



## WHAT'S ON TAP?

### *Grading Drinking Water in U.S. Cities*

#### EARLY RELEASE CALIFORNIA EDITION

October 2002

## FRESNO

**Fresno earned a water quality and compliance grade of Poor in 2000 and 2001.**

Problems with Fresno water include the following:

**Fresno has many wells in which contamination exceeds EPA standards.** Fresno contends, however, that it did not violate any enforceable EPA standards in 2000 and 2001 because it is allowed to average high contaminant readings with lower readings taken at other times throughout the year, or because it removes wells from service soon after they are found to exceed standards.

**Nitrate levels are a serious concern in Fresno.** Nitrates are the product of fertilizers, or human or animal waste. Infants who drink water containing excessive nitrates for even a short period of time can develop “blue baby syndrome,” in which nitrate poisoning prevents their blood from holding oxygen. Fresno has had frequent nitrate problems in some wells. The city reported that several of its wells exceeded EPA standards for nitrate in 2000 and 2001, and were later removed from service. In addition:

- ▶ In 2001, one well “was lost to high nitrates and two more are currently off line while plans for treatment or modification are in design.” Tests on another well in 2001 revealed nitrate levels far above the EPA’s standard, but the city concluded that the finding was incorrect. A subsequent reanalysis confirmed the original result. The California Department of Health Services ordered the well shut down.
- ▶ Similar problems with nitrates were found in 2000. Fresno says it removed all wells that exceeded the EPA standard from service once it confirmed the wells were above the standard.
- ▶ In its 2000 right-to-know report, Fresno buried on page 5 the advice, “If you are pregnant, you should drink bottled water.”<sup>2</sup> (It dropped this advice in its 2001 report.) Fresno went on to recommend, “If you are caring for an infant or you are pregnant, you should ask advice from your health care provider.”<sup>3</sup>
- ▶ NRDC recommends that Fresno immediately shut down any well with a single analysis that indicates the finished water is at or even near the Maximum Contaminant Level (MCL) (the enforceable federal standard) for nitrates.

#### **Pesticides and industrial chemicals are a serious concern.**

- ▶ In 2000, at least 38 of approximately 250 city wells were found to be contaminated with the synthetic organic chemicals ethylene dibromide (EDB), trichloroethylene (TCE), perchloroethylene (PCE), and/or dibromochloropropane (DBCP), requiring treatment and constant monitoring.
- ▶ Also in 2000, EDB and TCE levels in tap water exceeded standards in at least one well apiece. Additionally, DBCP was found in one well at a level equal to the tap water standard. Fresno says all wells contaminated in excess of standards were later taken out of service.

FRESNO	
System Population Served	485,000 <sup>1</sup>
Water Quality and Compliance	2000 ▶ Poor 2001 ▶ Poor
Right-to-Know Report—Citizenship	2000 ▶ Poor 2001 ▶ Poor
Threats to Source Water	6 (1=least threat to 6=highest threat)
REPORT CARD	

- ▶ In 2001, Fresno wells were found to be contaminated at levels above EPA standards with the industrial chemicals 1,1-dichloromethane or cis-1,2-dichloroethylene, or with the banned pesticide DBCP. At least two, and possibly four, wells provided water with DBCP levels in excess of the standard. Each highly contaminated well was taken offline only after the readings were confirmed with subsequent tests—sometimes after “six months of sampling.”
- ▶ Many other synthetic and volatile organic chemicals have been found at generally low levels in Fresno’s wells.

**Radon is a serious concern.** The radioactive gas is a leading cause of cancer, and, although it is better known for invading basements, it can also be found in groundwater. Fresno has high levels of radon, averaging more than twice the EPA’s proposed standard, and sometimes reaching nine times the proposed EPA standard. Fresno may ultimately qualify for a waiver of the EPA’s radon standard, if it or the state adopts a program to reduce radon levels in basements, which can pose an even greater cancer risk than tap water. But the cancer risks posed by the levels found in Fresno’s water alone are significant.

**Gross alpha radiation in the water is a concern.** Cancer-causing gross alpha radiation usually results from the breakdown of natural radioactive elements in the ground. Some Fresno wells contain significant amounts of gross alpha radiation, sometimes at levels above the relevant EPA standard. Fresno says the wells do not violate the standard because average readings are not in violation.

**Fresno levels meet the EPA’s lead action level but may be a concern in some homes.** Lead was found at levels that exceed the EPA action level in at least one household, but Fresno reports that the EPA action level requirements were met in more than 90 percent of homes tested, so it was in compliance with the EPA’s lead treatment technique.

**Arsenic is a potential concern.** According to the city, Fresno’s water contains arsenic at an average level well below the EPA’s new standard of 10 parts per billion. Fresno’s arsenic levels spike above the standard, but the city is not in violation because average readings do not exceed the standard. Nevertheless, Fresno’s arsenic levels exceed the state’s public health goal—and pose a cancer risk, according to National Academy of Sciences risk estimates.

**The need for water infrastructure investment in Fresno.** Fresno’s Department of Public Utilities (DPU) has recognized the need for major investment in the city’s water infrastructure. In its most recent capital improvement plan, Fresno DPU said it needed more than \$394 million to pay for ongoing capital improvements from 2003 to 2007, and more than \$143 million more during that period for new capital improvements—much, but not all, for rehabilitating and upgrading water infrastructure.<sup>4</sup> Included in this amount are a variety of drinking water-related

projects, including rehabilitating water mains and treatment facilities, building a large diameter transmission line from the Surface Water Treatment Plant (SWTP), protecting canals for transport of water from Kings River to the SWTP, constructing wells, upgrading the Supervisory Control and Data Acquisition system (the computerized system that runs the water pump stations and other aspects of the water system), and funding for design for future capacity.<sup>5</sup>

***Fresno earned a Poor for its 2000 and 2001 right-to-know reports.***

**On the “good citizen” side of the ledger:**

- ▶ The report described the health effects of arsenic, radon, DBCP, nitrate, and lead. However, the report included these discussions in a section headlined, “Information from the EPA about *Possible* [emphasis added] Contaminants,” making the section appear to be generalized reference information of unclear relevance to Fresno citizens. The report never linked these discussions of health effects to the specific finding that these contaminants are sometimes found at elevated levels in Fresno’s water.
- ▶ Fresno offers translations of its reports in Spanish and Hmong. EPA and state rules require that systems serving “a large proportion of non-English speaking residents,” defined in California’s regulations as 10 percent or 1,000 people, must provide information on the importance of the report in the relevant language(s), or a phone number or address where citizens can get a translated copy of the report or assistance in their language.<sup>8</sup> Fresno went beyond that requirement by actually translating the report into Spanish and Hmong. That is particularly important, because 26 percent of Fresno residents speak Spanish in the home, according to the 2000 Census, and 12 percent essentially speak only Spanish. In addition, nearly 10 percent of city residents speak Hmong or other Asian or Pacific Island languages at home, while about 6 percent of residents speak only their native Asian or Pacific Island language.
- ▶ The reports listed levels of many unregulated contaminants found in water, even though the city is not required to do so.
- ▶ The reports candidly admitted that groundwater contamination is a serious problem for the system.

