



# Is Water From Vending Machines Really “Chemical-Free”?



ENVIRONMENTAL WORKING GROUP



ENVIRONMENTAL LAW FOUNDATION

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## **ENVIRONMENTAL WORKING GROUP**

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## **ENVIRONMENTAL LAW FOUNDATION**

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## Executive Summary

Glacier Water Services, the largest owner-operator of drinking water vending machines in California and the U.S., claims its machines sell “safe, chemical-free water.” But statewide testing found that a third of Glacier machines sold water that failed to meet state standards for a class of chemicals linked to increased risk of cancer and birth defects.

For paying 100 times the price of tap water, vended water consumers are supposed to get drinking water that is essentially free of trihalomethanes (THMs), the chemical byproducts of treating water with chlorine. Glacier claims to reduce contaminants in tap water by approximately 97 percent, but two-thirds of the machines tested failed to remove that level of THMs.

The state has known about Glacier’s failure to meet THM standards for years but has taken no meaningful action. Glacier has promised to improve its machines’ performance, but these tests show it has not. To ensure that consumers get what they pay for, California must establish an industry-financed program of mandatory unannounced inspections of all water machines, with rigorously enforced penalties for failure to meet health standards.

# 1. Many Glacier Machines Fail State Standards

Glacier Water Services, Inc., is by far the largest seller in California and the United States of vended water. Glacier owns and operates more than 7,000 machines at grocery stores and other retail outlets statewide, and more than 14,000 vended water machines in 37 states nationwide. The company, based in Vista, Calif. (San Diego County), boasts that it is “the source for safe, chemical-free drinking water.” (Glacier 2002a.)

Customers pay 20 to 35 cents a gallon for vended water, compared to two-tenths of a cent or less for tap water. (Figure 1.) But vended water is, in almost all cases, ordinary tap water that is filtered and treated as it passes through the machine. California is one of the few states where vended water must by law be cleaner than tap water. For a markup of 10,000 percent, consumers are supposed to get drinking water that is essentially free of chemical contaminants, bacteria and dissolved solids.

Buying water from a vending machine in California is like playing a slot machine: You can't be sure what will come out.

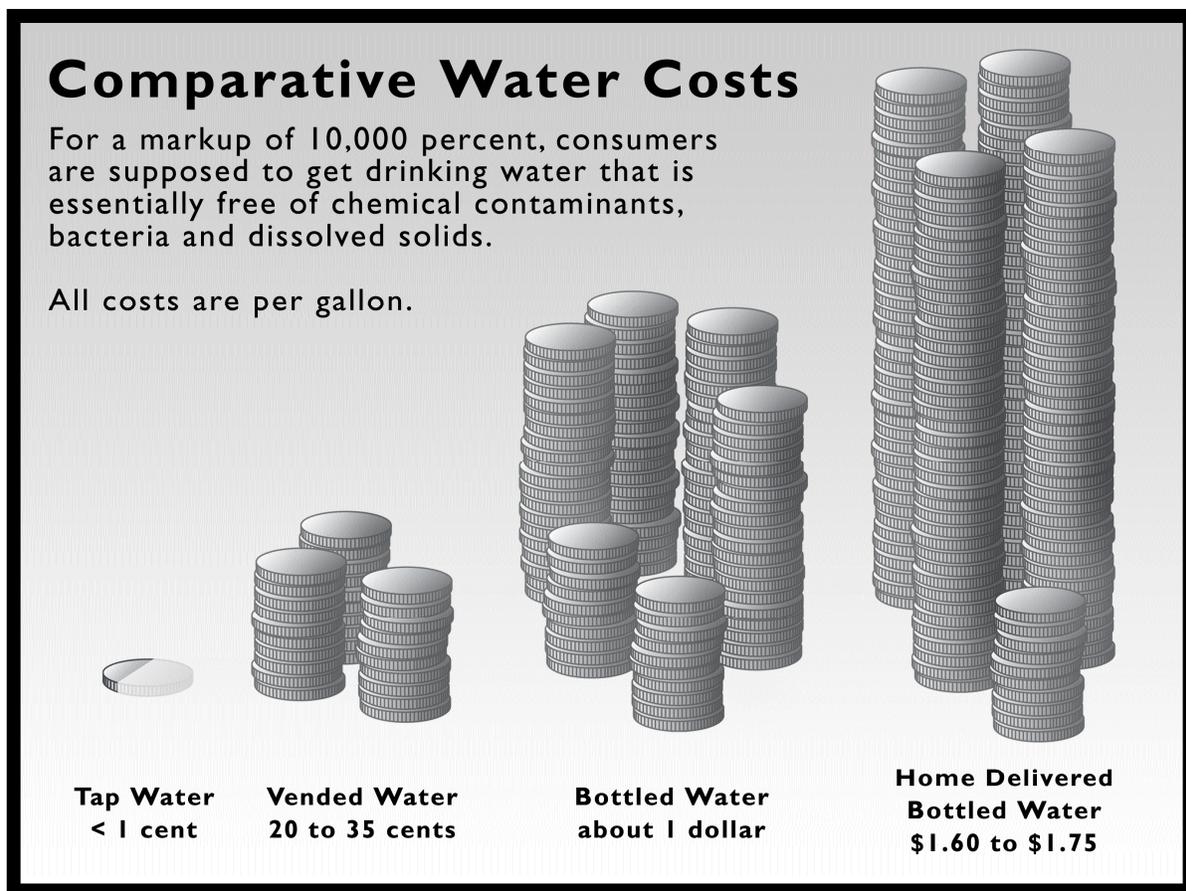
But in the first statewide tests of vended water for chemical contaminants, the Environmental Working Group (EWG) and the Environmental Law Foundation (ELF) found that about one in three Glacier machines sold water that failed state standards for a class of chemicals linked to increased risk of cancer and birth defects. About one in six Glacier machines sold water with more than twice the legal level of trihalomethanes (THMs). (Table 1.) And more than two-thirds fell short of Glacier's own claim that its filter system “typically removes 97 percent of all contaminants . . . from the source water.”

