STANFORD UNIVERSITY UTILITIES DIVISION

2001 Annual Water Quality Report

May 24, 2002

WHAT'S INSIDE:

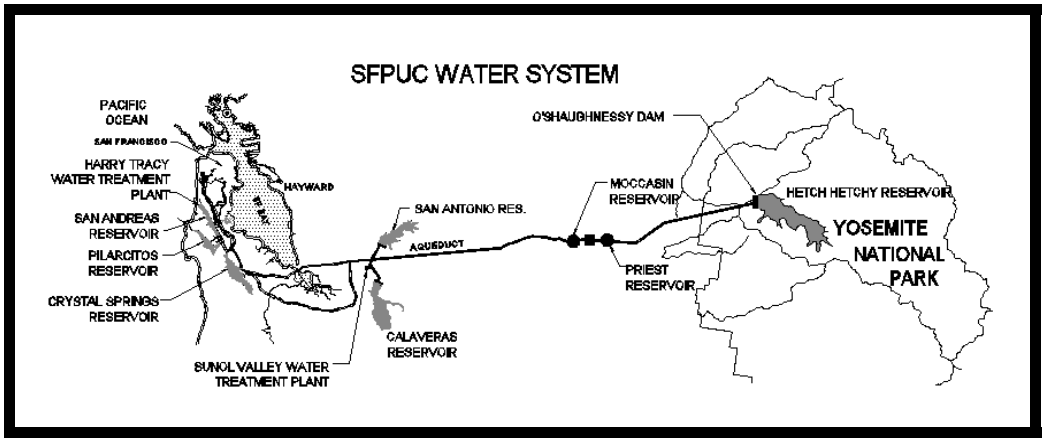
Water is Top Quality

The Stanford Utilities Division is pleased to provide you with the 2001 Annual Water Quality Report. During 2001, the San Francisco Public Utilities Commission (SFPUC) and Stanford monitored water quality for both source and treated water supplies, and in all cases the water quality was in compliance with California Department of Health Services (DoHS) and U.S. Environmental Protection Agency (U.S. EPA) drinking water requirements. We continue our commitment to provide our customers with safe, high quality drinking water. It is the policy of the Stanford Utilities Division to fully inform its consumers about the water quality standards and typical concentrations of constituents found in the water.

Stanford University
Utilities Division

Source of Stanford's Potable Water

During 2001, the sole source of potable water for Stanford consumers was from the SFPUC. The main source of our water supply comes from snowmelt in the Hetch Hetchy watershed. The watershed is located within 459 square miles of the protected Yosemite National Park. The water from this watershed is stored in the Hetch Hetchy Reservoir and is delivered 150 miles to the Bay Area through a series of tunnels and pipelines and it is treated but not filtered due to its high quality. The surface water from Hetch Hetchy is the main water source for approximately 80 percent of SFPUC's water supply. The remainder comes from surface water runoff collected on watershed lands in the East Bay and on the Peninsula. The local surface water runoff is treated and filtered.



Map by Virgilio DeCastro

SFPUC Completes Drinking Water Source Assessment and Watershed Sanitary Survey Updates

A detailed drinking water source assessment for all SFPUC source watersheds was completed in 2000. This assessment showed that SFPUC watersheds have very low levels of contaminants and those contaminants found are usually associated with wildlife and to a limited extent human recreational activity.

The SFPUC water system updates its watershed sanitary surveys for the Hetch Hetchy supply on an annual basis. The 2001 survey update describes the watersheds and water supply system, identifies potential sources of contamination in the watersheds, discusses the existing and recommended watershed management practices that protect water quality, and summarizes the water quality monitoring conducted.

General Information about Sources of Water

The DoHS requires that annual drinking water reports include the information in this section.

The sources of drinking water (both tap and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over land surfaces or through the ground, it dissolves naturally occurring minerals, and in some cases, radioactive material, and can pick up substances resulting from the presence of animals or human activity.

Explanations for expected contaminants that may be present in source water before treatment are:

Microbial Contaminants: such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural live stock operations, and wildlife.

Inorganic Contaminants: such as salts and metals, which can be naturally occurring or result from urban stormwater runoff, industrial or domestic wastewater discharge, oil and gas production, mining, or farming.

Pesticides and Herbicides: which may originate from a variety of sources such as agricultural, urban storm water runoff, and residential uses.

Organic Chemical Contaminants: including synthetic and volatile organic chemicals, that are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.

Radioactive Contaminants: which can be naturally occurring or be the result of oil and gas production and mining activities.

"Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice from their health care providers about drinking water. U.S. EPA/ Center for Disease Control guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the U.S.EPA Safe Drinking Water Hotline (800-426-4791)." [1]

"In order to ensure that tap water is safe to drink, U.S. EPA and the State DoHS prescribe regulations, which limit the amount of certain contaminants in water provided by public water systems. The State DoHS regulations also establish limits for contaminants in bottled water that provide the same protection for public health." [2]

"Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained from the U.S.EPA Safe Drinking Water Hotline (800-426-4791). " [3]

Water Supply Monitoring by SFPUC

Each day SFPUC collects water samples from various locations within their system. The routine samples are analyzed for primary standards that apply to the protection of public health and secondary standards that refer to the aesthetic qualities such as taste and odor.

Chloramine Conversion will Provide an Increased Level of Protection for Our Water

In fall 2003, the SFPUC will change its drinking water disinfectant from chlorine to chloramine to insure an even higher quality water supply. Chloramine, a combination of chlorine and ammonia, is a more stable, longer lasting disinfectant that will significantly lower disinfection by-product levels. Formed in water that is chlorinated, disinfection by-products are known or suspected carcinogens. In addition, a report released in January 2002 by an independent research group, suggested a possible link between trihalomethanes (a group of disinfection by-products) and an increased risk of miscarriage and birth defects. State and Federal regulations, which are in effect since January 2002, have lowered the allowable levels of disinfection by-products in drinking water to limit the impacts of exposure to disinfection by-products. The SFPUC's change of disinfectant to chloramines will reduce the level of disinfection by-products such that current and future more stringent regulations are consistently met. Chloramines also offer the added benefit of increased protection from bacterial contamination, and improved taste and odor in the water.

The change to chloramine disinfection requires the construction of new chlorine and ammonia chemical addition facilities to chloraminate the SFPUC water. Construction of these new facilities, with a total cost of about $60 million, started in early 2002.

Most major utilities in California currently use chloramines as the disinfectant in their drinking water supplies. The vast majority of Bay Area residents outside the SFPUC service area already have received chloraminated water for many years.

As with chlorine, certain water users, specifically kidney dialysis patients, aquarium owners and research, businesses, or industries that use water in their treatment process, will need to take special precautions to remove the chlorine and ammonia from the water prior to use. Public education will target specific audiences and the general public before conversion to chloramines occurs.

Well in advance of the conversion, Stanford Utilities is providing information to the Stanford community about the conversion. Stanford Utilities is proceeding with an outreach program to various groups within the University. Information about chloramines is being provided through various media, including meeting with campus groups, informational fact sheets on the Stanford Water web site, and informative articles in campus papers.

Two-Year Extension Granted by U.S. EPA

"As part of the new regulation governing disinfection byproducts, the U. S. EPA has developed a new drinking water standard for a group of five haloacetic acids (HAA5) and lowered the current standard for a group of four trihalomethanes (TTHMs). Water systems must meet these new standards starting in January 2002. Currently, while operating under optimum conditions, the San Francisco Regional Water System (SFRWS), the system that we purchase all of our water from, cannot meet the new standard on a consistent basis. To address this, the SFPUC, which operates the SFRWS, has embarked on a project to build new chloramination facilities. Unfortunately, a project of this size takes several years to complete and the facilities will not be operational until December 2003. Under the new regulation, EPA allows for a two-year extension to comply with the new standard if capital improvements are necessary to meet the new standard. We applied for and received a two-year extension. Under the extension, we will still have to meet all of the monitoring requirements and notify the public if the state standard for TTHM is exceeded. In addition, SFPUC must meet the deadliness in a U.S. EPA-developed construction compliance schedule."[5] You can find Stanford's annual results for TTHMs in Table 2, enclosed.

Water Distribution Monitoring by Stanford

The Stanford Water Department within the Utilities Division manages Stanford's water storage, distribution, system maintenance, and monitoring programs. Stanford fluoridates the water and collects daily samples to monitor fluoride concentrations. In 2001, 100 percent of fluoride sample results were within the optimum range between 0.8 and 1.4 mg/l. Stanford collects water samples routinely from various locations within the system. These samples are analyzed for coliform bacteria, chlorine residual, and general physical parameters. Additional samples are collected throughout the year. In compliance with DoHS requirements, a certified laboratory analyzes the samples and Stanford submits monthly monitoring reports to the DoHS.

The Stanford Water Department also maintains flushing, cross-connection, and backflow prevention programs.

