STANFORD UNIVERSITY UTILITIES DIVISION

2003 Annual Water Quality Report

May 7, 2004

WHAT'S INSIDE:

Water is Top Quality

The Stanford Utilities Division is pleased to provide you with the 2003 Annual Water Quality Report. During 2003, the San Francisco Public Utilities Commission (SFPUC) and Stanford University 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.

Stanford University Utilities Division

Stanford University's Drinking Water Sources

Water supplied to Stanford by the SFPUC comes from two major sources: Hetch Hetchy Reservoir in the Sierra Nevada Mountains, and local watersheds.

Hetch Hetchy Reservoir

Hetch Hetchy Reservoir, which is the largest reservoir in the SFPUC system, is located in Yosemite National Park. It provides approximately 85 percent of the total water supply. Spring snowmelt flows down the Tuolumne River and fills the reservoir. The high quality Hetch Hetchy water supply meets all federal and state criteria for watershed protection, disinfection treatment, bacteriological quality and operational standards. As a result, the U.S. EPA and DOHS granted the Hetch Hetchy water source a filtration exemption. This exemption is contingent upon the Hetch Hetchy water quality continuing to meet all filtration avoidance criteria.

Alameda Watershed

The Alameda watershed, locate in Alameda and Santa Clara Counties, contributes to surface water supplies by storing rainfall and runoff in two reservoirs (Calaveras and San Antonio). This surface water source is supplemented by groundwater from Sunol Filter Galleries near the Town of Sunol. The SFPUC treats and filters these local water sources prior to delivery to its consumers.

Protecting San Francisco's Water Resources

The SFPUC aggressively protects the natural water resources entrusted to its care, and continuously monitor Hetch Hetchy watershed weather conditions, water turbidity levels, microbial contaminants and aqueduct disinfection levels. The SFPUC complies with monitoring and reporting requirements to protect its watersheds, and update its watershed sanitary surveys annually. The 2003 annual update on Watershed Control Program and Sanitary Survey 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.

The SFPUC also completed a detailed drinking water source assessment in 2000. The assessment showed that SFPUC watershed has very low levels of contaminants, and those contaminants found are associated with wildlife and, to a limited extent, human recreational activity.

How Do Drinking Water Sources Become Polluted?

The sources of drinking water include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals which, in some cases, are radioactive and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

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 storm water 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 storm water runoff, and septic systems.

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

In order to ensure that tap water is safe to drink, the U.S. EPA and DOHS prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. DOHS regulations also establish limits for contaminants in bottled water that must provide the same protection for public health.

Water System Management

The Stanford Utilities Division manages the storage, distribution, maintenance, and monitoring programs for Stanford's drinking water supply.

Stanford fluoridates the domestic drinking water and collects daily samples to monitor that fluoride concentrations are within the optimum range between 0.8 and 1.4 mg/L. Stanford also routinely collects water quality samples from various locations within the campus distribution system. Most frequently collected samples are analyzed for coliform bacteria, chlorine residual, and general physical parameters.

Supplementary water quality samples are collected to monitor for additional constituents in compliance with DOHS requirements. A certified laboratory analyzes all samples. Stanford submits monthly reports that include all monitoring results to the DOHS.

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

The Stanford Utilities Division also maintains flushing, cross-connections, and backflow prevention programs to ensure a consistent high quality drinking water supply.

San Francisco Water Quality Capital Improvement Program

Sunol Valley Water Treatment Plant —The Sunol Valley Water Treatment Plant treats water supplies from SFPUC reservoirs in the East Bay. Recently, SFPUC spent $47 million for improving the water filtration system and installing a new chemical feed system that is supporting the SFPUC's recent conversion to chloramine disinfection which occurred in February 2004. The infrastructure improvements will ensure that customers receive safe, high quality drinking water for many years to come.

Priest Bypass Tunnel Successfully Completed —The new Priest Bypass Tunnel under Priest Reservoir was successfully completed in December 2003. Before the tunnel was built, Hetch Hetchy water always flowed into Priest Reservoir, where stormy weather conditions occasionally caused cloudiness in the water. The new Tunnel allows water to bypass the reservoir, improving the SFPUC's source water quality.

Results from SFPUC's and Stanford's 2003 Sampling

The enclosed data tables summarize the 2003 sampling results from laboratory analyses of parameters detected in SFPUC's supply and Stanford's distribution systems. An 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 and *Giardia* are parasitic microbes found in most surface water supplies and can pose a potential health threat. If ingested, either may produce symptoms of diarrhea, stomach cramps, upset stomach, and slight fever. Some people are more vulnerable to *Cryptosporidium* and *Giardia* than others, especially those with compromised immune systems. The SFPUC tests regularly for *Cryptosporidium* and *Giardia* in both source and treated water supplies. Both were occasionally found at very low levels in the SFPUC's treated water in 2003.

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

Protecting Your Health

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 about drinking water from their health care providers. U.S. EPA/ Center for Disease Control (CDC) 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 or on the U.S. EPA's Web site *epa.gov/safewater*.