The level of contaminants varied dramatically from county to county and even within counties. Machines in San Francisco were by far the worst, with more than nine of 10 dispensing water that failed to meet state standards. Despite state regulations meant to ensure that all vended water meets stringent health standards, buying water from a machine in California is like playing a slot machine: You can't be sure what will come out. Considering the premium that vended water customers are paying for supposedly cleaner water, this constitutes an outrageous consumer ripoff.

## STATE LAW SETS STRICT STANDARDS

The state law on vended water targets THMs, a class of chemicals that are byproducts of treating water with chlorine. A compelling

**Figure 1. Comparative Water Costs**



Source: Environmental Working Group

body of scientific research has found associations between increased risk of multiple types of cancer, miscarriages, and birth defects and consumption of water with THMs at levels well below federal drinking water standards. California law says THMs in vended water must not exceed 10 ppb – a level at which some research has found an association with low birth weight in babies whose mothers drank contaminated water during pregnancy.

The U.S. Environmental Protection Agency (EPA) allows an annual average of 80 parts per billion (ppb) of THMs in public drinking water supplies. But EPA’s non-binding health goals – maximum contaminant level goals, or MCLGs, defined as “the level of a contaminant in drinking water at which no known or anticipated adverse effect on the health of persons would occur, and which allows an adequate margin of safety” – indicate concern for THM consumption well below the drinking water standard: The MCLGs for two of the chemicals grouped as THMs are zero, and six ppb for a third.

During the summer of 2002, EWG and ELF sampled water from 274 vending machines in nine California counties, covering the state's eight largest metropolitan areas. Analysis of the samples by the laboratory of the Los Angeles County Environmental Toxicology Bureau found:

- Water from 33.7 percent of the machines exceeded the state health standard for THMs of 10 ppb.
- 17.8 percent of the samples had THM levels at least twice the state standard for vended water. In some samples the concentrations were as much as seven times higher than the state standard.
- Although Glacier claims that its filtration system gets rid of 97 percent of contaminants in tap water, of the machines we sampled only 32.8 percent achieved that level of reduction of THMs.

Glacier claims its filters get rid of 97 percent of chemicals in tap water, but tests found that two-thirds of the machines didn't fulfill that claim.

Sample locations of Glacier machines in urban counties were randomly selected from a state database of more than 9,000 licensed vended water machines. All were owned and operated by Glacier, which owns about 80 percent of the machines in California and recently bought out a leading competitor, Pure

**Table 1. Statewide, more than one-third of Glacier machines tested sold water exceeding state standards for trihalomethanes (THMs).**

	Max THM Level	Percent of samples over state limit (10 ppb)	Number of Machines Tested
Alameda	35.7	50.0%	41
Contra Costa	33.9	35.0%	40
Los Angeles	69.7	25.5%	106
Orange County	12.1	7.1%	14
Riverside	27.5	15.4%	13
Sacramento	15.1	20.0%	15
San Diego	25.8	66.7%	15
Santa Clara	9.2	0.0%	15
San Francisco	57.8	93.3%	15
<b>Statewide</b>		<b>33.7%</b>	<b>274</b>

Source: Environmental Working Group

Fill. There are almost 100 companies licensed to sell water from machines in California, and since almost all of them simply resell tap water subjected to similar filtration methods, there is no reason to believe that water from other machines is on average different than Glacier Water. But in 1998, after a Los Angeles County study of water machines found widespread failure to meet state standards, Glacier claimed its machines were cleaner, blaming the results on the fact that about half of the machines sampled were from other companies that do not “maintain the same level of commitment.” (Glacier 1998b.) Our tests, which were solely of Glacier machines, show that claim is simply not true.

## **PAY YOUR MONEY AND TAKE YOUR CHANCES**

In our tests, the levels of THMs in vended water varied dramatically with the county where the machines were located, as well as within counties. While about one-third of machines tested statewide were found to dispense water with THMs in excess of the California standard, this proportion was much higher in several counties. Samples from San Francisco machines were the worst, with 93.3 percent in violation, followed by San Diego County, with 66.7 percent in violation, and Alameda County, with 50 percent in violation. Of the nine counties where samples were taken, only in Santa Clara County did all machines sampled dispense water meeting state standards.