**On the “not-so-good citizen” side of the ledger:**

- ▶ A vitally important warning in the report for 2000 was buried on the fifth page. The recommendation urged pregnant women to avoid tap water because of high nitrate levels, and suggested that parents of infants consult with their health-care providers.<sup>6</sup> The warning should have been prominently highlighted on the front page of the report. Instead, the front page included this prominent claim: “Fresno Water Division Ranked #1.”
- ▶ Both the 2000 and 2001 reports buried mention of city wells that exceeded drinking water standards for nitrates; 1,1-DCE; cis-1,2-DCE; DBCP; EDB; and TCE in footnotes printed in type so small it was nearly unreadable.
- ▶ The tables in the reports stated that Fresno did not violate any enforceable standards. In fact, for each of the contaminants discussed above, Fresno residents

drank water exceeding the EPA health standard for some period of time. But because Fresno took the wells out of service later, or averaged the high levels with lower levels detected later, Fresno claimed there was no violation. This reading of the rules is questionable, particularly in the case of nitrate, an acute toxin for which averaging is not allowed.

► The reports included no information on specific known or potential polluters of Fresno's water, nor did they map or otherwise indicate the locations of such polluters. EPA and California rules require utilities to name known or likely sources of any specific regulated contaminant found in their tap water.<sup>7</sup> Even where this is not required, or where the specific polluter cannot be tied with assurance to a specific contaminant, the EPA encourages water systems to highlight significant sources of contamination in the watershed. Dissemination of such information helps increase consumer awareness of the importance of protecting the watershed.

***Fresno earned a "Threats to Source Water" rating of 6, the worst possible rating.<sup>9</sup>***

► At least 32 Fresno wells have serious contamination problems. The water in those wells must therefore be treated with granular activated carbon at the city's 28 treatment sites, and it must be monitored as often as weekly to determine whether it violates standards.

► Fresno's drinking water sources are highly susceptible to contamination by urban runoff and agricultural pollution.

► As Fresno forthrightly acknowledges in its right-to-know reports, groundwater contamination is a serious problem for the city.

---

## KEY CONTAMINANTS FOUND ABOVE NATIONAL HEALTH GOALS

The following contaminants are found in Fresno's drinking water. For more information on their properties and health effects, see Chapter 2, "Health Concerns for Common Tap Water Contaminants."

### INORGANIC CONTAMINANTS

#### ***Arsenic***

**Levels Found 1999<sup>10</sup>**    4 ppb average    34 ppb maximum

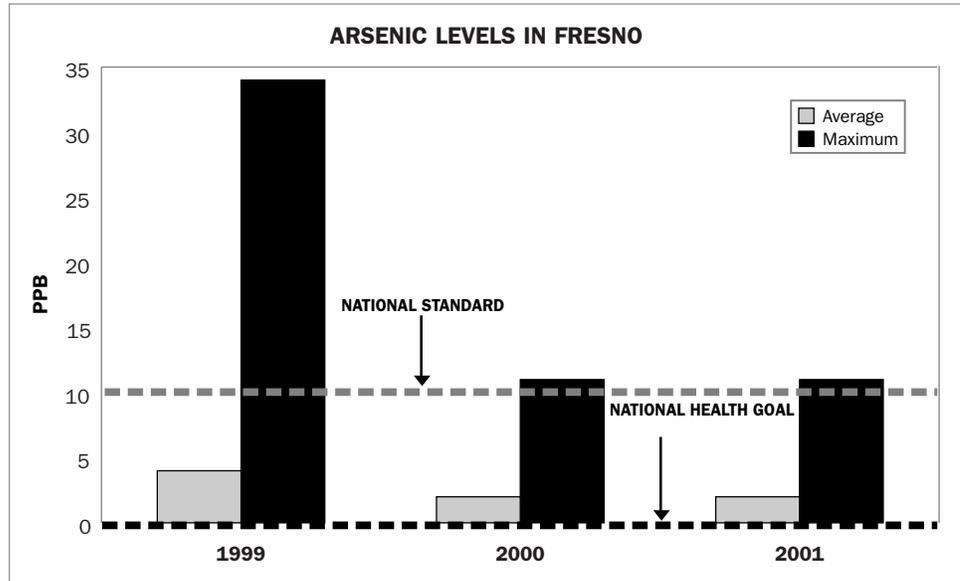
**Levels Found 2000<sup>11</sup>**    2 ppb average    11 ppb maximum

**Levels Found 2001<sup>12</sup>**    2 ppb average    11 ppb maximum

**National Standard (MCL):** 10 ppb (average) (effective 2006) (50 ppb effective through 2005)

**National Health Goal (MCLG):** 0 ppb—there is no known, fully safe level of arsenic

Arsenic is a known and potent human carcinogen, and is linked to a variety of other diseases. The National Academy of Sciences has estimated that a person who drinks water containing 4 parts per billion arsenic (the average level in Fresno in 1999) has a lifetime fatal total cancer risk of about 1 in 800, more than 10 times



higher than the EPA traditionally allows (1 in 10,000 cancer risk).<sup>13</sup> Fresno reports that in 2000, it decreased its arsenic level to about 2 parts per billion—a commendable step.

**Lead**

**Levels Found 1999 (most recent published data)<sup>14</sup>**

3 ppb 90th percentile home, i.e., 9 in 10 homes tested had 3 ppb or less lead  
 22 ppb high, i.e., 1 home of 50 tested exceeded 15 ppb

**National Standard (TT):** 15 ppb (action level)<sup>15</sup>

**National Health Goal (MCLG):** 0 ppb—there is no known fully safe level of lead

Lead is a major health threat—no amount of it is considered safe.<sup>16</sup> Infants, young children, and pregnant women and their fetuses are particularly susceptible to the adverse health effects of lead. While the tap water in most homes in Fresno apparently contains lead levels well below the EPA’s action level, a small percentage of homes may still have a serious lead problem.

