	Los Angeles	Vergeze, France	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	2.6	2-Chloro-toluene found at 3.7 ppb	3 (1 for each contaminant type)	EQI-1-LA 36-LA 38	Chlorotoluene of unknown origin
Perrier*	3	Sparkling Mineral Water (1 liter)	San Francisco	Vergeze, France	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Di(2-ethyl-hexyl)phthalate detected at 12 ppb.*	4.3	No Detection of 2-Chloro-toluene	10 (composited)	SA-712-0032	Exceeds 6 ppb tap water standard for Di(2-ethylhexyl) phthalate (DEHP), but there is no standard for bottled water for this chemical. California does not allow this DEHP level in the source water for bottled water, but sets no DEHP standard for finished bottled water.
Perrier	4	Sparkling Mineral Water	San Francisco	Vergeze, France	No test	No test	No test	No test	No test	No test	No test	4.1	No test	10 (composited)	SA-808-1662	Nitrate retest
Poland Spring†	1	Natural Spring Water (1 liter)	Washington, DC		750†	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		10 (composited)	298808-965 (819-824)	HPC bacteria found at levels exceeding guideline applied by some states to bottled water.

Bottled Water Contaminants Found (continued)

Brand[a]	Test #	Water Type	Purchase Location	Source of Water (if listed)	Contaminant & Level Found[b]									Number of Bottles Tested	Lab Rep. #	Comments
					HPC Bacteria[c] (Guidelines 500 cfu/ml; no enforceable standard) in cfu/ml	Arsenic[d] (CA Prop. 65 Level 5 ppb) in ppb	TTHMs[e] (CA & industry bottled water standard 10 ppb) in ppb	Chloroform (CA Prop. 65 level 10 ppb) in ppb	BDCM[f] (CA Prop. 65 level 2.5 ppb) in ppb	DBCM[g] (CA Prop. 65 level 3.5 ppb) in ppb	Phthalate (DEHP) (Tap water standard 6 ppb) no bottled water standard	Nitrate (Fed. & CA standard 10 ppm) in ppm	Other			
Poland Spring†	2	Natural Spring Water (1 liter)	Washington, DC		5 of 10 bottles tested had HPC bacterial overgrowth†	No test	No test	No test	No test	No test	No test	No test		10 (individually)	298 808-965 (809-818)	Bacterial overgrowth was observed in 5 of the 10 bottles of water tested. The presence of a large number of non-coliform HPC bacteria may be inhibiting the detection of coliform bacteria during the testing. See text for discussion of HPC bacteria.
Polar	1	Spring Water (1 gallon)	Washington, DC	Crystal Springs, Spring Grove, VT	Not Detected	Not Detected	0.1	0.1	Not Detected	Not Detected	Not Detected	0.8	Toluene detected at 2.5 ppb, (well below the standard of 1000 ppb)	10 (composited)	298 808-965 (851-856)	Toluene is often an indicator of the presence of gasoline or industrial chemicals, here of unknown origin.
Polar	2	Spring Water (1 gallon)	Washington DC	Crystal Springs, Spring Grove, VT	Not Detected	No test	No test	No test	No test	No test	No test	No test		10 (individually)	298 808-965 (841-850)	
Private Selection* (Ralphs)	1	Drinking Water (1 gallon)	Los Angeles		Not Detected	Not Detected	47.1*	16.7*	20.1*	10.3*	Not Detected	0.1		3 (1 for each contaminant type)	EQI-1-LA 26-LA 27	THM levels violated CA & industry standards for bottled water, and chloroform, bromodichloromethane, and dibromochloromethane exceeded California Prop. 65 levels.
Private Selection* (Ralphs)	2	Drinking Water (1 gallon)	Venice, CA	Ralphs LA, distrib. plant 06-178	66	Not Detected	22.3*	6.6	8.9*	6.8*	Not Detected	Not Detected		10 (composited)	SA-712-0399	THM levels violated CA & industry standards for bottled water, and bromodichloromethane, and dibromochloromethane exceeded CA Prop. 65 levels.
Private Selection (Ralphs)	1	Natural Spring Water (1 gallon)	Los Angeles		Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.1		3 (1 for each contaminant type)	EQI-1-LA 34-LA 35	

Private Selection* (Ralphs)	1	Purified Water (1 gallon)	San Diego, CA	Ralphs LA, distrib., plant 06-178	Not Detected	Not Detected	20.1*	8.4	7.4*	4.3*	Not Detected	Not Detected		10 (composited)	SA-712-0582	Trihalomethane levels violated CA & industry standard for bottled water, and bromodichloro-methane, and dibromochloro-methane exceeded CA Prop. 65 levels.
Private Selection* (Ralphs)	2	Purified Water (1 gallon)	Los Angeles	Ralphs LA, distrib., plant 06-178	No test	No test	10.4*	9.1	1.3	Not detected	Not Detected	Not Detected		10 (composited)	SA-808-1665	THM levels violated CA & industry/IBWA standard for bottled water.
Publix†	1	Drinking Water (1 gallon)	Miami, FL	Not Detected	1.3	45†	41	3.2	0.2	Not Detected	0.8	Acetone found at 11 ppb (no std); styrene found at 0.6 ppb (below std. of 100 ppb)	10 (composited)	304085-165 (085-090)	THM levels violate industry/IBWA standard of 10 ppb (no longer enforce-able in FL).
Publix†	2	Drinking Water (1 gallon)	Lakeland, FL	No test	No test	53†	47	5.3	0.4	No test	No test	Acetone found at 14 ppb (no standard)	8 (composite sample)	361 436-37 (36)	THM levels violate industry/IBWA standard of 10 ppb (no longer enforce-able in FL).
Publix†	3	Drinking Water (1 gallon)	Lakeland, FL	No test	No test	65†	59	6.0	0.5	No test	No test	Acetone found at 16 ppb (no standard)	1 bottle	361 436-37 (37)	THM levels violate industry/IBWA standard of 10 ppb (no longer enforce-able in FL)
Publix	4	Drinking Water (1 gallon)	Miami, Fl	Not Detected	No test	No test	No test	No test	No test	No test	No test	No test	10 (individually)	304085-165 (304091-304100)	
Publix†	1	Purified Water (1 gallon)	Miami, FL	1	Not Detected	15†	14†	0.9	Not Detected	Not Detected	Not Detected	Styrene found at 0.2 ppb (below std. of 100 ppb)	10 (composited)	304085 (117-122)	THM found at level exceeding 10 ppb industry/IBWA standard (no longer enforceable in FL). Styrene from unknown source.
Publix†	2	Purified Water (1 gallon)	Miami, FL	5 of 10 bottles tested con-tained HPC "bacterial overgrowth"†	No test	No test	No test	No test	No test	No test	No test	No test	10 bottles (individually)	304085-165 (304123-304132)	Bacterial overgrowth was observed in 5 of the 10 bottles tested. The presence of a large number of non-coliform HPC bac-teria may be inhibit-ing the detection of coliform bacteria during the testing. See text for discus-sion of HPC bacteria.

Bottled Water Contaminants Found (continued)