**In two earlier rounds of testing, Los Angeles County also found that one-third or more of water machines didn't meet state THM standards.**

Results of this first-ever statewide testing for THMs in vended water mirror two previous sampling programs in Los Angeles County, which in addition to THMs tested for bacteria and total dissolved solids (TDS, which measures the water's mineral content). (DHS 1999). In 1997, the Los Angeles County Environmental Toxicology Bureau tested water from 279 machines owned by Glacier and other companies, and found that 38 percent had THM levels exceeding the state health standard, 62 percent had TDS levels above the standard, and the average bacteria count was 163 times higher than tap water supplied by the Metropolitan Water District. (LACETB 1998.) In a follow-up study conducted in 2000 – a year after state health officials and the vended water industry jointly promised to “establish strategies” to address the problem – the toxicology bureau sampled machines at the same locations and found that 33 percent still violated the state THM standard. (LACETB 2000.)

Our testing program sampled about four percent of all Glacier Water machines in California. By projection, we estimate that more than 2,350 Glacier machines statewide fail to meet

California health standards for THMs. From Glacier's market share and the results of the two Los Angeles County studies, we estimate that about 3,000 water machines in California are in violation of state standards.

This is unacceptable. Glacier and other water machine operators must be held accountable, both for meeting state standards and living up to their marketing claims. The California Department of Health Services must establish an industry-financed program of mandatory unannounced inspections of water machines throughout the state – a program Glacier itself called for in the wake of the 1998 Los Angeles study. (Glacier 1998a.) The program must include regular water sampling, immediate removal from service of noncompliant machines and rigorous enforcement of penalties against companies whose water doesn't meet state standards. Consumers must get what they pay for.

**The state must establish a program of surprise inspections of water machines, paid for by Glacier and other companies.**

## 2. Marketing a Misperception

Although there are 95 licensed water vending machine operators in California, the vast majority are owned and operated by Glacier, a publicly traded company with headquarters in Vista, about 40 miles north of San Diego. In 1999 (the latest year for which figures are available), Glacier operated 7,140 of the 9,066 water vending machines in California. (DHS 1999.) In February 2002 Glacier increased its market dominance by acquiring one of its major competitors, Pure Fill, which operated about 1,625 machines in California and other Southwestern states. (Glacier 2002a, DHS 1999.) Glacier is also by far the largest operator of vended water machines in the U.S., with more than 14,000 machines in 37 states.

Customers may not realize that almost all vended water machines simply resell filtered tap water.

In 2001 Glacier Water's revenues exceeded \$60 million, although it posted a net loss of about \$5.4 million due to the costs of acquiring Pure Fill and shutting down its unsuccessful operations in Mexico. In August 2002 Glacier reported the highest quarterly revenues in its history – an increase of more than 17 percent over the previous year, which it attributed both to the addition of new machines and increased sales per customer. (Glacier 2002b.)

Vended water machines run water through a series of filters to remove contaminants and then dispense the water into a container provided by the customer. Although a small number of machines use water from private sources, according to the California Department of Health Services (DHS), the vast majority use public tap water. (DHS 1999.) The machines are typically found in or outside of grocery stores, as well as laundromats, corner stores and other businesses. They may be coin-operated or dispense water to be paid for at the cashier.

All water machines use at least one activated carbon filter (made from burnt coconut shells) to trap contaminants as water flows through. Most also use a reverse osmosis system, which squeezes out contaminants by forcing water through a membrane with tiny pores. According to DHS, the "purpose of these treatment systems is to remove chlorine odor, improve taste, and reduce harmful contaminants (e.g. trihalomethanes and lead) that may be present in the source water." (DHS 1999.)

Vended water appeals to consumers who are concerned about contaminants in their drinking water, but don't want to pay (or

can't afford) the price of bottled water, which is subject to the same THM standards. While vended water is 100 times or more expensive as tap water, it is significantly cheaper than bottled water off the shelf (about \$1 per gallon) or delivered to the home (\$1.60 to \$1.75 per gallon). According to DHS's Food and Drug Branch, filtered tap water is also sold from about 700 licensed water stores in California, most of them small mom-and-pop operations. (FDB 2002.) Our tests did not include samples from water stores, which must meet the same standards as vending machines.

## IMMIGRANTS ARE BEST CUSTOMERS

The customer base for vended water is strongest among recent immigrants from countries where tap water is undrinkable or suspect.

The customer base for vended water is strongest among recent immigrants from countries where tap water is undrinkable or suspect. Glacier says that in some areas of California, 60 percent of its sales are to Latino or Asian customers. (Kraul 1996.) The company's president explains: "Many people from Latin America and Asia took with them the habit of not drinking local tap water, because it was often not safe. . . . They are used to boiling tap water. . . . When they come here, they realize they can buy [vended] water at a cheap price." (Fine 1998.)

In Southern California, the preference for vended water among recent immigrants is so prevalent that in 1999 the Metropolitan Water District of Los Angeles launched a bilingual public education campaign to tell Latinos that tap water is safer in the United States than in Mexico. According to an MWD official, immigrants' reliance on vended water "represents a lack of confidence in the water-supply system. . . . What we're trying to tell people is that it's different here." (Godines 1999.) An investigation of water stores by the *San Jose Mercury News* found that recent immigrants are also the best customers for that form of vended water. (Ha 2001.) Ironically, when Glacier attempted to expand into Mexico, it couldn't get enough customers to pay the price of vended water instead of boiling their own tap water, and was forced to pull the plug on its venture. (Webb 2000.)

