Stanford University
Utilities Division
2000 Annual Water Quality Report

Water is Top Quality

The Stanford Utilities Division is pleased to provide you with the 2000 Annual Water Quality Report. During 2000, 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.

Source of Stanford's Potable Water

During 2000, 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.

SFPUC Completes Watershed Sanitary Survey Updates

Water systems with surface water sources are required to prepare sanitary surveys every five years. Unfiltered sources have updates completed on an annual basis. These surveys describe the watersheds and water supply system, identify potential sources of contamination in the watersheds, discuss the existing and recommended watershed management practices that protect water quality, and summarize the water quality monitoring conducted. The SFPUC completed the latest watershed sanitary survey in 2000.

Additionally, regulations require that drinking water source assessments be completed by May of 2003. The SFPUC completed the required assessments in 2000. The SFPUC watersheds are vulnerable to contaminants associated with wildlife and to a limited extent human recreational activity. Historically, the levels of contaminants have been very low in the watersheds. Full details are given in the Drinking Water Source Assessment and Protection Program reports by contacting Stanford Utilities, on the SFPUC web site **www.ci.sf.ca.us/html/wqb.htm**, and at the main branch of the San Francisco Public Library.

General Information about Sources of Water

The DoHS requires that annual drinking water reports include the following information.

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 included below.

- 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 stormwater 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 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 for the Hetch Hetchy source water? The SFPUC monitors Hetch Hetchy weather conditions, water turbidity levels, coliform bacteria levels, pathogens and parasite concentrations. The SFPUC also complies with disinfection, sampling and reporting requirements, as well as conducting regular inspections of the protected Hetch Hetchy watershed and reservoirs.

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

Currently, the SFPUC adds chlorine to the water supply; during the next two and a half years SFPUC is preparing to change disinfectants (mid 2003), from chlorine to chloramine. Chlorine and Chloramine disinfection has many benefits for customers including protecting customers from bacteria, viruses and most other microbes that can be found in water. Chloramine is a chemical compound formed by the addition of a small amount of ammonia to the chlorine water mix. The disinfection properties of chloramine last longer than chlorine in the distribution system providing increased protection for the water while it is in the reservoirs and pipelines on its way to your tap.

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.

While switching to chloramine disinfection is intended to improve public health overall by lowering disinfection byproducts, some customers will need to take precautions. Chloramine is toxic to pet fish and has the potential to be toxic to kidney dialysis patients. The SFPUC will coordinate with dialysis treatment centers and also address concerns of fish owners to ensure a safe conversion process. Customer satisfaction reports and the widespread use of chloramine disinfection by utilities across the country demonstrate how chloramine's benefits exceed the problems.

The SFPUC's environmental review process has been completed and has gained input and

approval from the regulatory agencies. Currently, engineering design of facilities needed for the chloramine conversion is underway.

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.

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 2000, 100 percent of fluoride sample results were within the optimum range between 0.8 and 1.4 mg/l. Stanford collects water samples routinely in a weekly and bi-monthly schedule 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. To satisfy University needs for emergency water storage, Stanford Utilities has completed construction of a new six million-gallon reservoir. The new reservoir will augment the existing two million-gallon Foothill 1 Reservoir and provide the Stanford campus with up to three days of water in the event of an SFPUC system emergency.

Results from SFPUC's and Stanford's 2000 Sampling

During 2000, SFPUC collected and analyzed approximately, 100,000 samples. Stanford collected and analyzed more than 1200 samples. The enclosed data summarizes the 2000 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 ultimately 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 amount detected, the typical sources of such contamination, footnotes explaining the data and a key to units of measurement.

Lead and Copper

Stanford University completed three consecutive six-month monitoring periods for lead and copper in 1994 and follow-up monitoring in 1995 and 1998. 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]

Cryptosporidium and Giardia

Cryptosporidium, a parasitic microbe found in most surface water supplies, can pose a potential health threat. Water with cryptosporidium if ingested 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.

SFPUC tests at least quarterly for Cryptosporidium in the source and treated water. SFPUC has found Cryptosporidium occasionally in the Hetch Hetchy, East Bay, and San Francisco Peninsula sources at low levels, but has not found any in treated water distributed to consumers. For several years, SFPUC has been monitoring its supplies for presence of these organisms. The levels of Cryptosporidium present in public drinking water

in California are very low and should not be of health concern to the general public.

Additional information about Cryptosporidium can be found on SFPUC's Web Page (http://www.ci.sf.ca.us/puc/). Click on **Consumer Information,** then click on **Other Reports and Information from the Water Quality Bureau**.

Giardia, a parasitic microbe is found in most surface water supplies and it can pose a potential health threat. If water with *Giardia is* ingested, it can produce the same symptoms as *Cryptosporidium*. The SFPUC tests for *Giardia* in both source and treated water at least quarterly and has occasionally (about 23 percent of the time) detected very low levels of *Giardia* in the Hetch Hetchy, East Bay, and San Francisco Peninsula source waters at an overall average level of less than 12 *Giardia*/100 liters of water.

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

Este informe contiene información muy importante sobre su agua beber. Tradúzcalo ó hable con alguien que lo entienda bien.

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
1-800-426-4791

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 ar.mll@forsythe.stanford.edu.

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 and 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.