Brand[a]	Test #	Water Type	Purchase Location	Source of Water (if listed)	Contaminant & Level Found[b]									Number of Bottles Tested	Lab Rep. #	Comments
					HPC Bacteria[c] (Guidelines 500 cfu/ml; no enforceable standard) in cfu/ml	Arsenic[d] (CA Prop. 65 Level 5 ppb) in ppb	TTHMs[e] (CA & industry bottled water standard 10 ppb) in ppb	Chloroform (CA Prop. 65 level l0 ppb) in ppb	BDCM[f] (CA Prop. 65 level 2.5 ppb) in ppb	DBCM[g] (CA Prop. 65 level 3.5 ppb) in ppb	Phthalate (DEHP) (Tap water standard 6 ppb) no bottled water standard	Nitrate (Fed. & CA standard 10 ppm) in ppm	Other			
Puritas	1	Drinking Water (1 gal.)	Los Angeles	Grt. Sprg. Waters of America, Milpitas, CA	Not Detected	3.2	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		3 (1 for each contaminant type)	EQI-1-LA1-LA2	
Puritas†	2	Drinking Water (1 gallon)	Berkeley, CA	Grt. Sprg. Waters of America, Milpitas, CA	990†	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Results not received	Not Detected		10 (composited)	SA-712-0033	Level of HPC bacteria substantially exceeded guideline.
Ralphs	1	Mountain Spring Water (1.5 liter)	Los Angeles	"California Mountains," L.A. ,CA distrib.	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.8		3 (1 for each contaminant type)	EQI-1-LA 28-LA 30	
Ralphs	2	Mountain Spring Water (1.5 liters)	San Diego	"California Mountains"	270	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.6		10 (composited)	SA-712-0583	
Randalls	1	Remarkable Drinking Water (1 gallon)	Houston, TX	Buck Springs, Jasper, TX	Not Detected	Not Detected	0.4	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Bromoform (a trihalomethane) found at 0.4 ppb	10 (composited)	298 808-965 (895-900)	
Randalls	2	Remarkable Drinking Water (1 gallon)	Houston, TX	Buck Springs, Jasper, TX	Not Detected	No test	No test	No test	No test	No test	No test	No test		10 bottles (individually)	298 808-965 (885-894)	HPC retest found none.
Randalls†	1	Deja Blue Drinking Water (1 liter)	Houston, TX	City of Irving Water Supply	>5700†	Not Detected	29.6†	14	12	3.6	Not Detected	Not Detected		10 (composited)	298 808-965 (911-916)	Levels of TTHM exceed IBWA/industry standards (not enforceable in TX).
Randalls	2	Deja Blue Drinking Water (1 liter)	Houston, TX	City of Irving Water Supply	Not Detected	No test	No test	No test	No test	No test	No test	No test		10 bottles (individually)	298 808-965 (901-910)	
Rocky Mountain	1	Drinking Water, non-carbonated (1.5 liter)	Los Angeles	"Deep Well Water"	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		3 (1 for each contaminant type)	EQI-1-LA 31-LA 33	
Rocky Mountain	2	Drinking Water, non-carbonated (1.5 liters)	San Dimas, CA	Santa Fe Springs, CA	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		10 (composited)	SA-712-0584	
S. Pellegrino	1	Sparkling Natural Mineral Water, bottled at the source (25..3 oz)	San Francisco	San Pellegrino, Italy	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		3 (1 for each contaminant type)	EQI-1-38-40	

S. Pelligrino	2	Sparkling Natural Mineral Water (1 liter)	San Francisco	San Pellegrino, Italy	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Fluoride found at 0.37 ppm (below standard)	10 (composited)	SA-712-0034	
Safeway*† (CA)	1	Drinking Water (1 gallon)	Berkeley, CA	Municipal Source, Safeway Inc., Oakland, CA-distrib.	8,500†	Not Detected	35.1*	31*	4.1*	Not Detected	Not Detected	Not Detected	Fluoride found at 0.81 ppm (above standard in warm weather areas)	10 (composited)	SA-712-0214	THM found at level above CA & industry bottled water standards; chloroform and bromodichloromethane (BDCM) found at levels above CA Prop. 65 limits. Fluoride at level above FDA & state limit for areas with av. high temp. >79.3°F. HPC bacteria above guideline adopted by some states for bottled water.
Safeway* (CA)	2	Drinking Water			51,000† (1 bottle) 12,000† (1 bottle) 2-21 (4 bottles) Not detected in 4 bottles (see notes)	No test	37*	35*	2.3	Not Detected	No test	No test		10 (composited for chemical analysis) 10 (individually for bacteria analysis)	SA 807-0081	THM found at level above CA & industry botled water standards, and chloroform found at a level above CA Prop. 65 limit. Retests of individual bottles that were initially found to contain 51,000 cfu/ml and 12,000 cfu/ml found no HPC and 6,000 cfu/ml, respectively, thought these results are unreliable since they were retested beyond EPA-mandated "hold time" after opening.
Safeway (CA)	1	Key Lime Sparkling Water (1 quart)	San Francisco		Not Detected	Not detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.5		3 (1 for each contaminant type)	EQI#1-13-15	

Bottled Water Contaminants Found (continued)

Brand[a]	Test #	Water Type	Purchase Location	Source of Water (if listed)	Contaminant & Level Found[b]									Number of Bottles Tested	Lab Rep. #	Comments
					HPC Bacteria[c] (Guidelines 500 cfu/ml; no enforceable standard) in cfu/ml	Arsenic[d] (CA Prop. 65 Level 5 ppb) in ppb	TTHMs[e] (CA & industry bottled water standard 10 ppb) in ppb	Chloroform (CA Prop. 65 level 10 ppb) in ppb	BDCM[f] (CA Prop. 65 level 2.5 ppb) in ppb	DBCM[g] (CA Prop. 65 level 3.5 ppb) in ppb	Phthalate (DEHP) (Tap water standard 6 ppb) no bottled water standard	Nitrate (Fed. & CA standard 10 ppm) in ppm	Other			
Safeway*† (CA)	1	Purified Water (1 gallon)	San Francisco		>5,700†	Not detected	26.4*	26.4*	Not Detected	Not Detected	Not Detected	0.1	Total coliforms Count 5*; Toluene found at 8.4 ppb	3 (1 for each contaminant type)	EQI#1-7-9	Coliforms, HPC bacteria, trihalomethanes, and chloroform exceed guidelines/standards. Toluene is a constituent of gasoline and industrial chemicals that should be removed if treated with reverse osmosis. Label claims "prepared by deionization and/or reverse osmosis." Could have been added during processing.
Safeway* (CA)	2	Purified Water (1 gallon)	San Francisco/ Berkeley, CA	Municipal Source, Safeway, Oakland, CA-distrib.	4	Not Detected	42.5*	39*	3.5*	Not Detected	Not Detected	Not Detected	Toluene not detected, coliforms not detected	10 (composited)	SA-712-0585	THM levels violate CA & industry standards, chloroform and bromodichloromethane exceeded CA Prop. 65 levels.
Safeway* (CA)	1	Select Club Soda (2 liter)	Berkeley, CA	Safeway, Oakland, CA, distrib.	Not Detected	Not Detected	53.3*	50*	3.3*	Not Detected	Not Detected	Not Detected	Fluoride found at 0.64 ppm, below std.	10 (composited)	SA-712-0215	THM levels violate CA & industry standards for bottled water. Chloroform and bromodichloromethane exceeded CA Prop. 65 levels.
Safeway* (CA)	2	Select Club Soda			No test	No test	25*	24*	0.54	Not Detected	No test	No test		10 (composited)	SA-807-0082	Chloroform level exceeds Cal. Prop. 65 Level; Trihalomethane levels over Cal. & industry standards.

Safeway*† (CA)	1	Select Seltzer Water (2 liter)	Berkeley, CA	Safeway, Oakland, CA, distrib.	Not Detected	Not Detected	36.1*	34*	2.1	Not Detected	Not Detected	Not Detected	Fluoride found at 0.83 ppm* above warm weather std. for added fluoride	10 (composited)	SA-712-0216	THM levels violate CA & industry standards. Chloroform level exceeds CA Prop. 65 level. Fluoride above 0.80 CA std. For areas with av. high >79.3°F (if fluoride added; if natural, warm weather area standard is 1.4 ppm); identical FDA standard does not apply to seltzer (not defined as "bottled water").
Safeway* (CA)	2	Select Seltzer Water			No test	No test	21*	21*	Not Detected	Not Detected	No test	No test		10 (composited)	SA-807-0083	THM levels violate CA & industry standards, chloroform level exceeds CA Prop. 65 level.
Safeway*† (CA)	1	Spring Water "Especially selected for its Natural Purity" (1 gallon)	San Francisco		>5700†	Not detected	56.8*	53.3*	3.5*	Not Detected	Not Detected	Not Detected	Toluene found at 14.2 ppb; o-Xylene at 3.1 ppb, both below standards	3 (1 for each contaminant type)	EQI-1-10-12	Toluene and o-Xylene are constituents of gasoline and industrial chems. This water apparently was chlorinated, suggesting that it could be tap water or if it is spring water, it was subjected to chlorination. Levels of TTHMs exceeded CA & industry standard; level of chloroform exceeds CA Prop. 65 level; HPC exceeded guidelines.
Safeway* (CA)	2	Spring Water (1 gallon)	Berkeley, CA	Safeway, Oakland, CA, distrib.	15	Not Detected	24.9*	23*	1.9	Not Detected	Invalid	Not Detected	Fluoride found at 0.28 ppm, below std.; no toluene or xylene found	10 (composited)	SA-712-0217	THM levels violate CA & industry standards. Chloroform level exceeds. CA Prop. 65 level.
Safeway (CA)	3	Spring Water (1 gallon)	Berkeley, CA	Safeway, Oakland, CA, distrib.	No Test	No test	No test	No test	No test	No test	Not Detected	No test	No test	10 (composited)	SA 801-0364	Retest for phthalate and semivolatile organics, not detected.
Safeway (DC)	1	Refreshe Natural Spring Water (16.9 oz)	Washington, DC	Safeway Spring, NY	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.7		10 (composited)	298808-965 (835-840)	