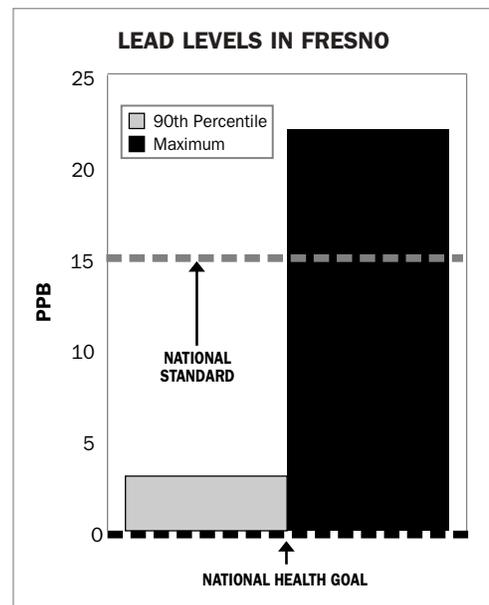
**Nitrate**

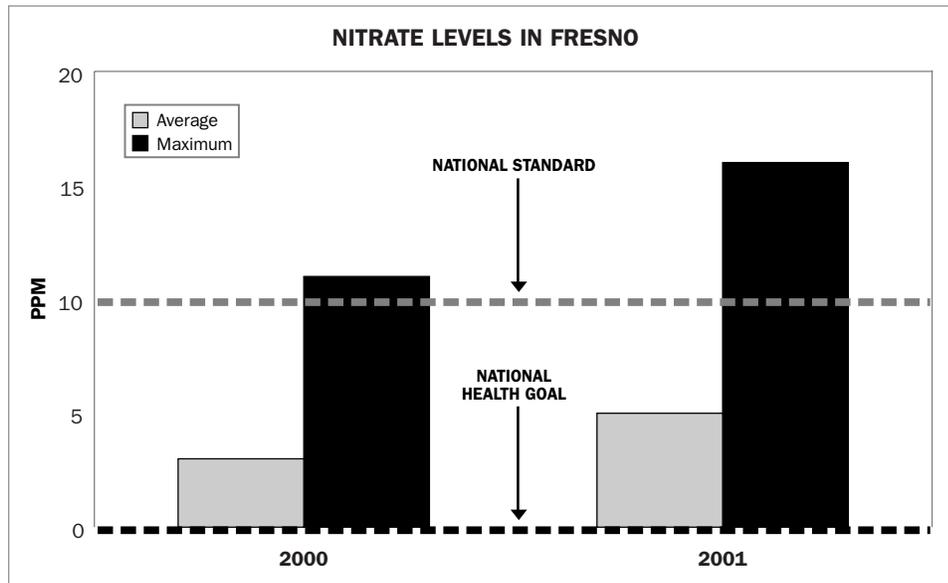
**Levels Found 2000<sup>17</sup>** 3 ppm average  
 11 ppm maximum (apparent violation)

**Levels Found 2001<sup>18</sup>** 5 ppm average  
 16 ppm maximum (apparent violation)

**National Standard (MCL):** 10 ppm  
 (two-sample average in 24 hours)

**National Health Goal (MCLG):** 10 ppm





Excess nitrates, even after very short-term exposure, can pose an acute risk to infants, causing what is known as “blue baby syndrome.”<sup>19</sup> Fresno admits some of its wells exceeded the EPA’s 10-parts-per-million standard in 2000 and in 2001.<sup>20,21</sup> But Fresno insists it did not violate the EPA’s standard even though the EPA treats nitrate as an acute toxin and does not allow averaging of multiple samples to determine compliance. For example, two consecutive samples from one well in 2000 were found to contain nitrates at a level exceeding the 10-parts-per-million standard, which appears to constitute a violation of the EPA’s standard.<sup>22</sup> Fresno should have issued a public notification for such a violation, but it apparently did not do so. Fresno contends it did not violate the nitrate standard because it took the polluted well offline at some point after the second test. According to Fresno, “For an acute contaminant such as nitrate, the original and one confirmation sample is averaged [sic] for compliance purposes. In this situation the two samples collected from the well . . . averaged [11] mg/L. No violation exists because the well was removed from service immediately after confirmation.”<sup>23</sup> This contention is incorrect, because EPA rules provide that if two consecutive samples, when averaged, exceed 10 parts per million, a violation has occurred, even if the well is later removed from service.<sup>24</sup> The EPA’s Safe Drinking Water Information System reports that Fresno violated the nitrate standard beginning in January 1997, and returned to compliance in April 1997, but does not report any subsequent violations by Fresno.<sup>25</sup> It is the State of California’s responsibility to report violations to the EPA.

Similarly, in 2001, Fresno admits that “a high nitrate result was recorded”—16 parts per million at one well—significantly over the 10-parts-per-million standard.<sup>26</sup> The original sample was re analyzed, and Fresno “confirmed the high level.”<sup>27</sup> However, Fresno went back to the site and collected a “confirmation sample” and a well influent sample, which Fresno contended “indicate that the well site is in compliance with drinking water standards for nitrate, but reanalysis of the original sample confirmed the high [above standard] level.”<sup>28</sup> The California Department of

Health Services ordered the well taken offline. Fresno notes that “it is possible the original sample may have been contaminated.”<sup>29</sup> However, Fresno takes the position that no violation occurred.

In its 2000 right-to-know report, buried on page 5, Fresno states, in discussing general information about nitrate, that, “If you are pregnant, you should drink bottled water.”<sup>30</sup> It goes on to recommend that, “If you are caring for an infant or you are pregnant, you should ask advice from your health care provider.”<sup>31</sup> The 2001 report drops the first recommendation, for bottled water, but restates the suggestion to seek advice from a health care provider.<sup>32</sup>

Whether or not these periodic nitrate contamination problems are violations, the nitrate problem in Fresno is a serious public health issue.

**RADIOACTIVE CONTAMINANTS**

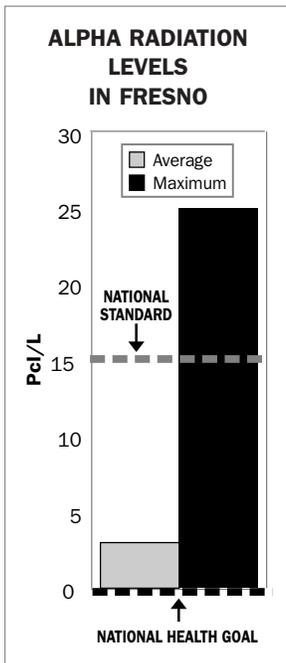
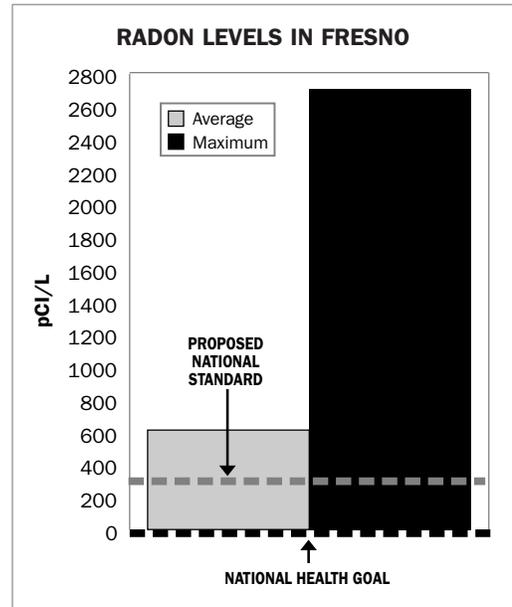
**Radon**