Results from SFPUC's and Stanford's 2000 Sampling

The enclosed data tables summarize the 2001 sampling results from laboratory analyses of parameters detected in SFPUC's supply and Stanford's distribution systems. Extensive water sample collection and testing protocol is used at the various water sources throughout the SFPUC transmission system and in the campus distribution system. Both the SFPUC and Stanford monitor for many additional parameters, which were not detected.

SFPUC's source water supply results are presented in Table 1. Stanford's water quality results for the campus distribution system are presented in Table 2. Tables 1 and 2 contain the name of each substance, the highest level allowed by regulation (MCL), the ideal goals for public health (PHG), the average and range, the typical sources of such contamination. Footnotes explaining the data and a key to units of measurement are included.

Cryptosporidium and Giardia

Cryptosporidium, a parasitic microbe found in most surface water supplies, can pose a potential health threat. If swallowed, it may produce cryptosporidiosis, with symptoms of diarrhea, stomach cramps, upset stomach, and slight fever. Some people are more vulnerable to *Cryptosporidium* than others and should seek advice about types of drinking water from their health care providers.

The SFPUC tests for *Cryptosporidium* in source water supplies regularly. *Cryptosporidium* was found in 11 percent of samples of the SFPUC's source waters in 2001. Tesla Portal, through which about 90 percent of the source water flows, contained an average of 1.5 *Cryptosporidium* per hundred liters. The two major Alameda reservoirs, which contribute about 10 percent of the source water, also contained an average of 1.5 *Cryptosporidium* per hundred liters.

Giardia, a parasitic microbe found in most surface water supplies, can pose a potential health threat. If swallowed, it can produce the same symptoms, as does *Cryptosporidium*. The SFPUC tests for *Giardia* in source water supplies regularly. *Giardia* was found in 16 percent of samples of the SFPUC's source waters in 2001. Tesla Portal, through which about 90 percent of the source water flows, contained an average of 1.5 *Giardia* per hundred liters. No *Giardia* were detected in the two major Alameda reservoirs, which contribute about 10 percent of the source water.

Lead and Copper

Stanford University completed three consecutive six-month monitoring periods for lead and copper in 1994 and follow-up monitoring in 1995, 1998 and 2001. Stanford does not exceed the lead and copper action levels established by the U.S. EPA and DoHS. Because Stanford met all compliance standards for lead and copper, the DoHS specifies a reduced sampling program to once every three years.

"Infants and young children are typically more vulnerable to lead in drinking water than the general population. It is possible that lead levels at your home may be higher than at other homes in the community as a result of materials used in your home's plumbing. If you are concerned about elevated lead levels in your home's water you can flush your tap for 30 seconds to 2 minutes before use, and always use cold water for cooking. You may also wish to have your water tested. Additional information is available from the Safe Drinking Water Hotline (800-426-4791)."[4]

Unregulated Contaminant Monitoring

Unregulated contaminant monitoring helps the U.S. EPA and the DoHS determine where certain contaminants occur and whether the unregulated contaminants need to be regulated. In 2001, the SFPUC participated in a statewide monitoring effort for N-nitrosodimethylamine (NDMA). Also during 2001, the SFPUC monitored for 20 other unregulated contaminants including MTBE, perchlorate, other volatile organic compounds, herbicides, pesticides, chromium 6, other metals, and Freon 12. These 20 contaminants were not detected in any of the SFPUC water supplies.

Note: Paragraphs with footnotes: 1, 2, 3, 4, and 5 are from the DoHS and are required to be included in this annual report.

TABLE 1. WATER QUALITY REPORT FOR SFPUC SOURCE WATER SUPPLY 2001[1][2]

PARAMETER	Unit	MCL[3]	PHG[4] (MCLG[5])	Range	Average	Major Sources in Drinking Water
PRIMARY STANDARDS						
MICROBIOLOGICAL CONTAMINANTS						
Turbidity Tesla Portal[6]	NTU	5.0[7]	N	0.20-0.76	0.29	Soil run-off
Turbidity Sunol Valley Water Treatment Plant[6]	NTU	0.5[8]	N	0.04-0.16	0.06	Soil run-off
ORGANIC CHEMICALS (SFPUC Transmission System)						
Total Haloacetic Acids (HAAs)[9]	ppb	NS	N	7-56	24	By-product of drinking water chlorination
Total Trihalomethanes (TTHMs)[9]	ppb	NS	N	19-62	47	By-product of drinking water chlorination
Total Haloacetonitriles (HANs)[9]	ppb	NS	N	1-6	3	By-product of drinking water chlorination
Total Haloketones (HKs)/Chloropicrin (CP)[9]	ppb	NS	N	<0.5-7	2	By-product of drinking water chlorination
Total Aldehydes [9]	ppb	NS	N	8-18	12	By-product of drinking water chlorination
Total Organic Halides (TOX)[9]	ppb	NS	N	110-173	131	By-product of drinking water chlorination
INORGANIC CHEMICALS						
Chlorate [10]	ppb	NS	N	<20-27	<20	By-product of drinking water chlorination
Fluoride - natural occurrence [11]	ppm	2	1	<0.1-0.2	0.1	Erosion of natural deposits