Bottled Water Contaminants Found (continued)

Brand[a]	Test #	Water Type	Purchase Location	Source of Water (if listed)	Contaminant & Level Found[b]									Number of Bottles Tested	Lab Rep. #	Comments
					HPC Bacteria[c] (Guidelines 500 cfu/ml; no enforceable standard) in cfu/ml	Arsenic[d] (CA Prop. 65 Level 5 ppb) in ppb	TTHMs[e] (CA & industry bottled water standard 10 ppb) in ppb	Chloroform (CA Prop. 65 level 10 ppb) in ppb	BDCM[f] (CA Prop. 65 level 2.5 ppb) in ppb	DBCM[g] (CA Prop. 65 level 3.5 ppb) in ppb	Phthalate (DEHP) (Tap water standard 6 ppb) no bottled water standard	Nitrate (Fed. & CA standard 10 ppm) in ppm	Other			
Safeway (DC)	2	Refreshe Natural Spring Water (16.9 oz)	Washington, DC	Safeway Spring, NY	1 of 10 bottles tested had over-growth of HPC bacteria	No test	No test	No test	No test	No test	No test	No test		10 bottles (individually)	298 808 965 (825-834)	Bacterial overgrowth was observed in 1 of the 10 bottles of water tested. The presence of a large number of non-coliform HPC bacteria may be inhibiting the detection of coli-form bacteria during the testing. See text for discussion of HPC bacteria.
Safeway (DC)	1	Safeway Spring Water (1 gallon)	Washington, DC	Tower City, PA	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Toluene found at 4.7 ppb (below the standard of 1000 ppb)	10 (composited)	298808-965 (863-868)	Toluene is a con-stituent of gasoline and industrial chem-icals, although its source here is unknown.
Safeway (DC)	2	Safeway Spring Water (1 gallon)	Washington, DC	Tower City, PA	Not Detected	No test	No test	No test	No test	No test	No test	No test		10 (composited)	298 808 965 (857-862, 917)	
Sahara*	1	Drinking Water, "Premium" (50.7 oz.)	Los Angeles		1	Not Detected	37.9*	14.7*	14.9	8.3*	Not Detected	1.1		3 (1 for each contaminant type)	EQI-1-LA9-11	THM levels violated CA & industry standards for bottled water, and chloroform, bromo-dichloromethane, and dibromochloro-methane exceeded CA Prop. 65 levels.
Sahara*	1	Mountain Spring Water (1.5 liter)	San Diego/ San Marcos, CA	Bear Spec. & Mktg., San Bernadino, CA distrib.	Not Detected	Not Detected	15.9*	6.5*	6.6*	2.8	Not Detected	2.5	Fluoride at 0.54 ppm	10 (composited)	SA-712-0586	THM levels violated CA & industry stan-dards for bottled water, and chloro-form, and bromo-dichloromethane exceeded California Prop. 65 levels.
Save the Earth	1	Natural Spring Water (1 liter)	Berkeley, CA	Baxter Springs, CA	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		10 (composited)	SA-712-0218	
Schweppes	1	Club Soda (1 liter)	San Francisco, CA	Cadbury Bev., Stamford, CT	Not Detected	Not Detected	7.7	7.7	Not Detected	Not Detected	Invalid test	Not Detected	Fluoride found at 0.13 ppm, well below standard	10 (composited)	SA-712-0219	

Schweppes	2	Club Soda (1 liter)	San Francisco	Dr. Pepper/ Seven Up, Inc, Dallas, TX	No test	No test	No test	No test	No test	No test	Not Detected	No test		10 (composited)	SA 801-0360	Retest of semi-volatile organics, including phthalate, found none.
Schweppes	1	Seltzer Water (1 liter)	Berkeley, CA	Cadbury Bev., Stamford, CT	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Invalid test	Not Detected	Fluoride found at 0.28 ppm, well below standard	10 (composited)	SA-712-0220	
Schweppes	2	Seltzer Water (1 liter)	San Francisco	Dr. Pepper/ Seven Up, Inc, Dallas, TX	No test	No test	No test	No test	No test	No test	Not Detected	No test		10 (composited)	SA 801-0361	Retest of semi-volatile organics, including phthalate, found none.
Shasta	1	Sparkling Club Soda (2 liters)	Berkeley, CA	Shasta Bev., Hayward, CA distrib.	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Results not received	Not Detected	Fluoride found at 0.19 ppm, well below standard	10 (composited)	SA-712-0221	
Shasta	2	Sparkling Club Soda (2 liters)	Berkeley, CA	Shasta Bev., Hayward, CA distrib.	No test	No test	No test	No test	No test	No test	Not Detected	No test		10 (composited)	SA 801-0365	Retest of semi-volatile organics, including phthalate, found none.
Sparkletts†	1	Crystal Fresh Drinking Water—"Meet or Exceed all State and Federal Water Quality Standards" (1 liter)	Los Angeles	McKesson Water Prods., Pasadena, CA	3600†	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.1		3 (1 for each contaminant type)	EQI-1-LA 12-LA 14	Heterotrophic Plate Count Bacteria (HPC) exceeded guideline.
Sparkletts	2	Crystal Fresh Drinking Water—"Meet or Exceed all State and Federal Water Quality Standards" (1 liter)	Venice, CA	McKesson Water Prods., Pasadena, CA	140	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		10 (composited)	SA-712-0587	HPC Level below guidelines in retest.
Sparkletts	1	Distilled Drinking Water (1 gallon)	Venice, CA	McKesson Water Prods., Pasadena, CA	190	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		10 (composited)	SA-712-0588	
Sparkletts†	1	Mountain Spring Water (33.8 oz.)	Los Angeles	McKesson Water Prods., Pasadena, CA	>5700†	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.6		3 (1 for each contaminant type)	EQI-1-LA 18-LA 20	Heterotrophic Plate Count Bacteria (HPC) exceeded guideline.
Sparkletts	2	Mountain Spring Water (1 liter)	Venice, CA	McKesson Water Prods., Pasadena, CA	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		10 (composited)	SA-712-0589	HPC not detected.
Sparkling Springs	1	(1.5 liter)	Chicago, IL		Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	3.1		10 (composited)	297 719-48 (37-42)	
Sparkling Springs	2	(1.5 liter)	Chicago, IL		Not Detected	No test	No test	No test	No test	No test	No test			9 (individually)	297 790 836 (819-827)	

Bottled Water Contaminants Found (continued)