**Levels Found** 611 picocuries per liter (pCi/L) average  
2708 pCi/L maximum.<sup>33</sup>

**National Standard (MCL) (proposed):**  
300 pCi/L (alternate MCL of 4000 pCi/L where approved multimedia mitigation program is in place) (averages)

**National Health Goal (MCLG) (proposed):** 0 pCi/L—there is no known fully safe level of radon

Radon is a radioactive gas known to cause lung cancer. No amount of it is considered fully safe in tap water.<sup>34</sup>



**Alpha Radiation**

**Levels Found 1999 (most recent data published)**

3 picocuries per liter (pCi/L) average 25 pCi/L maximum<sup>35</sup>

**National Standard (MCL):** 15 pCi/L (average)

**National Health Goal (MCLG):** 0 pCi/L—there is no known, safe level of gross alpha radiation

Gross alpha radiation<sup>36</sup> is known to cause cancer. It usually results from the breakdown of natural radioactive elements in the ground. The finding of gross alpha radiation at a level as high as 25 pCi/L, nearly double the standard, is a health concern. While the standard allows averaging of multiple samples, it is unclear from Fresno’s data whether some customers are provided water primarily from wells heavily contaminated with gross alpha radiation, thus rendering averaging across the system inappropriate under EPA rules.

**MICROBIOLOGICAL CONTAMINANTS**

**Total Coliform Bacteria**

**Levels Found 2000:** 1% highest month, one *E. coli* positive (not confirmed on retest)<sup>37</sup>

**Levels Found 2001:** 1% highest month<sup>38</sup>

**National Standard:** 5% in highest month; 0 repeat samples *E. coli*

**National Health Goal:** 0%—there is no known, fully safe level of coliform bacteria

*Note that the contaminant levels are presented as a percentage. Total coliform is regulated as a percentage of positive samples that are present in water. The national health standard of 5 percent means that if more than 5 percent of the utility's total coliform samples test positive, then the national health standard has been violated. To say that a sample tests positive is to say that there are total coliform bacteria present in the sample. Therefore, for compliance purposes, the utilities provide the percentage of total coliform samples that tested positive.*

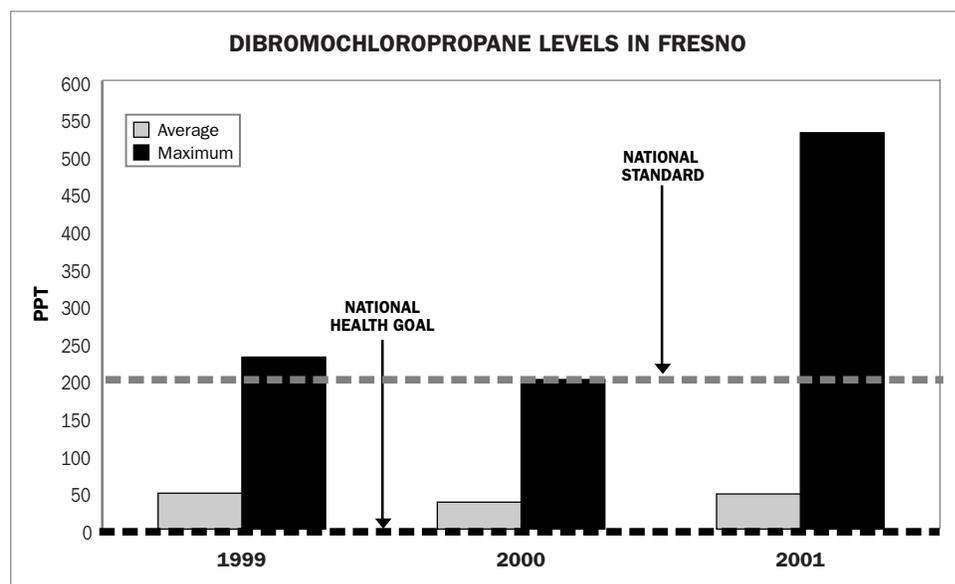
Total coliform bacteria<sup>39</sup> are microbial contaminants, whose presence is a potential indicator that disease-causing organisms may be present in tap water. Fresno also found *E. coli* in one sample in 2000, but the repeat sample found no bacteria. Although Fresno's total coliform bacteria percentages are not very high, any readings of *E. coli* or total coliform bacteria are a sign that vulnerable people may be at risk. In addition, the presence of coliform in Fresno's distribution system is a potential indication that bacteria may be regrowing in the city's pipes. Some studies suggest that serious regrowth problems may allow disease-causing pathogens to subsist in pipes.

**ORGANIC CONTAMINANTS**

**Dibromochloropropane (DBCP)**

**Levels Found 1999<sup>40</sup>**    48 ppt average    230 ppt maximum

**Levels Found 2000<sup>41</sup>**    36 ppt average    200 ppt maximum



**Levels Found 2001<sup>42</sup>** 47 ppt average 530 ppt maximum

**National Standard (MCL):** 200 ppt (average)

**National Health Goal (MCLG):** 0—there is no known fully safe level of DBCP

Dibromochloropropane (DBCP)<sup>43</sup> is a banned pesticide shown to cause cancer, sterility, and other health effects. It has been detected repeatedly in Fresno’s water. The enforceable standard is an average of 200 parts per trillion. Fresno has had a long history with DBCP. In the 1980s, 44 wells were shut down due to DBCP contamination.<sup>44</sup> Fresno says it has not recently violated the DBCP standard because high spike levels averaged out with lower levels at other times. However, in 2001, Fresno residents had an average DBCP concentration of 47 parts per trillion—less than the 200-parts-per-trillion MCL, but still 25 times higher than the 1.7-parts-per-trillion public health goal, a statewide health goal specific to California and obviously well above the national health goal of zero.<sup>45</sup>

**Ethylene Dibromide**

**Levels Found 2000<sup>46</sup>** 2 ppt average 86 ppt maximum

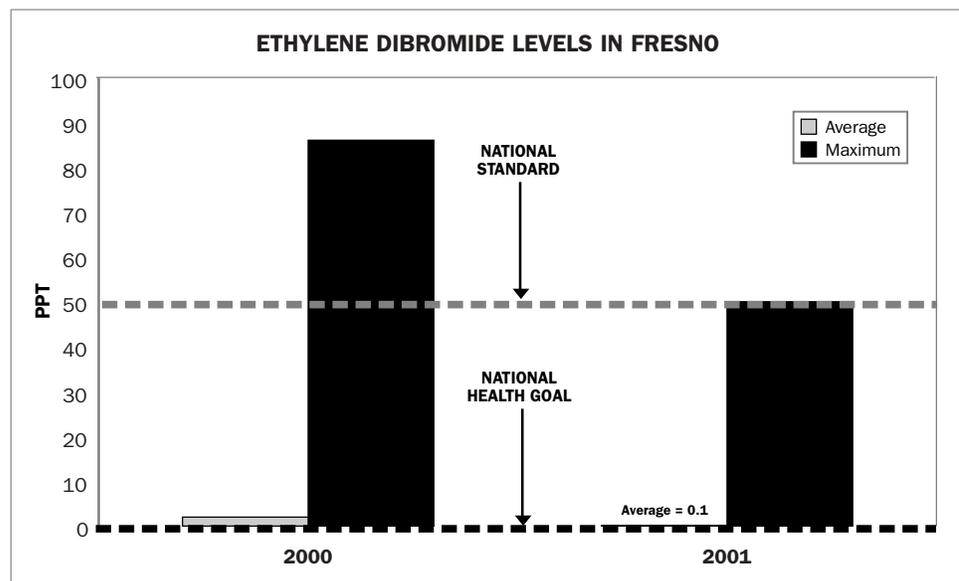
**Levels Found 2001<sup>47</sup>** 0.1 ppt average 50 ppt maximum