On the surface, the targeting of recent immigrants may seem like smart niche marketing. But on closer examination, it is cynical and exploitive. Glacier's marketing strategy takes advantage of the fact that new arrivals, many of whom have limited English skills, may not know that California tap water is safer than the water back home. Then it charges people who can least afford it an inflated price for a basic necessity. "It's unfortunate people are spending money on purified water," says a University of California nutritionist. "Their money would go further if they bought a big bag of beans and vegetables. They really would . . .

get more nutrition out of it." (Ha 2001.) Finally, as our tests show, one-third of Glacier Water purchases fail to meet the company's legal obligations and two-thirds fail to deliver on its marketing claims.

## **"SOMETHING TO BE AFRAID OF"**

According to design experts, Glacier's disingenuous marketing extends even to the appearance of its machines. In 1995, Glacier's new in-store water machines won a gold medal in the national Industrial Design Excellence Awards. One critic wrote:

Glacier machines are designed to tell customers "water is something to be afraid of."

"With its icy blue tinted top and recessed dispensing mechanism, the machine is a handsome extension of the brand's packaging, which links water to stylishness, fitness and advanced technology. . . . The bright graphics of contaminants that ornament the front of the unit express the subtext of this design: a deep and growing mistrust of public water supplies . . . It tells us . . . that water is something to be afraid of." (Hine 1995.)

Glacier says its "State-of-the-Art Filtration System . . . instantly produces high quality, great tasting, healthy water." The machines run tap water through two carbon filters, which Glacier says "removes chlorine, gases, odors," and "improves the taste of water." The water passes through a micron filter ("removes dirt, rust and algae"), a reverse osmosis system ("removes salts, lead, mercury and impurities"), and finally under ultraviolet light (which "sterilizes bacteria" to "ensure safe, pure water"). (Glacier 2002a.)

Glacier says most of its machines are inspected and serviced weekly, and stickers on each machine are supposed to record the date of last inspection. Based on the stickers on machines we sampled, Glacier fulfills this claim, with six days the average time elapsed since the last inspection. But there were exceptions. Eight machines we sampled had not been inspected for two weeks to one month. One machine in Contra Costa County hadn't been inspected for 51 days, and one in Alameda County hadn't been inspected for 114 days. Twenty-seven machines, or nine percent, either had no sticker or no date was given, so the date of last inspection was unknown. In Sacramento County, nine of the 15 machines sampled had no inspection sticker.

But there was no apparent correlation between elevated THM levels and the time elapsed since the machine was serviced. The

average THM level in water from machines serviced on the day of sampling or the day before was slightly higher than the average for all machines sampled. So what exactly constitutes an inspection?

## **“HIGHLY TRAINED TECHNICIANS”**

According to Glacier, at each service visit, “highly trained technicians” clean and sanitize the inside and outside of the machine, test the water quality, inspect all parts of the machine and perform any needed repairs or maintenance. (Glacier 2002a.) But according to a Los Angeles County official, these practices are superficial and cosmetic. “The industry says they check their machines every week,” says County Agricultural Commissioner Cato Fiksdal. “You have to do more than check the machines. You have to replace the filters and membranes and clean the spouts more frequently than the industry is currently doing.” (Fine 1998.)

In fact, the company’s water quality testing is minimal. Glacier acknowledges that although technicians routinely test for chlorine and total dissolved solids, they “do not test for amounts of specific elements [such as THMs] in the vended water.” (Glacier 2002a.) In other words, Glacier claims to meet all “state and federal standards for quality and safety,” but performs no regular testing to see if its product meets California standards for chemical contaminants in vended water. (Glacier 1998.)

Glacier also claims that its machines remove 97 percent of the contaminants in tap water. (Of course, since Glacier does not require its “highly trained” technicians to test for THMs, the company has no way of verifying this claim.) The company advises customers who want to know the approximate amounts of contaminants in their vended water to consult the water quality reports that all water suppliers are required by law to make public and subtract 97 percent. (Glacier 2002a.) But comparing the results of our vended water sampling to public drinking water data yields a different picture.

**Glacier claims to meet all state and federal safety standards, but does no testing to ensure that is true.**

We compiled data from water utilities’ Consumer Confidence Reports for 2001 and compared the highest three-month average of THM levels with the vended water test results for each area. Statewide, Glacier lived up to its 97 percent claim in only about one-third of the samples tested. In San Francisco, more than 93 percent of the machines couldn’t meet the claim; in Riverside County, almost 91 percent fell short; and in Alameda County,

more than 87 percent failed. Even in the company's back yard, San Diego County, more than 73 percent of machines failed to achieve 97 percent reduction. (Table 2.)

Glacier came closest to meeting the 97 percent claim in Santa Clara County, where 60 percent of machines achieved that level of reduction. This could be the result of the San Jose Mercury News investigation in April 2001, which took state officials to task for failing to oversee the filtered water industry and spurred DHS to step up inspections in the area. Presumably, increased regulatory and enforcement efforts would have a similar impact statewide. In any case, California consumers should not have to depend on newspaper exposes to ensure that the water they're buying meets state health standards.

In eight of nine counties, at least half of Glacier machines didn't live up to the company's marketing claims.