Brand[a]	Test #	Water Type	Purchase Location	Source of Water (if listed)	Contaminant & Level Found[b]									Number of Bottles Tested	Lab Rep. #	Comments
					HPC Bacteria[c] (Guidelines 500 cfu/ml; no enforceable standard) in cfu/ml	Arsenic[d] (CA Prop. 65 Level 5 ppb) in ppb	TTHMs[e] (CA & industry bottled water standard 10 ppb) in ppb	Chloroform (CA Prop. 65 level 10 ppb) in ppb	BDCM[f] (CA Prop. 65 level 2.5 ppb) in ppb	DBCM[g] (CA Prop. 65 level 3.5 ppb) in ppb	Phthalate (DEHP) (Tap water standard 6 ppb) no bottled water standard	Nitrate (Fed. & CA standard 10 ppm) in ppm	Other			
Vittel*	1	Mineral Water (1.5 liter)	Berkeley, CA	Vittel Bonne Source Well, Vittel, France	Not Detected	11*	9.3	9.3	Not Detected	Not Detected	Not Detected	Not Detected		10 (composited)	SA-712-0222	Arsenic level exceeds CA Prop. 65 level and WHO/EU arsenic water limit.
Vittel*	2	Mineral Water	San Francisco	No test	No test	13 ppb	No test	No test	No test	No test	No test	No test	No test	10 (composited)	SA-901-0799	Arsenic exceeds CA Prop. 65 level and WHO/EU water limit.
Volvic*	1	Natural Spring Water (1.5 liter)	Berkeley, CA	Clairvic Spring, Volvic, France	11	14*	Not Detected	Not Detected	Not Detected	Not Detected	Results not received	1.3	Fluoride found at 0.17 ppm, well below standard	10 (composited)	SA-712-0223	Arsenic level exceeds CA Prop. 65 level and WHO/EU arsenic water limit.
Volvic*	2	Natural Spring Water (1.5 liter)	Berkeley, CA	Clairvic Spring, Volvic, France	No test	12*	No test	No test	No test	No test	No test	No test	No test	10 (composited)	SA-808-1667	Arsenic level exceeds CA Prop. 65 level and WHO/EU arsenic water limit.
Volvic	3	Natural Spring Water (1.5 liter)	Berkeley, CA	Clairvic Spring, Volvic, France	No test	No test	No test	No test	No test	No test	Not Detected	No test		10 (composited)	SA 801-0362	Retest of semi-volatile organics, including phthalate, found none.
Vons	1	Drinking Water (1 gallon)	Los Angeles	Vons LA, distrib.	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		3 (1 for each contaminant type)	EQI-1-LA 24-LA 25	
Vons	2	Drinking Water (1 gallon)	San Diego/ San Marcos, CA	Vons LA, distrib. plt 06-2796	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Test invalid	Not Detected		10 (composited)	SA-712-0590	
Vons	3	Drinking Water (1 gallon)	Los Angeles	Vons LA, distrib. plt 06-2796	No test	No test	No test	No test	No test	No test	Not Detected	No test		10 (composited)	SA 801-0363	Retest of semi-volatile organics, including phthalate, found none.
Vons	1	Natural Spring Water (1 liter)	Los Angeles	Vons LA, distrib.	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.6		3 (1 for each contaminant type)	EQI-1- LA 21-LA 23	
Vons	2	Natural Mountain Spring Water (1 liter)	San Diego/ San Marcos, CA	Vons Co. LA, distrib.	1.0	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	0.7		10 (composited)	SA-712-0591	
Vons	1	Purified Water (1 gallon)	San Diego/ San Marcos, CA	Vons LA, plt. 06-2796	1	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected		10 (composited)	SA 712-0805	

Yosemite Waters†	1	Drinking Water (5 gallons)	Los Angeles/ Santa Monica	Highland Park, CA	1100†	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	1.3	10 (composited)	SA 712-0806	Level of HPC bacteria exceeds guidelines.
Zephyrhills	1	Distilled Water (1 gallon)	Miami, FL		Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected above blanks	Not Detected	10 (composited)	304 085-165 (133-138)	

Note: These tests used established FDA- or EPA-approved test methods, but are not necessarily statistically representative of all bottled water of the brand listed. See text for further discussion.

[a] Row with bold name indicates level exceeding standard or guideline: asterisk {*} indicates exceeds enforceable standard; dagger {†} indicates exceeds unenforceable guideline. See text and accompanying *Technical Report*.

[b] As discussed in the text, the California Proposition 65 ("Prop. 65") levels noted in this table are derived from the "No Significant Risk" levels established by the California Department of Health Services, and are based on the CDHS's rules' assumption that people drink 2 liters of water per day (the same assumption used by the U.S. EPA). Thus, for example, the Arsenic Proposition 65 level is 10 micrograms per day, so assuming 2 liters of water consumed per day, the Prop. 65 Arsenic level is 5 ppb.

[c] There is no enforceable FDA standard for HPC bacteria. We use 500 cfu/ml as an informal guideline. HPC bacteria are not necessarily harmful themselves but are often used as an indicator of overall sanitation during bottling. The European Union (EU) has adopted an enforceable bottled water standard of 100 colonies per 100 ml (at 22°C) at bottling. EPA's tap water rules provide that water containing over 500 cfu/ml is treated as a coliform-positive sample absent proof of adequate disinfectant residual. The International Bottled Water Association recommends plants meet a level of <30 cfu/ml at bottling, and <200 cfu/ml in 90% of samples tested 5 days after bottling. Massachusetts and New York have an informal bottled water guideline (unenforceable) of 500 cfu/ml. Other states (such as RI) also have informal guidelines.

[d] Federal tap water and bottled water standards for arsenic, originally set in 1942 and not revised since, is 50 ppb. Congress has required updated standard by 2001. International (WHO/EU) standard is 10 ppb (see text).

[e] TTHMs are "total trihalomethanes," potentially cancer-causing chemicals created when organic matter reacts with chlorine. Recent studies also indicate TTHMs may also be linked to birth defects and spontaneous abortions. While California and International Bottled Water Association (industry trade association) standard is 10 ppb, new Federal tap water standard is 80 ppb, and FDA bottled water standard is 100 ppb (see text).

[f] BDCM is bromodichloromethane, a type of trihalomethane (see above).

[g] DBCM is dibromochloromenthane, a type of trihalomethane (see above).

APPENDIX B

Documented Waterborne Disease from Bottled Water

The bottled water industry (through IBWA) flatly denies that bottled water has ever caused a disease outbreak—going so far as to assert that the Centers for Disease Control and Prevention (CDC) has found that there has never been an outbreak of waterborne disease from bottled water.[1] However, such outbreaks from contaminated bottled water have indeed occurred and are well documented by CDC and others in the scientific literature.

For example, in a published 1996 study of waterborne disease in the United States, the CDC reported a 1994 outbreak of cholera associated with bottled water that occurred in Saipan, U.S. territory in the Marianas Islands in the Pacific.[2] FDA bottled water standards apply to this U.S. territory to the same extent that they would in any U.S. state.[3] While there was not a full epidemiological study of all those who drank the water, CDC reported that at least 11 were known to have become ill, and 4 were hospitalized with serious cases of cholera.[4] The brand of water involved was not named.[5] According to an unpublished Waterborne Disease Outbreak report on this outbreak filed with CDC by local public-health officials, approximately one third of the island residents drink water from the company involved, and "thousands" of people may have been exposed.[6] The total number of people who became ill is unknown.

The bottled water plants producing the water involved in this outbreak reportedly obtain their water from municipal water (some of the wells used tested positive for fecal coliform bacteria), but they supposedly then treat the water with state-of-the-art treatment using reverse osmosis.[7] While the bottles used were supposed to have been cleaned by machine or manually with hot water and a chlorine solution, the bottling plants had, according to CDC, "occasionally been cited for the cursory handling of returned bottles (e.g., for only rinsing them with treated water.")[8] The CDC reported that during the outbreak, bottled water tested positive for fecal coliform, but the actual source of the bacterial contamination in the bottled water was not determined.[9]

Another well-documented cholera outbreak, which occurred in Portugal, was due to the use of bottled water from a contaminated source.[10] The outbreak occurred in the mid-1970s, but demonstrates the continuing potential for contaminated bottled

water to spread waterborne disease. According to a study of the affected population, there were 2,467 bacteriologically confirmed hospitalized cases of cholera, of whom 48 died.[11] While apparently bottled water was not the only cause of the outbreak, at least 82 patients had a history of drinking bottled water from the contaminated source.[12] In addition, 36 cholera victims had visited the spa that was fed with the same source as used for bottled water.[13] It was believed that the limestone aquifer was contaminated by broken sewers from a nearby village.[14]

Historically, other cases of illness from bottled water have been documented in the scientific literature. For example, there are published reports showing that bottled water was the causative agent not only in the outbreaks of cholera just noted, but also illnesses from typhoid[15] and "traveler's disease."[16]

References

1 See, e.g., International Bottled Water Association, "Frequently Asked Questions," (1997).

2 M.H. Kramer, et al., "Surveillance for Waterborne-Disease Outbreaks—United States, 1993–1994," *Centers for Disease Control & Prevention Surveillance Summaries, Morbidity and Mortality Weekly Report*, vol. 45, no. SS-1, pp. 1–31 (April 12, 1996).

3 See, 21 U.S.C. §321(a).

4 *Ibid*.

5 *Ibid*.

6 Waterborne Disease Outbreak Report Form, filed with CDC by Division of Public Health, Commonwealth of the Northern Marianas Islands, dated January 3, 1995.

7 M.H. Kramer, et al., "Surveillance for Waterborne-Disease Outbreaks—United States, 1993–1994," *Centers for Disease Control & Prevention Surveillance Summaries, Morbidity and Mortality Weekly Report*, vol. 45, no. SS-1, pp. 1–31 (April 12, 1996).