STANFORD UNIVERSITY 2000 ANNUAL WATER QUALITY REPORT[1][2]

Table 1. SFPUC Source Water Supply Water Quality Report

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]	NS	0.18-0.64	0.28	Soil runoff
Turbidity Sunol Vally Water Treatment Plant[6]	NTU	0.5[8]	NS	0.04-0.09	0.06	Soil runoff
ORGANIC CHEMICALS (SFPUC Transmission System)						
Total Haloacetic Acids (HAAs)[9]	ppb	NS	NS	17-46	28	By-product of drinking water chlorination
Total Haloacetonitriles (HANs)[9]	ppb	NS	NS	0.9-6	3	By-product of drinking water chlorination
Total Haloketones (HKs)/Chloropicrin (CP)[9]	ppb	NS	NS	<0.5-5	2	By-product of drinking water chlorination
Total Aldehydes [9]	ppb	NS	NS	<1-14	7	By-product of drinking water chlorination
Total Organic Halides (TOX)[9]	ppb	NS	NS	110-173	131	By-product of drinking water chlorination
INORGANIC CHEMICALS						
Aluminum [10]	ppm	1	NS	<0.050-0.064	0.051	Erosion of natural deposits; residue from some surface water treatment processes
Fluoride - natural occurrence [10]	ppm	2	1	<0.1-0.2	<0.1	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories

PARAMETER	Unit	SMCL[3]	Range	Average	Major Sources in Drinking Water
SECONDARY STANDARDS - SOURCE WATER[10]					
Chloride	ppm	500	<3-19	8	Runoff/leaching from natural deposits; seawater influence
Specific Conductance	µS/cm	1600	9-340	200	Substances that form ions when in water; seawater influence
Sulfate	ppm	500	<0.5-30	16	Runoff/leaching from natural deposits; industrial wastes
Total Dissolved Solids (TDS)	ppm	1000	21-170	110	Runoff/leaching from natural deposits
SECONDARY STANDARDS - TREATED WATER[11]					
Aluminum	ppb	200	<50-59	<50	Erosion of natural deposits; residual from some surface water treatment processes
Color	unit	15	<5-14	<5	Naturally-occurring organic materials
Odor Threshold	TON	3	2	2	Naturally-occurring organic materials
ADDITIONAL CONSTITUENTS - TREATED WATER[11][12]					
Alkalinity (as $CaCO_3$)	ppm	NS	15-122	60	
Calcium	ppm	NS	4-27	15	
Hardness (as $CaCO_3$)	ppm	NS	9-132	60	
Magnesium	ppm	NS	<0.5-9	5	
pH	pH unit	NS	8.1-9.8	9	
Potassium	ppm	NS	<0.5-1	0.7	
Silica	ppm	NS	5-10	7	
Sodium	ppm	NS	3-22	13	

Table 2. Stanford University Distribution System Water Quality Report

PARAMETER	Unit	MCL[3]	PHG[4] (MCLG[5])	Range	Average	Major Sources in Drinking Water
MICROBIOLOGICAL CONTAMINANTS						
Total Coliform Bacteria[13]		>1	0	0-1	<1	Naturally present in the environment
Turbidity	NTU	5	NS	<0.1-0.53	0.27	Soil runoff
ORGANIC CHEMICALS						
Disinfection By Products[14]						
Bromodichloromethane	ppb	NS	NS	<0.50-3.1	1.23	By-product of drinking water chlorination
Chloroform	ppb	NS	NS	15.2 -88	52.97	By-product of drinking water chlorination
Dibromochloromethane	ppb	NS	NS	ND	ND	By-product of drinking water chlorination
Bromoform	ppb	NS	NS	ND	ND	By-product of drinking water chlorination
Total Trihalomethanes (TTHMs)	ppb	100	NS	16-88	54	By-product of drinking water chlorination
INORGANIC CHEMICALS						
Fluoride[15]	ppm	NS	NS	0.80-1	0.87	Erosion of natural deposits; Water additive which promotes strong teeth

LEAD AND COPPER RULE STUDY	Unit	AL[16]	PHG[4]	Range	90th Percentile	Major Sources in Drinking Water
Lead[16]	ppb	15	2	<0.5-12	2.8	Corrosion of household plumbing systems; Erosion of natural deposits
Copper[16]	ppm	1.3	0.17	<0.002-0.32	0.07	Corrosion of household plumbing systems; Erosion of natural deposits

Footnotes:

(1) Water Quality Annual Report setforth 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 set by U.S. EPA / California Department of Health Services.

(4) Public Health Goal adopted by the State Office of Environmental Health Hazard Assessment (OEHHA) of the California EPA.

(5) Maximum Contaminant Level Goal 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 2000 at Alameda East Portal and SVWTP except for Total Organic Halides (TOX) which was collected in 1998.

(10) Data obtained from Hetch Hetchy, Calaveras and San Antonio Reservoirs.

(11) Data obtained from Alameda East Portal and Sunol Valley Water Treatment Plants.

(12) Note that arsenic, chromium, perchlorate, and MTBE were not detected in the source or treated water.

(13) Results are published as number of detections in a month.

(14) Results are for 4-quarter running average in Stanford Univeristy's tap water.

(15) 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 2000.

(16) 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 1998.

KEY	
<	= less than
>	= greater than
MFL	= Million Fibers per Liter
ND	= Lower than Detection Limit, Not Detected
NS	= No Standard
NTU	= Nephelometric Turbidity Unit
pCi/L	= picoCuries per Liter
ppb	= parts per billion (ug/L)
ppm	= parts per million (mg/L)
mS/cm	= micro Siemens per centimeter
TON	= Threshold Odor Unit