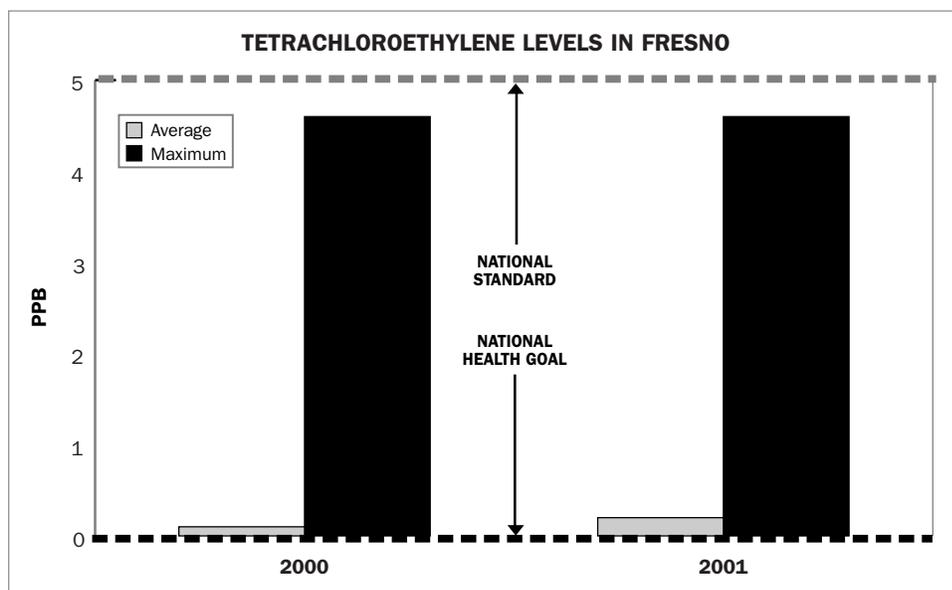
**National Standard (MCL):** 50 ppt (average)

**National Health Goal (MCLG):** 0—there is no known fully safe level of EDB

Ethylene dibromide (EDB)<sup>48</sup> is a pesticide and industrial chemical, found by the EPA to “potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: damage to the liver, stomach, and adrenal glands, along with significant reproductive system toxicity, particularly the testes.”<sup>49</sup>

Fresno asserts that while it exceeded the EDB standard, it nevertheless is not in violation because the standard allows averaging. EDB’s MCL is 50 parts per trillion, and its health goal is zero.





***Tetrachloroethylene (also called Perchloroethylene, PCE, or Perc)***

**Levels Found 2000<sup>51</sup>** 0.1 ppb average 4.6 ppb maximum

**Levels Found 2001<sup>50</sup>** 0.2 ppb average 4.6 ppb maximum

**National Standard (MCL):** 5 ppb (average)

**National Health Goal (MCLG):** 0—there is no known fully safe level of perc

Tetrachloroethylene<sup>52</sup> is used in dry cleaning and industrial metal-cleaning or finishing. Prolonged consumption of water contaminated by perc can cause liver problems, and may cause cancer. Fresno’s system-wide average perc level is reported to have been well below the EPA MCL of 5 parts per billion, but at least one well contained perc in 2000 at up to 4.6 parts per billion—just below the EPA standard and above the EPA health goal of zero.

***Trichloroethylene***

**Levels Found 2000<sup>53</sup>** 0.4 ppb average 11 ppb maximum

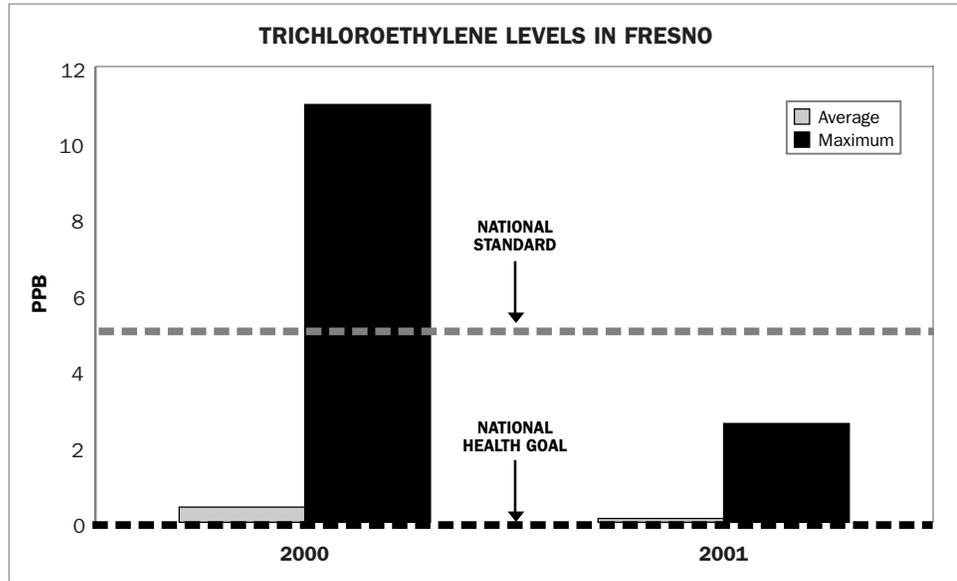
**Levels Found 2001<sup>54</sup>** 0.1 ppb average 2.6 ppb maximum

**National Standard (MCL):** 5 ppb (average)

**National Health Goal (MCLG):** 0—there is no known fully safe level of TCE

Trichloroethylene is a colorless liquid used as a solvent to remove grease from metal parts. It is present in most underground water sources and in many surface waters as a result of the manufacture, use, and disposal of the chemical. Humans exposed to high levels of trichloroethylene in their drinking water may experience harmful effects to their nervous systems, liver and lung damage, abnormal heartbeat, coma, and possibly death.<sup>55</sup>

Fresno reported a system wide average of less than 1 part per billion of TCE, but had a spike up to 11 parts per billion in 2000. The standard is 5 parts per billion. Fresno admits that it had a TCE problem, but argued it did not violate standards:



*A single sample result exceeding the MCL for a less than acute contaminant such as TCE must first be verified with 1 or 2 follow-up samples. If the average exceeds the MCL, the utility is allowed to operate the affected source for up to 6 additional months and collect samples no less than monthly. The average of all results is used to determine compliance. In this situation, well 265 confirmed above the MCL and was removed from service. No violation exists because the well was removed from service immediately after confirmation.<sup>56</sup>*

As in the case of several other contaminants, Fresno appears to be skating just along the edge of violating standards. Whether or not this technically constituted a standard violation—because Fresno was able to take advantage of provisions allowing averaging—it is clear that even by Fresno’s account some customers were drinking water that exceeded the EPA’s standard for many months.