8 *Ibid*.

9 *Ibid*.

10 P.A. Blake, et al., "Cholera in Portugal, 1974. II. Transmission by Bottled Water," *American J. Epidemiology*, vol. 105, pp. 344–48 (1977).

11 P.A. Blake, et al., "Cholera in Portugal, 1974. I. Modes of Transmission." *American J. Epidemiology*, vol. 105, pp. 337–43 (1977).

12 *Ibid.*

13 *Ibid.*

14 *Ibid.*

15 D.W. Warburton, "A Review of the Microbiological Quality of Bottled Water Sold in Canada. Part 2. The Need for More Stringent Regulations," *Canadian J. Microbiology*, vol. 39, pp. 158–168 (1993), citing R. Buttiaux, "La Surveillance Bacteriologique Des Eaux Minerales en Bouteilles et en Boites," *Ann. Instit. Pasteur Lille*, vol. 11, pp. 23–28 (1960).

16 D.W. Warburton, "A Review of the Microbiological Quality of Bottled Water Sold in Canada. Part 2. The Need for More Stringent Regulations," *Canadian J. Microbiology*, vol. 39, pp. 158–168 (1993).

Summary: State Bottled Water Programs

Survey Questions	State Staff or Budget Dedicated to Bottled Water Program?	Bottled Water Survey?	Regs. More/Less Strict vs. FDA?	State Regulates BW Not Reg'd by FDA?	Additional Labeling Require-ments? (FDA +)	Enforcement Actions Reported?	Violations Data Reported?	Illness Reported?	Testing & Source Certification Require-ments?	State Permit Program?	Contaminant Posing Most Threat?	State Recom-mended Changes Needed?	Notes
Alabama	< 1 FTE	No	= FDA	No	No	No. Two voluntary recalls	No	No	=FDA	Yes	No comment	No recommenda-tions at this time.	
Alaska	None	No	=EPA IBWA, & FDA Codes; Alaska does not require annual testing for chemicals & radioactive contaminants	Intrastate, carbonated, flavored waters regulated under same standards as bottled water	No	No	No	No	=Fed.; Must comply with Class A drinking water reqts per SDWA	Yes	Microbiological	FDA needs definition of "glacier water"; Annual chemical & radiological contaminants testing should be eliminated: tests are expensive and not necessary.	
Arizona	½ FTE	No	=+IBWA Code; = FDA	Intrastate regulated same as interstate	No	No	No	No	=FDA; Require chemical, radiological and microbial testing; verified by twice-yearly inspections	State Certification	Known carcinogens, bacteria	Annual inspec-tions; Need more regional approach to chemical & biological test-ing b/c not all contaminants found in all areas.	
Arkansas	None	Yes; Data more like lists of lab results	= FDA	Arkansas regulates all bottled water within state	No	No	No	No	=FDA; Bottlers must get approval on water source, filtration & chlorination (or other sanita-tion method)	Yes; Renewed yearly	Coliform bacteria, giardia, other bacteria	Biennial inspection (contact with FDA).	
California	2 FTE; 9 inves-tigators state-wide	Not in last 1½ years	Stricter (THHM, disinfection rules)	No comment from state (but regulations appear to cover such waters)	Must list source, including municipal; Labeling must agree with source listed	State has sep-arate investi-gative arm; Fines have been imposed; No shutdowns or recalls	No access to specific violations	Yes[b]	Stricter than FDA; Water analysis required to renew annual license; Licenses for plants and source are site-specific; Any changes must be sub-mitted and approved by state	Yes; Renewed annually; Water analysis must be submitted each year	Parasites, cryptosporidium	No comment	IBWA Code Stricter standards & warning labels for many contaminants.

Summary: State Bottled Water Programs (continued)

Survey Questions	State Staff or Budget Dedicated to Bottled Water Program?	Bottled Water Survey?	Regs. More/Less Strict vs. FDA?	State Regulates BW Not Reg'd by FDA?	Additional Labeling Requirements? (FDA +)	Enforcement Actions Reported?	Violations Data Reported?	Illness Reported?	Testing & Source Certification Requirements?	State Permit Program?	Contaminant Posing Most Threat?	State Recommended Changes Needed?	Notes
Colorado	< 1 FTE	No	= FDA, EPA drinking water; Bottlers must keep records of required lab analysis; Records must meet EPA drinking water requirements	No	No	Yes; Regulatory action mostly for heavy metal or THMs; No "serious" enforcement actions taken; No shutdowns or recalls	Small # of violations; Data not available	No	Bottlers must meet state reqts, almost identical to EPA drinking water standards for source water (includes well and spring construction)	Yes	Nitrates	Many of our concerns were addressed w/passage of latest FDA labeling regs; Before that, misbranding on labels was a concern	
Connecticut	$50,000	No	= FDA +IBWA Code; State code based on Fed. Standards (21 CFR 129, 103) and EPA	CT licenses & regs all manufacturers of non-alcoholic beverages sold in state	Separate state regs	Must request specific information and companies using freedom of information law	Same as above	No response	No response	No response	VOCs from underground fuel tanks	None	
Delaware	None	No	No active regulatory oversight or permit program; No separate state code	Delaware does not have a state program for bottled water	No	No	No; Any violations would be recorded in home state	No	No state requirements	No	No comment	Pending the start up of in-state bottlers, the state would need to develop & implement a state BWP	No bottlers in DE
District of Columbia	None	No	=FDA	No	No	No	No	No	DC reqs bottlers to send copy of most recent inspections of water source in DC; Agency is new, but will eventually adopt FDA inspection policies	No	Chemicals, bacteria, waste contaminants	Proper labeling so that labels are accurate, not misleading; Bottled water used for babies & other at-risk groups should be clearly labeled	
Florida	2 FTE	Food Lab. collects random samples from food shelves	=FDA	Intrastate sales	No	No	Listed in records at Dept. of Agric.; No database	No	=FDA; Inspections and analytical results conducted in field	Yes; Renewable annually	No comment	None	IBWA Code
Georgia	None dedicated specifically to BWP	Pesticide analysis on end-product on random basis	=+FDA; GA regs used to be much more stringent	GA regulates all bottled, flavored, carbonated water	No	Yes; Some springs have exceeded radioactive limits: use denied or shutdown	GA working on database for sampling results; Summary of violations not feasible at this time	No answer	GA issues starter kits for bottlers	No answer	No problems w/chemical; Some bacteriological	None; "Bottled water as a food is probably one of the safest items on the market"	

Hawaii	<⅕ FTE	Yes; Hawaii samples bottled water product on regular basis; Test for bacteria & chemicals	=FDA; Used to have stricter laws than FDA (IBWA Code)	No	Yes (not specified)	Not in past 4 yrs; Recalls in past b/c of too much coliform bacteria & "filth"	Info available through FOI request	No	Source must be approved, then license/ permit issued	Yes; Renewable every 2 yrs; Sample end-product every 6 months; Plant inspections every 1–2 yrs	Microbiological contamination in source	No comment at this time	<10 bottlers in state
Idaho	None	No	=but cover intrastate; Must comply with Idaho drinking water regulations	Idaho regulates intrastate bottlers only; FDA handles all interstate	Intrastate labeling law prohibits misbranding	No	No; Only regulate intrastate bottled water sales; Non-critical violations not recorded; Sanitation violations not included	No	Must apply w/ plan review, pre-operational inspections; Must qualify under HACCP prior to getting license; Must meet labeling requirements	Yes; License renewable annually	No comment	None	
Illinois	None; No separate state BWP	Yes; 2 surveys on water bottlers in past 5 yrs; Report available through FOI request	=FDA, except 1 gal+ must add safety seal	Intrastate bottlers regulated	No	Yes; Most enforcement actions in form of letters[c]	Probably available, but would require great deal of resources to get info.	No answer	No state certification process; Source only inspected upon request	No state certification process; Inspections of bottlers conducted annually	Microbiological	State should adopt licensing process, providing more control & leverage	
Indiana	None	No	=FDA; State does not have separate code	Intrastate sales of bottled water	No	No	Inspection reports made, but not gathered in database; Would require extensive time & labor to compile	Yes[d]	Testing =FDA; State does not certify source; Private source needs satisfactory bacteria/ radiological physical & chemical analysis of source by state lab before approval	No state permit, license or certification process	No comment	None	
Iowa	None	No	=FDA	State does not directly regulate end-product from out of state	No	Enforcement actions for food safety, labeling violations; No shutdowns or recalls	No summarized statistical data available; Info not stored in database	No	Testing=FDA; Bottlers must sample end-product before license issued; Only private sources must sample	Yes; License renewable annually	Microbiological	Need more sampling for chemical residues on national level by FDA & it should do more actual testing	
Kansas	<1 FTE	No	Less stringent; No separate state regulations	Yes; Bottled water is "food" & subject to Kansas Food & Drug Act	=FDA; General labeling requirements of Kansas F & D Act	No	Current computer system could not pull out this info	No answer	Kansas has no statutory authorization to issue permits, licenses, or certificates for BW processors, plants, or distributors	No	No comment	Would like to update state code to similar to industry model code or FDA's regs	