**Table 2. More than 67% of Glacier's machines fail to meet the company's claim of reducing contaminants by 97%.**

Percent of Machines not Meeting Glacier's Claim of Reducing Contaminants by 97%	
Alameda	87.2%
Contra Costa	75.7%
Los Angeles	54.9%
Orange County	50.0%
Riverside	90.9%
Sacramento	66.7%
San Diego	73.3%
Santa Clara	40.0%
San Francisco	93.3%
<b>Statewide</b>	<b>67.2%</b>

**Source: Environmental Working Group**

### 3. THMs and Public Health

Chlorinating tap water is a critical public health measure that saves thousands of lives each year by reducing the incidence of water-borne disease. But chlorine combined with the organic matter in water pollutants – primarily animal waste from agricultural discharges into source water – produces harmful byproducts, collectively referred to as chlorination byproducts (CBPs). In spite of the diligent efforts of water utilities to filter and clean the water before chlorination, CBP levels remain high in the water consumed by millions of Americans. Approximately 240 million Americans drink tap water contaminated with some level of CBPs. (EWG 2002.)

A compelling body of scientific evidence – nearly 30 peer-reviewed epidemiologic studies – links chlorination byproducts to increased risk of cancer. The EPA estimates that at current levels in U.S. tap water, CBPs cause up to 9,300 cases of bladder cancer each year. But a growing body of science also links CBPs to miscarriages and birth defects, including neural tube defects, low birth weight, and cleft palate. Other health problems from CBP exposure may include rectal and colon cancers, kidney and spleen disorders, immune system problems and neurotoxic effects. (63 FR 69390- 69476.)

Trihalomethanes are the most prevalent class of chlorination byproducts, and have been the focus of most of the CBP-related health effects research. In 1998 the EPA completed a revision of the health standard governing CBPs, reducing the levels of THMs allowed in tap water from an annual average of 100 ppb to 80 ppb. But in its risk assessment EPA made no estimate of the risk or potential reduction in the rates of other cancers, birth defects or miscarriages. (63 FR 69390-69476.) This despite the fact that water utilities that fail to meet federal THM standards must tell their customers: “Some people who drink water containing trihalomethanes in excess of the [safety standard] over many years may experience problems with their liver, kidneys or central nervous systems, and may have an increased risk of getting cancer.” (40 CFR CH.1 Part 141, 7-1-00 Edition)

**The EPA warns people who drink water containing high levels of THMs may experience liver, kidney or nerve illness and an increased risk of cancer.**

## LINKS TO CANCER AND BIRTH DEFECTS

An Iowa study found that babies whose mothers drank water with THMs higher than the California standard for vended water suffered from low birth weight

By now at least 25 major epidemiological studies have been conducted that provide strong evidence of elevated rates of multiple internal human cancers from chlorinated tap water. (EWG 2001.) In 1992 Dr. Robert Morris, then of the Medical College of Wisconsin, composited and analyzed the results of all available human cancer studies related to chlorination byproducts, using a standard technique called meta-analysis. With this method, Dr. Morris was able to combine the power of between four and eight studies previously published for each cancer. His best statistical estimates show an elevated risk varying from one percent to 38 percent for twelve internal cancers: bladder, brain, breast, colon, colorectal, esophageal, kidney, liver, lung, pancreatic, rectal and stomach. The strongest associations were for bladder and rectal cancer. (Morris et al. 1992.)

Over the past decade there has been mounting evidence from epidemiological studies and tests on laboratory animals that CBPs also have adverse reproductive effects, such as increased risks for birth defects, miscarriages, and low birth weight. One of the largest studies looked at more than 81,500 babies born in 75 New Jersey towns between 1985 and 1998, and found increased risk of low birth weight, central nervous system defects, neural tube defects, major cardiac defects, and oral cleft defects when mothers drank tap water with high levels of THMs during pregnancy. (Bove et al. 1995.) Another study of 141,077 births in Norway found that a mother's reliance on a chlorinated tap water supply was linked to increased rates of all birth defects, urinary tract defects, neural tube defects, major cardiac defects, and respiratory tract defects. (Magnus et al. 1999.)

While some research has looked at the consumption of chlorinated tap water in general, a good deal of it has focused at the effects of THMs in particular, with similar findings. And a number of studies have found effects to occur at or below the EPA's new drinking water standard:

- In a study of 4,028 pregnancies among Iowa women, researchers found low newborn weight (intrauterine growth retardation) for babies whose mothers drank tap water containing at least 10 ppb of THMs through pregnancy. (Kramer et al. 1992.)
- A study in New Jersey found that among 360 pregnant women studied, babies were twice as likely to have neural tube defects for tap water with greater

than 40 ppb THMs than for mothers drinking water with less than 5 ppb THMs. (Klotz and Pyrch, 1999.)

- Three studies that have focused on THM levels and bladder cancer have found increased risks for bladder cancer ranging from 50 to 80 percent among people drinking water with THM levels of at least 50 ppb.
- In a study of 5,144 pregnant women from California, researchers found that the spontaneous abortion rates of women who drank water with greater than 75 ppb were twice the rates of women who drank water with lower concentrations of THMs. (Waller et al. 1998.)