PARAMETER	Unit	SMCL[3]	Range	Average
SECONDARY STANDARDS - SOURCE WATER[10]				
Chloride	ppm	500	<3-10	5
Specific Conductance	µS/cm	1600	11-280	184
Sulfate	ppm	500	1-23	16
Total Dissolved Solids (TDS)	ppm	1000	15-170	112
SECONDARY STANDARDS - TREATED WATER[12]				
Aluminum	ppb	200	<50-88	<50
Color	unit	15	<5-15	<5
Odor Threshold	TON	3	1-2	2
ADDITIONAL CONSTITUENTS - TREATED WATER[12][13]				
Alkalinity (as $CaCO_3$)	ppm	NS	14-110	62
Calcium	ppm	NS	4-29	16
Hardness (as $CaCO_3$)	ppm	NS	8-110	59
Magnesium	ppm	NS	<0.5-10	5
pH	pH unit	NS	8.6-9.6	9.1
Potassium	ppm	NS	<0.5-1	1
Silica	ppm	NS	5-5	5
Sodium	ppm	NS	<3-19	10

Notes:
(1) Water Quality Annual Report set-forth in 40 CFR Parts 141 and 142 National Primary Drinking Water Regulation and Cal. Code of Regulations, Title 22 Section 116470.
(2) All results met State and Federal drinking water regulations.
(3) Maximum Contaminant Level and Secondary Maximum Contaminant Level (SMCL) set by U.S. EPA / California Department of Health Services.
(4) Public Health Goal (PHG) adopted by the State Office of Environmental Health Hazard Assessment (OEHHA) of the California EPA.
(5) Maximum Contaminant Level Goal (MCLG) set by U.S. EPA.
(6) Turbidity is the water clarity indicator; it also indicates the quality of the water and the treatment system efficiency.
(7) The turbidity standard for unfiltered supplies is 5 NTU.
(8) Filtered water turbidity must be less than 0.5 NTU 95% of the time. This goal was met 100% of the time.
(9) Based on data collected in 2001 at Alameda East Portal and SVWTP; except for Total Organic Halides (TOX) which was collected in 1998.
(10) Data obtained from Calaveras and San Antonio Reservoirs (Based on year 2000 data).
(11) Data obtained from Hetch Hetchy, Calaveras and San Antonio Reservoirs.
(12) Data obtained from Alameda East Portal and Sunol Valley Water Treatment Plants.
(13) Note that arsenic, chromium, perchlorate, and MTBE were not detected in the source or treated water.
(14) Results are published as percent of positive samples per month.
(15) Results are for 4-quarter running average in Stanford Univeristy's tap water.
(16) For fluoride that is added to the water supply the optimal level is temperature dependent based on annual averages of maximum daily air temperatures. Stanford's control range is 0.8 mg/L to 1.4 mg/L, the optimal level is 0.9 mg/L. The control range was not exceeded in 2001.
(17) Action Level (AL). The 90th percentile level for lead or copper must be less than the action level. All Stanford's sampling results were below the action levels. Results are based on 60 samples collected in 2001.

TABLE 2. WATER QUALITY REPORT FOR STANFORD UNIVERSITY DISTRIBUTION SYSTEM 2001[1][2]