Summary: State Bottled Water Programs (continued)

Survey Questions	State Staff or Budget Dedicated to Bottled Water Program?	Bottled Water Survey?	Regs. More/Less Strict vs. FDA?	State Regulates BW Not Reg'd by FDA?	Additional Labeling Requirements? (FDA +)	Enforcement Actions Reported?	Violations Data Reported?	Illness Reported?	Testing & Source Certification Requirements?	State Permit Program?	Contaminant Posing Most Threat?	State Recommended Changes Needed?	Notes
Kentucky	None	No	=FDA	Intrastate; Out-of-state bottlers submit most recent water analysis, permit & label for review prior to distribution in KY	=FDA	Yes; Warning letters issued	Only in inspection results	No answer	Intrastate source certified by Natural Resources & Environmental Protection Cabinet; No out-of-state source certification	Yes	Chemical	Specific bottled water regulation	
Louisiana	1/3 FTE	State samples end-product every 3 months, from both in- & out-of-state	=FDA	Intrastate must get permit; Out-of-state must register with state, send water & plant approval, labels, lab analysis	=FDA	Violations listed from routine inspections; No shutdowns, recalls	No	No	Stricter than FDA; Out-of-state must register; In-state must apply for & obtain permit	Yes	Microbiological, carcinogens	No comment	
Maine	<1/2 FTE	No	=EPA	Intrastate sales; In-state bottler inspections annually	Yes; If source or end-product exceed MCLs, must be listed on label; optional listing of analytical results; must list altered water quality	None	Listed in database; Take 1/2 hour to gather; Sorted by water systems	None	Must submit test results, site map, copies of labels, inspection reports prior to state certification	Yes; does not need to be renewed	Microbiological, nitrate/nitrite	Equalize drinking & bottled water regulations; Source listing on labels	
Maryland	None	No, but bottlers required to conduct sampling through state-certified lab	=FDA	Intrastate sales	Yes; Source of water must be listed on labels; Labels must meet Nutrition Labeling Act requirements	Yes[e]	Database	None	Stricter than FDA; Bottlers required to do EPA primary drinking water analysis of source; Bottlers must pass sanitation inspection	Yes	Bacteriological	Has requested funding & staff be increased to add 2 FTE; EPA should add cryptosporidium to drinking water checklist	THHM=10ppb, IBWA code, 100ppb chlorine; disinfection
Massachusetts	1/3 FTE	Yes, annually	= FDA +IBWA Code	Intrastate, carbonated, all nonalcoholic beverages	Yes. Source must be listed	Denials of applications	No	No	Must get Dept. Envtl Protection (DEP) approval	No response	VOCs	None	IBWA Code
Michigan	No response	State samples bottled water on routine basis, at least once/year	=FDA & SDWA	Intrastate sales, carbonated, unprocessed public drinking water, water dispensing machines	Declaration of identity, name & address of bottler, and declaration regarding carbon dioxide	"No legal actions" 4 years	No (will provide for $200/year)	No	Essentially= FDA; Annual inspection by independent 3rd party	Annual registration for each brand	No response	No response	

Minnesota	None	Yes; Currently sampling 459 samples of bottled water for metals; Samples taken from retail stores	=FDA	Separate state code	Yes; State rules & CFR requirements	No	No	No response	State does not certify source; License firms located in state; No longer issue permits to out-of-state firms	Yes; See above	Nitrites &pesticides (spring water)	State rules need updating (from 1993)	
Mississippi	3 FTE for all state bottling facilities	Try to sample each bottled water product sold in state on monthly basis for *E. coli* & bacteria	=FDA	Intrastate regulated same as interstate	No	Bottled water products not meeting standards will be withdrawn (done in past)	No	No answer	Must submit testing, geological survey, engineer certification & report, preliminary site inspections; If approved, state issues source certification	Yes; See above; re-cert every 3 years	No response	More FDA oversight needed; FDA program analysis of state's bottled water program & assist it as necessary	
Missouri	<1 FTE	Yes; Annual survey[f]	=FDA, except state requires pseudomonas testing	Intrastate; Seltzer water; All bottled waters regulated same as all other beverages	=FDA	No	No; Currently working on database	No answer	Private source only;[g] Spring source must get private lab chemical & bacteriological analysis testing; Source must be protected from surface contaminants	Yes; See above	No response	None	
Montana	1/20 FTE	Random monitoring program at plant for finished product every 2–3 years	More stringent; State monitors water quality more closely; Stricter definiton of "spring water"	All bottlers regulated under licensing programs as food processors	In-state labeling definitions more stringent; If labeled "organic" must be verified by 3rd party "organic certification group"	Yes; 3 recalls (2 microbial contaminations, 1 misbranding); No shutdowns	No	No	In-state bottlers apply to DEQ & meet EPA standards; Out-of-state bottlers must provide certification from source state public health agency	Out-of-state must register & obtain license (automatically renewed annually unless violations); In-state must apply to DEQ and become PWS; License issued upon approval as PWS (automatically renewed annually unless violation)	Nitrates (greatest risk to pregnant women); heavy metals & bacteriological in terms of protecting public	FDA's honesty in labeling should extend to artesian, spring, and other definitions of bottled waters	All in-state bottlers must become Public Water Systems (PWS) & meet EPA drinking water standards

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Nebraska	None	No (last bottled water survey done in 1991)	=FDA	Intrastate bottlers must follow same guidelines as interstate	No	No	Yes, but data available would have more to do with sanitation violations rather than analytical results	None	Testing =FDA; Source does not have to be certified, but bottlers must supply satisfactory analytical results before processing begins	Yes, see above; Permit renewed annu-ally; Bottlers do not need to submit ana-lytical results to renew per-mit, but must have FDA test results on hand at plant; State conducts spot-checking on random basis	Testing & analytical process is effective at preventing contamination	Reduce testing for unlikely contaminants; FDA requirements should not be made any more stringent	
Nevada	$5000 or 1/10 FTE	No	=FDA	Intrastate; All bottled waters produced in state are covered by various portions of state code	Source, name & address of bottler must be on label; If making any claims such as to low sodium or flouride content, must list levels found in product	Yes; Denial of permits for distribution into state without meeting chemical parameters; One local bottler had high bacteria levels found in sampling, resulting in voluntary recall of end-product	Violation data kept in paper files for local producers only; No data on out-of-state violations	None	Must submit detailed chemical & bacteriological analysis on source; Testing = FDA, SDWA	Permit renewed annually; Bacteriological analysis must be submitted every week if plant in "full" operation	Coliform; Bacteriologicals	Pretty happy with our regulations right now	
New Hampshire	<1 FTE	No	=FDA, +IBWA	Intrastate; License other waters, such as filtered waters	Accurate source listing (no misleading brand names)	Yes; Enforce-ment letters and permit actions; One recall and 2 shutdowns in last 4 years (no details available over phone)	No	No	Testing= FDA; Source certified through Dept. Environmental Services	Permitting pro-gram for source and bottling facility; Must submit analytical & hydrogeological reports; Plant permits re-newed annually & analytical reports must be resubmitted with renewal application	No comment	More money/ staff in some states	Strong label requirements