**Total Trihalomethanes**

**Levels Found 2000<sup>57</sup>** <1 ppb average 11 ppb maximum

**Levels Found 2001<sup>58</sup>** <1 ppb average 3 ppb maximum

**National Standard (MCL):** 80 ppb (average) (effective 2002) (100 ppb effective through 2001)

**National Health Goal (MCLG):** 0 ppb—there is no known fully safe level of exposure to TTHMs

*Total trihalomethanes (TTHMs) consist of a sum of the levels of four closely related chemicals—chloroform, dibromochloromethane, bromoform, and bromodichloromethane—which occur together at varying ratios when water is chlorinated. The latter two TTHMs have health goals of zero. The EPA promulgated and then withdrew (after a court decision) a zero health goal for chloroform, and has not yet issued a new goal for chloroform. Dibromochloromethane has a health goal of 60 parts per billion. Since water systems generally report only the combined TTHM level, and since it is essentially chemically impossible to create one*

trihalomethane in tap water without some level of the others, we list the health goal for TTHMs as zero.

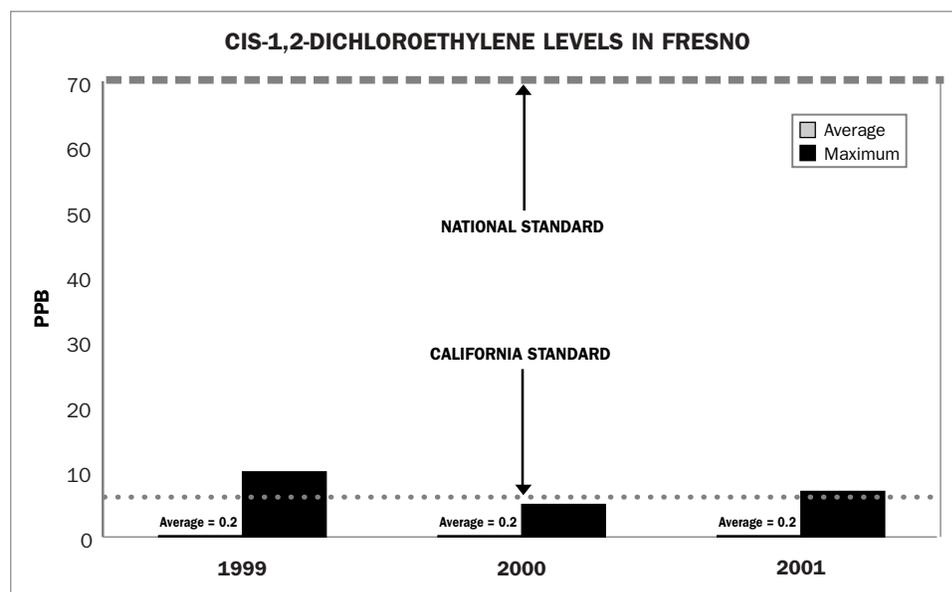
Total trihalomethanes<sup>59</sup> (TTHMs) are chemical contaminants that result when chlorine that is used to treat drinking water interacts with organic matter in the water. Many studies show that these chemicals are linked with cancer. Recent studies also link TTHMs to miscarriages and birth defects. Fresno's levels are far below the EPA standard. Even a high of 11 parts per billion (in 2000) is not a level at which studies show miscarriages or fetal development problems. Unlike many other major cities (especially those that rely on surface water), Fresno does not appear to have a problem with trihalomethanes.

### OTHER WATER QUALITY ISSUES OF CONCERN

Fresno reported that it found several pesticides in its water, at times at levels of potential concern, although the system reports that it did not violate any standards for these chemicals from 1999 to 2001. Among the chemicals of concern found in Fresno's water were:<sup>60</sup>

**Cis-1,2-dichloroethylene** at a system-wide average of less than 1 part per billion, but spiking up to 7 parts per billion in 2001, up to 5 parts per billion in 2000, and up to 10 parts per billion in 1999. The federal standard, or maximum contaminant level (MCL), and health goal are both 70 parts per billion (average), but the stricter California MCL is 6 parts per billion (average). This volatile organic chemical reaches drinking water supplies as discharge from industrial chemical factories. It is linked with liver and nervous system problems.<sup>61</sup>

**2,2-Dichloropropane (2,2-DCP)** at an average of less than 1 part per billion but with a spike of up to 85 parts per billion in 2000. No standard has been established



for 2,2-DCP. It is a volatile organic chemical that evaporates at room temperature and is found in a few drinking water supplies, most of these from groundwater sources. It was once used as a soil fumigant in the farming industry. Its isomer 1,2-dichloropropane is linked to liver problems and cancer, however NRDC has been unable to find specific studies on the health effects of low-level exposure to the chemical.

---

## PROTECTING FRESNO'S DRINKING WATER

Following are approaches to treating Fresno's drinking water, as well as a discussion of threats to source water. (For information on Fresno pollution sources, visit <http://map2.epa.gov/enviromapper>.) Also included in this section is information on how individuals can protect drinking water.

### TREATMENT OPTIONS AVAILABLE FOR CONTAMINANTS OF GREATEST CONCERN

**Arsenic:** Treatment options available to reduce arsenic levels may include the use of activated alumina, anion exchange, or other technologies at a cost the EPA estimates would be about \$20 per household per year for a city of Fresno's size.<sup>62</sup>

**Radon:** To reduce Fresno's radon levels, the city could use aeration—essentially bubbling air through the water—at a cost the EPA estimates to be about \$9.50 per household per year for a system of Fresno's size.<sup>63</sup>

**Organic Chemicals:** Fresno treats approximately 38 of its wells with granular activated carbon (GAC) in order to reduce the organic chemicals found in the water. However, many other Fresno wells are not treated with GAC. Fresno's decentralized system of well fields works against it in this effort. Other cities have installed GAC technology for the entire water system at a central location, at a cost of about \$25 per household per year, but Fresno has no central site, making treatment more difficult and more costly.