## **FEDERAL STANDARDS MAY NOT BE STRONG ENOUGH**

While federal drinking water standards are based on a combination of health, technological and economic considerations, EPA's maximum contaminant level goals (MCLGs), which are nonenforceable health goals, indicate further concern for THMs below the current maximum contaminant level (MCL), the maximum permissible level of a contaminant in water. The MCLGs for two trihalomethanes (bromodichloromethane and bromoform) are zero and the MCLG for another trihalomethane (dibromochloromethane) is six ppb. There is no MCLG for chloroform. EPA defines MCLGs as "nonenforceable health goals" which are "the maximum level of a contaminant in drinking water at which no known or anticipated adverse effect on the health of persons would occur, and which allows an adequate margin of safety." (40 CFR CH.1 Part 141, 7-1-00 Edition.)

The bottom line is that the EPA's new health standards may not be low enough to significantly reduce the incidence of adverse health effects from THMs, and the California Department of Health Services is not presently considering stricter standards for public drinking water. This makes California's more stringent vended and bottled water THM regulations all the more important to consumers who are justly concerned about the health effects of chlorination by-products and other contaminants. But standards are useful only to the extent that they are enforced.

**EPA's standards may not be low enough to significantly reduce the incidence of adverse health effects from THMs.**

## 4. Misplaced Trust

*"The problem is not a lack of standards. . . . As an industry, we know what we should be doing. The problem is making sure everyone complies with those standards."*

– Jerry A. Gordon, then-president of Glacier Water, 1998

Los Angeles County's 1998 study of water vending machines, which found widespread failure to meet THM and TDS standards, triggered a public uproar, particularly over the state's lack of inspection and enforcement. Glacier, the market leader, responded not by taking action but by issuing press releases blaming the study's results on other operators, stating: "[A]lmost one-half of the machines tested in the County's study were not Glacier machines, thus skewing the results unfavorably" because not all water vending operators "maintain the same level of commitment." Glacier may have found the results unfavorable, but data from the county's study clearly showed that many of their machines couldn't meet standards. Despite the facts, Glacier falsely assured the public that "[E]very Glacier machine dispenses water that meets all applicable federal and state standards for quality and safety." (Glacier 1998b.)

The Department of Health Services' first response was to meet privately with the vended water industry. DHS then announced it would conduct its own statewide sampling program of water machines to "allow an evaluation of the safety and quality of the state's vended water supply and the need, if any, for additional [water vending machine] regulatory requirements." (DHS 1999.) But astoundingly, DHS decided not to test for THMs, instead looking only at bacteria and dissolved solids – even though state regulations specifically single out THMs as "harmful contaminants" water machines are supposed to remove. This omission also runs counter to the Food and Drug Branch's stated mission to protect public health "through sound investigations and inspections based on valid scientific principles and specific legal authority, and effective industry and consumer education." (FDB 2002.)

The state did its own study of vended water, but didn't bother to test for THMs.

Although DHS' study of 794 machines did not look at THMs, the agency did find some cause for concern and met with the water machine industry to "establish strategies" to address "quality areas [that] deserve more attention by operators." (DHS 1999.) A

year later, Los Angeles County did a followup study to see if DHS's recommendations had led to any improvements in vended water quality. The county Environmental Toxicology Branch retested all of the machines from its first study that were still in operation (219 of 279) and found that 33 percent of these machines still violated the state THM limit of 10 ppb. (LACETB 2000.)

## STATE LAW IS CLEAR

There is no ambiguity in the law covering trihalomethane levels allowed in vended water. The California Health and Safety Code states: "[B]ottled and vended water shall not exceed 10 parts per billion of total trihalomethanes or five parts per billion of lead unless the department establishes a lower level by regulation." (California Health and Safety Code, Division 104, Part 5, Chapter 5, Article 12, Section 111080.) It further states: "No water-vending machine shall be used in this state which does not at least satisfy the minimum standards adopted by the department." (Section 111110.)

It flies in the face of this mandate that after Los Angeles County alerted DHS that a large percentage of water machines did not meet THM standards, the agency did nothing – not even conducting its own THM testing, much less acting to uphold the law. DHS justifies its inaction by claiming that federal Nutritional Labeling and Education Act of 1990 "provides that the federal . . . THM limit preempts the state 10 ppb limit." (DHS 1999.) But federal law and the California Constitution both debunk this argument.

**State law covering THMs in vended water is both strict and clear.**

The Nutritional Labeling and Education Act states that the law "shall not be construed to preempt any provision of state law" unless that preemption is specified by the federal Food, Drug and Cosmetic Act — which says nothing about the California vended water law. (PL 101-535, 104 Stat. 2364, Sec. 6 (c)(1).) The state Constitution very clearly prohibits DHS' or any other agency's "[refusal] to enforce a statute on the basis that federal law or federal regulations prohibit the enforcement of such statute" unless an appeals court has ruled that federal law preempts state law. (California Constitution, Art. 3, Section 3.5.) Since no appellate court has made such a ruling, DHS is spurning its constitutional duty.

## DHS: “WE CAN’T KEEP UP”

The Food and Drug Branch of DHS is charged with ensuring that vended water meets state standards, through licensing and inspection of machines. DHS fails to do either effectively. The *San Jose Mercury News* investigation found that more than half of the water stores that had opened in Santa Clara County over the past decade were operating without a license. The *Mercury News* also looked at how often DHS had inspected the vended water stores in Santa Clara County. They found that between 1991 and 1997, only 22 inspections had taken place, and none from the beginning of 1998 to April of 2001. (Ha 2001.)