PARAMETER	Unit	MCL[3]	PHG[4] (MCLG[5])	Range	Average	Major Sources in Drinking Water
MICROBIOLOGICAL CONTAMINANTS						
Total Coliform Bacteria[14]	% monthly positive sample	5.0	(0)	0-1	<1	Naturally present in the environment
Turbidity[6]	NTU	5[7]	NS	0.1-0.04	0.22	Soil run-off
ORGANIC CHEMICALS						
Disinfection By Products[15]						
Bromodichloromethane	ppb	NS	NS	<0.50-20	5.93	By-product of drinking water chlorination
Chloroform	ppb	NS	NS	8 –79	49.13	By-product of drinking water chlorination
Dibromochloromethane	ppb	NS	NS	<0.50-25	6.13	By-product of drinking water chlorination
Bromoform	ppb	NS	NS	<0.50-11	2.5	By-product of drinking water chlorination
Total Trihalomethanes (TTHMs)	ppb	100	NS	46-79	63.63	By-product of drinking water chlorination
INORGANIC CHEMICALS						
Fluoride[16]	ppm	NS	NS	0.80-1.15	0.87	Erosion of natural deposits; Water additive which promotes strong teeth
LEAD AND COPPER RULE STUDY	**Unit**	**AL[17]**	**PHG[4]**	**Range**	**90th Percentile**	**Major Sources in Drinking Water**
Lead[17]	ppb	15	2	<0.002-0.003	<0.002	Corrosion of household plumbing systems; Erosion of natural deposits
Copper[17]	ppm	1.3	0.17	<0.01-0.12	0.04	Corrosion of household plumbing systems; Erosion of natural deposits

KEY

<	= less than	ppb	= parts per billion (ug/L)
ND	= Lower than Detection Limit, Not Detected	ppm	= parts per million (mg/L)
NS	= No Standard	µS/cm	= micro Siemens per centimeter
N	= None	TON	= Threshold Odor Unit
NTU	= Nephelometric Turbidity Unit		
SVWTP	= Sunol Valley Water Treatment Plant		

Water Supply Protection and Maintenance

People and their activities are a major cause of source water contamination. The SFPUC has an intensive management program to limit human access, thus protecting the watersheds and reservoirs. Additional protection is provided through water treatment by SFPUC. Chlorine is used to disinfect all the source water by killing bacteria and other common harmful organisms. To protect the main water supply from cross-contamination, SFPUC maintains strict cross-connection and backflow prevention programs.

The water that Stanford receives from SFPUC local sources is filtered. However, the water received from the Hetch Hetchy system meets DoHS and U.S. EPA criteria for watershed protection, disinfection treatment, bacteriological quality and operational standards for drinking water. As a result, the U.S. EPA and DoHS granted the Hetch Hetchy source water a filtration exemption so that water from this source does not require filtration treatment to ensure its safety.

How does the SFPUC maintain the filtration exemption? The SFPUC aggressively monitors the Hetch Hetchy watershed weather conditions, water turbidity levels, coliform bacteria levels, parasite concentrations and other pathogens, and aqueduct disinfectant levels. The SFPUC also complies with disinfection, monitoring, and reporting requirements, works with the National Park Service in protecting the watershed, and conducts regular inspections of the Hetch Hetchy watershed and reservoirs.

Definitions

In this year's report, the following definitions were used for each parameter that was analyzed.

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically or technically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

Regulatory Action Level (AL): The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements, which a water system must follow.

Primary Drinking Water Standard (PDWS): MCLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

Public Health Goal (PHG): The level of contaminant in drinking water below which there is no known or expected risk to health. The California Environmental Protection Agency sets PHGs.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. The U.S. EPA sets MCLGs.

Variances and Exemptions: State or U.S. EPA permission to exceed an MCL or not comply with a treatment technique under certain conditions.

Treatment Techniques: A required process intended to reduce the level of a contaminant in drinking water.

Waiver: State permission to decrease the monitoring frequency for a particular contaminant.

ADDITIONAL INFORMATION

Stanford Water Group Internet Homepage:
http/www.stanford.edu/group/water

SFPUC's Internet Homepage:
(Click on Reports/Studies)
http://www.ci.sf.ca.us/puc/

U.S. EPA Drinking Water Internet Homepage
http://www.epa.gov/safewater/
or Safe Drinking Water Hotline at-800-426-4791

If you have questions or need additional information about this report or Stanford's water quality, please contact Marty Laporte at 650/725-7864 or E-mail: martyl@bonair.stanford.edu

Stanford Launches Water-Wise Landscape

Stanford's Water-Wise Landscape Program is offering free services and rebates on water-saving plants and irrigation hardware to help homeowners reduce outdoor water use while maintaining beautiful yards. Free services include a water use assessment for qualifying customers. Applications for the rebate program will be accepted until January 31, 2003 or until program funds are depleted. Free assessments are available until November 15, 2002 or until program funds are depleted. Contact our water specialists at (415) 434-0900 ext. 130 for more information.

Este informe contiene información muy importante sobre agua potable. Por favor tomese el tiempo de entenderlo y traducirlo ó hable con alguien que lo entienda bien.