**Alternative Water Sources:** Alternative water sources may be available to Fresno. The city reports that in 2003 it will have a surface water treatment plant that will meet about 15 percent of the city's water demand.

### CURRENT AND FUTURE THREATS TO FRESNO'S SOURCE WATER

Tap water provided by the City of Fresno Department of Public Utilities is treated groundwater. The source of that groundwater is Fresno Sole Source, a large, unconfined aquifer. Because groundwater depletion is a serious problem in Fresno, the system relies upon groundwater that has been artificially recharged, in part by Central Valley Project water from the San Joaquin River—reportedly one of the largest artificial recharge programs in the United States.

Fresno asserts that “groundwater contamination is a serious problem for Fresno.”<sup>64</sup> NRDC agrees and concludes that Fresno merits a source water threat rating of “6”—a high degree of threat. The EPA's Index of Watershed Indicators (IWI) refers to the surface waters in the Fresno area as Tulare-Buena Vista Lakes. The groundwater aqui-

fers in this area are the source waters for drinking water in the Fresno metropolitan area. Surface water contamination can pollute groundwater aquifers, and Fresno admits that most of its groundwater “actually comes from the Kings and San Joaquin River watersheds.”

Overall, based on the IWI and other currently available data on source water quality, Fresno’s watershed is highly vulnerable to contamination. This is true for three main reasons.

First, the IWI indicates that from 1991 to 1999, 10 to 15 percent of Fresno’s population was served by community water systems with standards violations or treatment for chemical contaminants. In addition, between 1990 and 1997, 5 percent of the samples of ambient groundwater, Fresno’s main source water type for drinking water, had chemical levels exceeding one-half the national standard (MCL) for that chemical.

Second, Fresno’s drinking water sources are highly susceptible to contamination by urban runoff and percolation. This type of pollution occurs when water passes through an urban environment, picking up particles, dirt, and chemicals, and flows into the surface and ground water resources of the area. According to the most recent available IWI data—for 1990—more than 4 percent of the watershed’s land area is more than one-quarter impervious. In other words, Fresno’s watershed and consequently its water sources are likely to experience a heavy loading of pollutants as a result of urban runoff.

Third, Fresno’s watershed is likely to be contaminated by agricultural pollutants. From 1990 to 1995, IWI estimated a high potential impact of agricultural runoff on Fresno’s watershed. In particular, pesticide and nitrogen runoff have a high potential of polluting Fresno’s drinking water sources, and sediment delivery to rivers and streams is determined to be moderate.

Of course, California is a major farming state, and the Central Valley region is particularly agriculture-intensive. Conventional agriculture relies heavily on nitrate-rich fertilizers, pesticides, and herbicides. Heavy use of these chemicals can cause water sources to become contaminated.

## HOW INDIVIDUALS CAN PROTECT SOURCE WATER

You can take steps to protect Fresno’s drinking water by protecting its sources.

**Reduce the amount of water you use.** Plant drought-resistant plants or “xeriscape” (use plants that need little or no watering), use low-flow shower-heads, shorten your shower time, don’t spray down your driveway to clean it, minimize the number of times (and how long) you water your lawn. Consider installing low-flush toilets. For more tips on water conservation, see:

- ▶ [www.monolake.org](http://www.monolake.org)
- ▶ [www.mwdh2o.com/mwdh2o/pages/conserv/save/tentips/tentips01.html](http://www.mwdh2o.com/mwdh2o/pages/conserv/save/tentips/tentips01.html)

**Avoid using pesticides** in the home or yard, or storing pesticides in the home. Consumer pesticide use in the home leads to runoff into water resources.

**FRESNO WATER UTILITY INFORMATION**

City of Fresno Department of Public Utilities  
 City of Fresno Water Division  
 1910 East University Avenue  
 Fresno, CA 93703-2988  
 559-498-4136  
[www.ci.fresno.ca.us/public\\_utilities](http://www.ci.fresno.ca.us/public_utilities)

**Buy organic foods**, if possible. Purchasing organically grown food helps prevent the drinking water source contamination from pesticide and herbicide runoff that results from conventional agricultural practices.

**Attend meetings of your local water supplier**, the City of Fresno Department of Public Utilities—Water Division. Check the right-to-know report or call and ask for dates, times, and locations. (Contact information above.)

**Learn more from these groups:**

- ▶ Clean Water Action, [www.cleanwater.org](http://www.cleanwater.org)
- ▶ NRDC, [www.nrdc.org](http://www.nrdc.org)
- ▶ Clean Water Network, [www.cwn.org](http://www.cwn.org).

**NOTES**

- 1 EPA, Safe Drinking Water Information Database.
- 2 Fresno Department of Public Utilities, Water Division, 2001 Water Quality Report.
- 3 Ibid.
- 4 Fresno, *Capital Summary Report: 2003–2007* at pages 573–578 (pp. 43–46 on web-version) (2002). Available online at [www.ci.fresno.ca.us/budget/budgets/proposed%5F02%5F03/pdf/capital\\_summary.pdf](http://www.ci.fresno.ca.us/budget/budgets/proposed%5F02%5F03/pdf/capital_summary.pdf).
- 5 Ibid., page 2.
- 6 Fresno Water Division, 2000 Water Quality Report.
- 7 See EPA regulations at 40 C.F.R. §141.153(d)(4)(ix), which provide that the RTK report must include “the likely source(s) of detected contaminants to the best of the operator’s knowledge. Specific information about the contaminants may be available in sanitary surveys and source water assessments, and should be used when available to the operator.” While EPA allows reliance upon general lists of potential sources where the water system is not aware of the specific source of pollution, where the water system is aware of the pollution source, the rules require that polluter to be identified.
- 8 40 CFR §141.153(h)(3).
- 9 Information on contamination is derived from City of Fresno, Water Division, 2000 & 1999 Water Quality Reports.
- 10 City of Fresno, Water Division, 1999 Water Quality Report.
- 11 City of Fresno, Water Division, 2000 Water Quality Report.
- 12 City of Fresno, Water Division, 2001 Water Quality Report.
- 13 Total cancer risk estimates are based upon the National Academy of Sciences’ report *Arsenic in Drinking Water: 2001 Update* (2001).
- 14 Fresno Water Division, 1999 Water Quality Report.
- 15 The so-called “action level” standard for lead is different from the standard for most other contaminants. Water utilities are required to take many samples of lead in the tap water distribution system. If the amount of lead detected in the samples is *more* than 15 ppb at the 90th percentile (which means that 90% of the samples have 15 ppb or less), then the amount is said to exceed the “action level.” Under the complex EPA lead rule, a water system that exceeds

the action level is not necessarily in violation. If a system exceeds the action level, additional measures such as chemical treatment to reduce the water's corrosivity (ability to corrode pipes and thus its ability to leach lead from pipes) must be taken. If this chemical treatment does not work, the water system may have to replace lead portions of its distribution system if they are still contributing to the lead problem.