In testing hundreds of vended water machines throughout the state, we discovered similar failings in DHS’ record-keeping. The database of licensed machine locations provided by DHS was highly inaccurate. Many machines were found that did not appear in the database, while many of the machines that were included were found to be non-existent, and many others were out of order.

In its defense, DHS points to the growing market for vended water: “The growth of the industry has . . . exceeded our ability to keep up.” (Ha 2001.) It can be argued that the rapid expansion of an industry profiting from consumer health claims should make inspection and enforcement a bigger priority. DHS’ excuse also ignores the fact that in 1998 Glacier publicly stated that the vended water industry – not the taxpayers – should pay for the costs of an inspection program. With public health and consumer protection at stake, why did DHS choose not to take Glacier up on its offer? Whatever the reason, as the 1998 Los Angeles County study states: “No routine monitoring is done on these units by any regulatory agency at the State or local level. . . . It is likely that this problem has been going undetected for years, and will continue unless regulatory oversight is enhanced.” (LACETB 1998.)

**If Glacier machines can't meet state THM standards, what about lead and other contaminants?**

The results of our tests have implications beyond THM levels. Glacier claims that its machines remove 97 percent of the contaminants contained in source water. But if this isn’t true for THMs, it is likely that the machines are also leaving substantial proportions of other contaminants, such as lead.

In the wake of the 1998 study, Glacier itself called for an industry-financed program of mandatory unannounced state inspections of water vending machines throughout California, declaring: “Only this way can consumers be confident they have nothing to worry about.” (Glacier 1998a.) But when DHS –

relying on a testing program that didn't bother to look at THMs – decided such a program was unnecessary, Glacier said it trusted the state's decision. (Speilvogel 1999.) Clearly, that trust was misplaced.

## RECOMMENDATIONS

Machines that don't meet state standards should be shut down, and the companies that operate them should be held accountable.

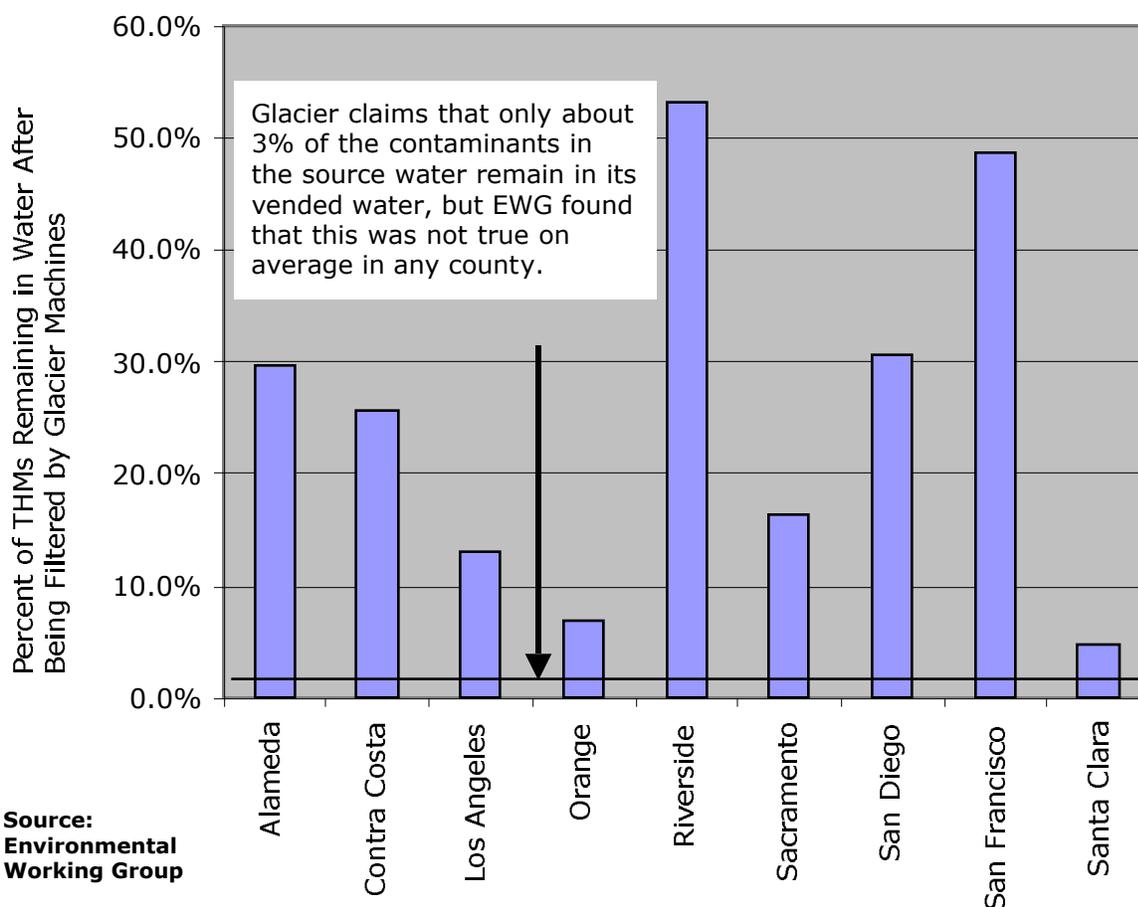
- All owners and operators of vended water machines and water stores in California must be held accountable both for meeting state standards and living up to their own marketing claims.
- The California Department of Health Services must establish an industry-financed program of mandatory unannounced inspections of water machines throughout the state.
- The regulatory program must include regular water testing, immediate removal from service of noncompliant machines and rigorous enforcement of penalties against companies whose water doesn't meet state standards.
- Inspection stickers should be prominently displayed and printed in all languages used by customers. They should disclose the source of the machine's water – specifically, whether it is local tap water. The stickers should describe, in layman's language, the steps in the machine's filtration process. Finally, the stickers should tell the customer what percentage of contaminants in the source water were removed by the machine at its last inspection.