New Jersey	1 FTE	Yes (annual). Spot checks of bottled water sold and produced in state; State rules require periodic submission of samples for review by state health dept. lab	=FDA; Some parameters stricter than federal standards (=EPA drinking water standards)	Intrastate; Carbonated water covered under bottled water rules; Other types of waters may be classified as beverages & regulated as nonalcoholic beverage product	Source must be listed on label; Two-year expiration date (from time of bottling)	Yes; 2 recalls in 1995–96;[h] No shutdowns within last 4 years; Regulatory letters sent for various violations, primarily for unsanitary conditions; No fines or penalties assessed; No actions against in-state bottlers for violations of safe drinking water standards	Annual summary of test results to legislature mandated by state statute	No	Testing = FDA & EPA drinking water standards; Must submit analytical results of source testing showing compliance with state drinking water act standards; Spring sources must be protected from outside sources of contamination at discharge point	License must be renewed annually and bottlers subject to periodic inspections; Source and end-product subject to mandatory periodic testing at a DEP certified water testing lab	No particular contaminants have consistently exceeded established standards	No comment	IBWA Code; Annual enforcement/ violation report mandated by state statute
New Mexico	No response	No	=FDA	No response	No response	Yes	No	No	= FDA	No response	Microbiologicals	No comment	5-year record retention
New York	1–1½ FTE	No (last survey in 1992)	Stricter (total SOCs)	Intrastate regulated same as interstate by state; Seltzer and carbonated waters not regulated under bottled water rules	Must list source, owner, certificate number & date water bottled; Nutritional claims must be consistent with FDA regs; Variances must be listed on label	Yes	Violation data kept in paper files	No	Testing= Stricter monitoring; Source must be certified & meet standards in building design & water quality (through certified lab)	State issues certification numbers; Renewed annually; All sampling & other requirements must be resubmitted upon renewal application	Microbiologicals	Uniform labels, FDA standards = EPA; NY's goal is to become more consistent with national standards	Standards may be waived; IBWA Code
North Carolina	No comment	No	= FDA (adopted by reference into state code)	Intrastate; Seltzer water considered a beverage & regulated under different part of state code	No	Yes	No	No	Testing = FDA; In-state bottlers must get source approved (one-time approval); State occasionally does unannounced inspections and sampling	No permit program	No comment	None at this time	Bacterial contamination incidents reported
North Dakota	<¼ FTE	No, but state is considering conducting survey of water vending machines if time & resources allow	"much less stringent"	State has jurisdiction over all water bottlers not already under FDA's jurisdiction	No	No	No	No	"Little if any testing;" Bottlers do not have to submit source analysis; Source must be "unadulterated"	Licensing program for facilities; Renewable annually	Probably nitrates	Should = EPA rules; State should adopt regulatory provisions when and if the demand arises; "Little need" for an additional state regulatory scheme	

Summary: State Bottled Water Programs (continued)

Survey Questions	State Staff or Budget Dedicated to Bottled Water Program?	Bottled Water Survey?	Regs. More/Less Strict vs. FDA?	State Regulates BW Not Reg'd by FDA?	Additional Labeling Require-ments? (FDA +)	Enforcement Actions Reported?	Violations Data Reported?	Illness Reported?	Testing & Source Certification Require-ments?	State Permit Program?	Contaminant Posing Most Threat?	State Recom-mended Changes Needed?	Notes
Ohio	Approx. 1 FTE	Yes. Water quality survey on 5-gallon containers of bottled water, but not smaller (ice also surveyed)	=FDA	Intrastate regulated same as interstate	Must list source if non-municipal; Any additives must be listed	Yes; Embargoed 5-gallon containers with high standard plate count; No recalls	No	No	Testing = FDA; Source must be inspected and declared acceptable by EPA	License is renewable yearly and all data/test results must be resubmitted	Bacteria	None	IBWA Code
Oklahoma	1 FTE	No	= FDA	Yes	Yes	No response	Yes; Inspection reports (not provided)	No	= FDA; Bottler must send chemical, radiological, & bacteriological analysis & have con-taminant levels within acceptable parameters	Permit renew-able annually; Renewal based upon compli-ance with regulations	Bacteria	Truth in labeling	IBWA Code
Oregon	1/10 FTE	No	= FDA; State does more inspections than FDA	State regulates all water and beverage bottlers	No	Yes. Action against bottler claiming source water was spring water when it was not	Yes (Summary report of violations for period 1/1/94–12/31/97)	"No listings available"	= FDA plus must meet state drinking water require-ments for location, design, con-struction and water quality	Bottlers licensed as food pro-cessors; Reciprocity to bottlers to out-of-state bottlers; Licenses renewed annually	None; Water in compliance with standards does not pose any great risk to consumers & our program is adequate to assure compliance	Support FDA change	
Pennsylvania	None	Occasional bottled water quality surveys in 1992; Some VOC contami-nation found	Stricter	Intrastate; Waters with additives & bottled water under ½ gallon regu-lated by Dept. of Agriculture	Must list source; If source is taken from "finished water source," i.e., a public water system, must list name	Yes (5 permits revoked, 6 recalls); Mostly informal notices to bottlers of violations, w/set period time to correct violations; No recalls in 4 years	Yes	No	Essentially = FDA; Must submit source sampling that meets all Maxi-mum Contami-nant Levels; Once approved, source need not be moni-tored; Finished product must be tested weekly for coliforms	Yes	Microbials, especially cryptosporidium & giardia	Reciprocity among states as to accepting analytical results & some sort of standardization among the different states' labs	IBWA Code

Rhode Island	1/5 FTE	Occasionally RI takes random samples of end-product off retail shelves & conducts microbiological analyses	= FDA; some sections of state code more stringent, e.g., RI requires dedicated line for bottling water	State regulates all bottled water, including carbonated; If natural juices added, regulated as soft drink under different part of state code	Source must be listed unless run through a deionizer (reverse osmosis); Municipal waters without deionizaton process must list source	1 recall of baby water b/c of mold contamination; Informal actions for other incidents, including chlorine contamination[i]	Must request from database and paper files	No	= FDA & EPA; Out-of-state must send analytical report and approval letter from appropriate state agency; In-state must submit analytical report engineering drawing with location of spring source & everything within 1700' radius	Yes; Bottler must submit end-product & source samples with annual renewal application	Microbiologicals	More stringent than FDA labeling reqts, e.g., specific location & name of water source; Shift focus away from health claims to more accurate labeling	
South Carolina	<1 FTE	No	More stringent b/c state follows EPA standards for drinking water	State regulates and permits construction of bottling & treatment facilities & monitor source & end-product	No comment	Yes; Enforcement actions taken over past 4 years mostly related to non-permitted construction activities & unapproved water bottling facilities	"No major violations;" All SC bottlers kept on water system inventory & assigned a water system number	No	Bottler must submit plans & specifications for their design & construction for review under state code; Source must be tested for water quality	Yes; State issues permit to operate; Currently, permits need not be renewed; Regulatory changes will most likely impose a periodic renewal requirement in near future	Giardia & cryptosporidium (in terms of one-time exposure health risk)	Adopt model code; Need consistent standards for all states	FDA does monitoring & inspection
South Dakota	<1 FTE	State conducts yearly bottled water survey	Less stringent than FDA	Only one intrastate bottler, subject to state regulations only which are less stringent than FDA	No	No	Yes; Computerized data base of violations	No	All sources in SD currently public water sources & are approved upon verification as municipal source after inspection(municipal sources must meet safe drinking water requirements); No natural spring sources in SD	No	Since all sources are municipal & must meet safe drinking water requirements anyway, there is no great risk to bottled water consumers	Recommend that SD bring state regs up to FDA requirements	
Tennessee	No response	No	= FDA	No response	No response	Not provided	Not provided	Not provided	Not provided	No response	No answer	No answer	