16 See EPA, Consumer Fact Sheets on Lead, [www.epa.gov/safewater/Pubs/lead1.html](http://www.epa.gov/safewater/Pubs/lead1.html) and [www.epa.gov/safewater/standard/lead&col.html](http://www.epa.gov/safewater/standard/lead&col.html), and IRIS summary for lead online at [www.epa.gov/iris/subst/0277.htm](http://www.epa.gov/iris/subst/0277.htm).

17 Fresno Water Division, 2000 Water Quality Report. Fresno reported its nitrate levels as nitrate as nitrate (NO<sub>3</sub>), rather than as N (nitrogen). NRDC has converted the reported values to Nitrate as N.

18 Fresno Water Division, 2001 Water Quality Report. Fresno reported its nitrate levels as nitrate as nitrate (NO<sub>3</sub>), rather than as N (nitrogen). NRDC has converted the reported values to Nitrate as N.

19 The information regarding the health effects of nitrate are derived from National Academy of Sciences, National Research Council, *Nitrate and Nitrite in Drinking Water* (1995)(available online at [www.nap.edu/catalog/9038.html](http://www.nap.edu/catalog/9038.html)), and EPA, Nitrates, fact sheet, available online at [www.epa.gov/safewater/dwh/c-ioc/nitrates.html](http://www.epa.gov/safewater/dwh/c-ioc/nitrates.html).

20 See note 17.

21 See note 18.

22 See 40 C.F.R. § 141.11 (nitrate MCL is 10 ppm); *ibid.* §141.23(o) (if 2 consecutive nitrate samples exceed the MCL for nitrate, this constitutes a violation and public notice is required).

23 See note 17.

24 See note 22.

25 EPA, SDWIS, available online at [http://oaspub.epa.gov/enviro/sdw\\_report.first\\_table?report\\_id=633965&pwsid=CA1010007&state=CA&source=Ground%20water%20&population=485000&sys\\_num=0](http://oaspub.epa.gov/enviro/sdw_report.first_table?report_id=633965&pwsid=CA1010007&state=CA&source=Ground%20water%20&population=485000&sys_num=0).

26 Fresno Water Division, 2001 Water Quality Report.

27 *Ibid.*

28 *Ibid.*

29 *Ibid.*

30 Fresno Water Division, 2000 Water Quality Report.

31 *Ibid.*

32 Fresno Water Division, 2001 Water Quality Report

33 Fresno Water Division, 2000 Water Quality Report.

34 The information in the radon section is derived from National Academy of Sciences, National Research Council, *Risk Assessment of Radon in Drinking Water*, 1999, available online at <http://books.nap.edu/books/0309062926/html/index.html>), and from EPA, Radon in Drinking Water (fact sheet available online at <http://www.epa.gov/safewater/radon/proposal.html>).

35 Fresno Water Division, 2000 Water Quality Report.

36 See note 34.

37 Fresno Water Division, 2000 Water Quality Report.

38 Fresno Water Division, 2001 Water Quality Report.

39 The information on health effects of coliform is derived from EPA, "Total Coliform Rule," 54 Fed.Reg. 27544-27568, June 29, 1989; and EPA, "Total Coliform Rule: A Quick Reference Guide," available online at *Total Coliform Rule: A Quick Reference Guide*, PDF File (816-F-01-035, September 2001).

40 Fresno Water Division, 1999 Water Quality Report.

41 Fresno Water Division, 2000 Water Quality Report.

42 Fresno Water Division, 2001 Water Quality Report.

43 Health effects and other general information on DBCP derived from EPA, Consumer Fact Sheet on Dibromochloropropane, available online at [www.epa.gov/safewater/dwh/c-soc/dibromoc.html](http://www.epa.gov/safewater/dwh/c-soc/dibromoc.html).

44 Brad Heavner, California Public Interest Research Group Charitable Trust, *Toxics on Tap: Pesticides in California Drinking Water Sources*, 1999, pg. 17; Fresno Water Division, 2001 Water Quality Report.

45 *Ibid.*, pg. 22.

46 Fresno Water Division, 2000 Water Quality Report.

47 Fresno Water Division, 2001 Water Quality Report.

48 This EDB health and use information derived from EPA, Consumer Fact Sheet on Ethylene Dibromide," available online at [www.epa.gov/safewater/dwh/c-soc/ethylene.html](http://www.epa.gov/safewater/dwh/c-soc/ethylene.html).

49 *Ibid.*

- 50 Fresno Water Division, 2000 Water Quality Report.
- 51 Fresno Water Division, 2001 Water Quality Report.
- 52 EPA, Consumer Fact Sheet on Tetrachloroethylene, available online at [www.epa.gov/safewater/dwh/c-voc/tetrachl.html](http://www.epa.gov/safewater/dwh/c-voc/tetrachl.html).
- 53 Fresno Water Division, 2000 Water Quality Report.
- 54 Fresno Water Division, 2001 Water Quality Report.
- 55 Agency for Toxic Substances and Disease Registry. ToxFAQs—Trichloroethylene (TCE), September 1997, available online at [www.atsdr.cdc.gov/tfacts19.html](http://www.atsdr.cdc.gov/tfacts19.html) (last visited January 4, 2001.).
- 56 Fresno Water Division, 2000 Water Quality Report.
- 57 Fresno Water Division, 2000 Water Quality Report.
- 58 Fresno Water Division, 2001 Water Quality Report.
- 59 Health effects information on disinfection byproducts is summarized in Chapter 2 as well as in *Trouble on Tap*, 1995; NRDC, *Bottled Water: Pure Drink or Pure Hype?*, 1999, available online at [www.nrdc.org/water/drinking/bw/bwinx.asp](http://www.nrdc.org/water/drinking/bw/bwinx.asp); and EPA, draft Preamble for Stage 2 Disinfection Byproducts Regulation, available online at [www.epa.gov/safewater/mdbp/st2dis-preamble.pdf](http://www.epa.gov/safewater/mdbp/st2dis-preamble.pdf).
- 60 All information in this section on levels of contaminants found are derived from City of Fresno, Water Division, 2000 Water Quality Report; and City of Fresno, Water Division, 1999 Water Quality Report.
- 61 EPA, Consumer Fact Sheet on 1,2-Dichloroethylene, available online at [www.epa.gov/safewater/dwh/c-voc/12-dich2.html](http://www.epa.gov/safewater/dwh/c-voc/12-dich2.html).
- 62 EPA, Final National Primary Drinking Water Regulation: Arsenic, 66 Fed. Reg. 6976, 7011, Table III.E-2 (costs per household); 7038, Table V.F-4.1 (treatment available), January 22, 2001.
- 63 EPA, Proposed National Primary Drinking Water Regulation: Radon-222, 64 Fed. Reg. 59246, 59328 Table XIII.11, November 2, 1999.
- 64 Fresno Water Division, 1999 Water Quality Report.