## Appendix

EWG and ELF acquired a database from the California Department of Health Services containing all registered vended water machines in the state. Using this list and a random number generator, we selected a set of Glacier machines from each of nine counties in the state containing major population centers. Because we wanted to get a representative sample of the quality of vended water consumers were purchasing in California and some counties (especially Los Angeles) contain many more machines than other counties, the numbers of machines sampled per county varied.

If a designated machine could not be located, samplers selected the closest machine in that same ZIP code or a neighboring ZIP code. In areas where a large number of the machines could not be located, samplers tested Glacier machines not found in the DHS database. About half of the machines we tested were located in low-income neighborhoods, according to EWG analysis of 2000 U.S. Census data. Analysis revealed no significant

**Figure 2. Glacier Water is far from being “Chemical Free”**



difference between machines in low-income areas and other neighborhoods. Samples were taken between June and October, 2002.

Sample collection and testing protocol was based on EPA Method 600/4-88/039 and was the same protocol used by the Los Angeles County Environmental Toxicology Bureau (LACETB) in their 1998 and 2000 studies. For each machine, samplers filled a new, clean one-gallon or two-quart glass jar with the vended water being careful not to touch the lid of the jar or interfere with the stream of water. Using gloved hands, the samplers then slowly poured some of the collected water into two 40-ml glass vials so that an inverted meniscus formed on the rim of the vial (each vial contained two mg of the preservative sodium thiosulfate and had Teflon-lined screw caps). The lids were carefully replaced, inverted several times to mix the water and the preservative and checked for air bubbles. The sample was discarded if any bubbles were found. The samples were labeled, placed on ice and shipped overnight to the Los Angeles County Toxicology Lab for analysis.

Samplers also recorded any information that might have influenced the results, the make and model of the machine, its serial number, DHS license number and the date of the last inspection by a Glacier technician.

To ensure that no contamination occurred as a result of the sample handling, field blanks were taken for each day of sample collection. Blanks were made up by a commercial Alameda County lab and contained two mg of sodium thiosulfate preservative but were filled with deionized (DI) water which contain no trihalomethanes. When collecting a field blank sample, samplers with gloved hands removed the caps from two vials containing DI water and exposed the water to air for the same amount of time it typically took them to pour a vended water sample into a vial. The lids were replaced, the sample inverted, checked for air bubbles, and then placed on ice with the rest of the samples.

All samples were analyzed for the trihalomethanes chloroform, bromodichloromethane, dibromochloromethane and bromoform. The detection limit for each these chemicals was 0.5 micrograms per liter (ug/l), which is equivalent to parts per billion (ppb). The sum of these individual chemical concentrations is the total trihalomethane concentration, which is often abbreviated as TTHM but in this report is called THM concentration for simplicity. No THMs were detected in any of the field blank

samples. All samples where THM concentrations were below detectable levels were assumed to have THM concentrations of zero.

Results were analyzed by EWG to determine the proportion of samples containing greater than the state's legal limit of 10 ppb of THMs. Samples above 10.4 ppb were considered to violate state standards. There is always some normal analytical variation when determining chemical concentrations in water samples. DHS criticized the LACETB 1998 study for considering any sample that exceeded 10 ppb of THMs to be in violation of the state standard because it does not account for possible error in the measurement. DHS proposed that "any reported result of 13 ppb or less" should not be considered in violation, but we feel this is unreasonable as there is no bias towards overestimation in lab analysis. (DHS 1999.) That is, since a three ppb overestimate of THM concentration is just as likely as a 3 ppb underestimate in concentration, a 13 ppb sample is just as likely to actually be meeting the state standard of 10 ppb as a nine ppb sample is likely to be in violation of the state standard. Furthermore, state law states that "vended water shall not exceed 10 parts per billion of total trihalomethanes" – not 13 ppb. (California Health and Safety Code, Division 104, Part 5, Chapter 5, Article 12, Section 111080.)

EWG also compared the THM concentrations of the vended water samples with THM concentrations in public drinking water in that community to see if Glacier was meeting its claim to reduce the contaminant level by "typically" 97 percent (Figure 2). Because data on THM levels was not available for the time period when testing took place, EWG used the highest three-month running average THM level in the community's tap water as reported in its 2001 Consumer Confidence Report. This three-month running average value is likely to be an overestimate of the overall yearly average THM concentration because THM levels can vary significantly throughout the year.

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