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Texas	<1 FTE (300 hundred bottlers)	Yes; State inspects each firm individually & inspects at least annually; Private businesses send out their own quality control people to make sure finished product meets quality standards	More stringent; More frequent inspection program; Requires source labeling & certification of operators under Bottled Water Certification Program	All beverages manufactured, packaged and labeled in state are regulated as food; Water vending machines regulated	Source must be labeled; Chemicals or bacteria that exceed Maximum Contaminant Levels must be listed (must state on label "contains excessive bacteria")	Yes; Bottler fined approximately $1250 for operating without certification; Recall in Dallas 1–2 years ago b/c of gross misbranding	Yes (not provided); State keeps copies of warning letters, but no summary reports available	No	Testing = FDA; Source must meet non-community public water system standards & state issues "Source Certification" letter (one-time)	State licenses bottled water plants & vending machines; Renewed annually; Water quality analysis must be resubmitted annually to EPA certified lab unless city source	Bacterial contamination	More FDA oversight where states have inadequate programs; Reinstitute certification program	IBWA Code; Bottled Water Certification Program
Utah	<1 FTE	No	= FDA	Intrastate bottled waters regulated same as interstate	No	Informal hearing held b/c company not permitted; Bottler now bottling water from another source; No recalls, shutdowns, or other legal action	No	No	Testing = FDA; Water quality analysis of source must be submitted; Bottling facility inspected before approval	No; State does not currently approve source, but environmental inspections required before company starts operations	Pesticides, fertilizers	Current regulations on both state & federal level adequate	
Vermont	<1 FTE	Dept. has requested random sampling, but has not occurred	More stringent than FDA: State has stricter labeling requirements, chemical contaminant levels, & name of bottler	Intrastate sales of bottled water regulated same as interstate; No regulation of seltzer, carbonated, or flavored waters	Source, town & state of bottler, & finished product levels of chemical contaminants of arsenic, lead, sodium, & nitrates	Yes; Approx. 4 years ago, bottler was fined for using unapproved source	Yes; Computer data base of violations	No	Bottler must apply for permit & submit hydrogeological info on source, schematic diagram of treatment facility & engineering facility; Copy of labels, chemical results for source & finished product, recall plan, list of foreign Country requirements.	Permit must be renewed every 5 years; Bottlers must resubmit water quality analysis & copy of most recent license & inspection program	Microbiological & VOCs	More frequent inspections of facilities, random testing of end product & active participation & support by FDA; FDA's definition of "spring water" needs to be less ambiguous	

Virginia	1–2 FTE	State samples regularly for bottled water quality, but no survey in past 5 years	= FDA	Intrastate; Seltzer & carbonated waters regulated same as other bottled waters	No	State enforcement actions have included enforcement letters, a formal hearing, and court action which resulted temporary shutdown; Will provide for $235.80	Information kept in data base; Will provide for fee	Will provide for fee	State does not issue certification, but source needs to be tested & meet standards with respect to microbiological quality, physical turbidity, and chemical quality & radiological quality; plant inspections every 4 months	State does not have a permitting program: State is not empowered to permit of license	Microbiological contaminants	Adopt state licensing or permitting program which would enable state to address food safety issues in a more timely manner	
Washington	1/3 FTE; $20,000	Not sure	We adopt federal regulations verbatim; State inspects bottled water operations on much more frequent basis than FDA	Yes	No (same as 21 CFR 129)	Yes; Warning letters & notices of corrections issued approximately to 6–10 bottlers; License suspension/civil penalty issued against one bottler; Civil penalty action issued against one bottler	No	No	Bottler must go through source approval process with Dept. of Health, Division of Drinking Water, including site inspection & chemical, bacterial, and physical analysis	Licensing renewed annually; Water quality analysis required per CFR schedule, but not in order to renew license	(1) Bacteriological –due to post-process contamination; (2) Primary inorganics; (3) VOCs	No suggestions	
West Virginia	1/2 FTE	No; State relies on bottlers to do required sampling in accordance with CFR reqts	= FDA; More stringent reporting requirements; Bottlers must test weekly for bacteriological contaminants & submit their reports to state agency by 10th of each month	Intrastate; Flavored & seltzer waters currently regulated under soft drink regulationss	No	Yes; Mainly for technical permit violations, not for quality violations; Formal notices based upon consumer complaints of mold growth; No recalls	Yes; Information stored in hard files and would require substantial resources to compile	Yes[j]	WV does not have separate permitting program for source; Chemical tests followed by on-site physical inspection of plant; Source must be protected from outside contamination at point of discharge and draw area	Permitting program for facilities; Renewed annually; Bottlers must submit chemical analysis for both source & end-product and have satisfactory physical inspection to renew	WV has never really had a problem with either in-state or out-of-state contamination	State regulations need updating to meet standards of most recent CFR regulations; Currently, WV is following most recent CFR regs by interpretation only	Annual inspections

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Wisconsin	<1 FTE	Yes; State statute requires publication of annual bottled water quality analysis report	= FDA; Exceeds in some areas, e.g., some state bottled water plant facility regulations much more stringent than FDA requirements	Intrastate, seltzer, carbonated, all bottled water establishments regulated under ATCP (Agriculture, Trade & Consumer Protection)	No	State has had some regulatory dealings which have been handled by working with bottlers without further legal actions; State reports few problems with bottled water facilities; 1 problem with pre-consumer lead contamination[k]	No (stored in paper files)	No answer	Bottles must contact DNR & have inspectors approve & verify source & construction; Source must be analyzed for contaminants	Permits renewed annually; Bottlers must maintain analysis criteria & testing schedule to renew license	Lead	Regulatory scheme of state is more than adequate to protect both consumers & bottling facilities	
Wyoming	<1 FTE	No; State goes by what bottles must sample per CFR requirements	= FDA; State code is modeled after IBWA code; Separate state code adopted in Sept. 1986 & refers to CFR often	State regulates everything manufactured in-state; Out-of-state processors must apply for distribution permit; Contractual agreement with FDA to do federal inspections	Specific source must be listed; Municipal water must be labeled as "drinking water"	No; One incident of misbranding in which source labeled as "spring" when really tap; Bottlers response was to find a spring as source	Yes; Violation data stored on computer data base	No	Bottler must submit proof of approved source from previous testing; State inspects in-state sources & processing plants upon initial application	State issues Food Handlers License; Renewed annually; Source sampling not required to renew license; Out-of-state processors must submit proof of approval by state authority, copy of labels, & last inspection results	Cryptosporidium & giardia (problems in municipal sources)	Rules should be put in layman's language to increase voluntary compliance	IBWA Code

[a] Information based on NRDC Survey conducted late 1995–early 1996, updated with information publicly available from International Bottled Water Association, 1998, regarding states which have adopted IBWA's model code, and, most recently updated with information gathered as a result of a state-by-state telephone and fax survey conducted April–May, 1998

[b] While a 11/27/95 letter to NRDC from California Department of Health services indicated "no reports or listings [of illnesses or poisonings] are available at this time," the state attached a summary of numerous citizen complaints about adulterated or contaminated water, in which injuries to consumers were reported. Moreover, a 1985 California Assembly Office of Research found numerous complaints by bottled water consumers who alleged illnesses. *Bottled Water & Vended Water: Are Consumers Getting Their Money's Worth?* (1985).

[c] One incident in which firm bottled water from municipal source without boiling during boiled water order; Resulted in voluntary recall of water product involved; No injuries reported from this incident.

[d] Indiana State Department of Health reported 3 illness incidents: (1) 1/25/95 "suspect pseudomonas," illness reported, from Anita Springs water; (2) Kroger Springdale water, 10/27/94 "off taste/not confirmed," illness reported; Hinkley & Schmidt, 12/2/93, "foreign material/not confirmed," illness reported. These statements were not independently verified by NRDC and should be viewed as unconfirmed.

[e] Generic descriptions of enforcement actions taken by the state of Maryland over the past four years include: Detention orders, in which the state retained water bottled under questionable conditions (2–3 times in last four years); Denial of applications due to lack of or incomplete information; Detained water for failure to renew annual license (approximately 10 occurrences in last four years); Maryland has not enforced any shutdowns, brought court action, or made any recalls in the past four years.

[f] Annual survey must include standard plate count, coliform, pseudomonas, yeast, mold, chemical, & radiological analysis.

[g] If source is municipal, no certification or testing is required because municipal water already subject to regulatory requirements.

[h] Recalls were based upon consumer complaints for alleged presence of mold and involved out-of-state companies. The two companies reportedly involved were Triton Water Company, Burlington, NC, and Aquapenn Spring Water Company, State College, PA. No injuries were reported as a result of either one of these incidents.

[i] Poland Springs conducted voluntary recall after unacceptable levels of chlorine contamination found in end-product. At that time, Poland Springs did their own recall. Rhode Island officials found out about the chlorine and contamination only after the fact from state of Massachusetts. Poland Springs did not notify Rhode Island. No further action was taken by Rhode Island.

[j] Illness of two individuals likely caused by "contamination after purchase through absorption through plastic."

[k] State detected lead in end-product bottled water while still at bottling facility (lead exceeded Preventive Action Limits (PAL), but not enforcement standards. The result was that the bottler voluntarily replaced defective equipment and corrected the problem. There were no injuries or illnesses reported.