SFPUC Addresses New Drinking Water Regulations

In 2003, the U.S. EPA proposed two new rules requiring water systems to enhance their existing efforts in reducing *Cyptosporidium* and disinfection byproducts. The Long Term 2 Enhanced Surface Water Treatment Rule and Stage 2 Disinfection Byproduct Rule, if adopted, will impose additional monitoring and disinfection requirements for SFPUC's Hetch Hetchy water supply.

The SFPUC is proactively addressing the proposed new requirements by developing and implementing a new monitoring plan for *Cryptosporidium* in source waters, receive U. S. EPA's certification of the SFPUC Water Quality Laboratory for *Cryptosporidium* analysis, and planning a study to evaluate ultraviolet light technology for *Cryptosporidium* inactivation.

TABLE 1. WATER QUALITY REPORT FOR SFPUC SOURCE WATER SUPPLY 2003 [1]

PARAMETER	Unit	MCL	PHG (MCLG)	Range	Average (Maximu	Typical Sources in Drinking Water
PRIMARY STANDARDS - MICROBIOLOGICAL CONTAMINANTS						
TURBIDITY [2]						
Unfiltered Hetch Hetchy Water	NTU	5 [3]	NS	0.24 - 0.74 [4	(1.58) [5]	Soil run-off
Filtered Water - Sunol Valley WTP, max turbidity	NTU	1	NS	-	(0.4)	Soil run-off
minimum percentage of time < 0.3 NTU	%	95 [6]	NS	99% [7]	-	Soil run-off
ORGANIC CHEMICALS [8]						
Total Trihalomethanes (TTHMs)	ppb	80	NS	25.3 - 75.1	50.8 [10]	By-product of drinking water chlorination
Total Haloacetic Acids (HAAs)	ppb	60	NS	16.2 - 35.1	29 [10]	By-product of drinking water chlorination
Total Organic Carbon [9]	ppb	NS	NS	2.4 - 3.3	2.8	By-product of drinking water chlorination
INORGANIC CHEMICALS						
Aluminum	ppb	1000	600	33 - 40	36.5	Erosion of natural deposits
Barium	ppb	1000	2000	<5 - 67	34	Erosion of natural deposits
Fluoride [11]	ppm	2	1	<0.1 - 0.2	0.1	Erosion of natural deposits
Nickel	ppb	100	12	<1 - 1	<1	Erosion of natural deposits
Nitrate (as NO_2)	ppm	45	45	0.2 - 0.7	0.45	Erosion of natural deposits, soil run-off
CONSTITUENTS WITH SECONDARY	**Unit**	**MCL**	**PHG**	**Range**	**Average**	**Typical Sources in Drinking Water**
Chloride	ppm	500	NS	<3 - 22	8	Runoff / leaching from natural deposits
Color	unit	15	NS	<5 - 6	<5	Naturally-occurring organic materials
Iron	ppb	300	NS	<10 - 28	14	Leaching from natural deposits
Specific Conductance	µS/cm	1600	NS	29 - 398	185	Substances that form ions when in water
Sulfate	ppm	500	NS	1 - 43	22	Leaching from natural deposits
Total Dissolved Solids	ppm	1000	NS	20 - 180	100	Runoff / leaching from natural deposits
Turbidity	NTU	5	NS	0.08	0.29	Soil runoff

OTHER WATER QUALITY PARAMETERS	Unit	AL	Range	Average
Alkalinity (as $CaCO_3$)	ppm	NS	10 - 156	67
Boron	ppb	1000	<100 - 150	<100
Calcium	ppm	NS	4 - 30	17
Hardness (as $CaCO_3$)	ppm	NS	8 - 140	56
Magnesium	ppm	NS	<0.5 - 13	6.5
pH	Unit	NS	7.5 - 9.8	9.1
Potassium	ppm	NS	<0.5 - 2	1
Silica	ppm	NS	5 - 7	6.0
Sodium	ppm	NS	3 - 27	15

KEY:
- < = less than
- AL = Action Level
- N/A = Not Available
- ND = Lower than detection, Not detected
- NS = No Standard
- NTU = Nephelometric Turbidity Unit
- ppb = parts per billion
- ppm = parts per million
- µS/cm = microSiemens/centimeter
- TON = Threshold Odor Unit

TABLE 2. WATER QUALITY REPORT FOR STANFORD UNIVERSITY DISTRIBUTION SYSTEM 2003 [1]

PARAMETER	Unit	MCL	PHG (MCLG)	Range	Average (Maximu	Typical Sources in Drinking Water
MICROBIOLOGICAL CONTAMINANTS						
Total Coliform Bacteria [12]	% monthly positive sample	5	NS (0)	0-0	0	Naturally present in the environment
Turbidity	NTU	5	NS	0.1-0.5	0.3	Soil runoff
ORGANIC CHEMICALS						
Disinfection By Products						
Total Trihalomethanes	ppb	80	NS	49.5-93.8	72.0 [10]	By-product of drinking water chlorination
Total Haloacetic Acids	ppb	60	NS	9.9-42	23.6 [10]	By-product of drinking water chlorination
INORGANIC CHEMICALS						
Fluoride [13]	ppm	NS	NS	.08-1.29	0.95	Natural Deposites; Water Additive which promotes strong
Chlorine	ppm	MRDL = 4	MRDLG = 4	0.46-0.88	0.6 [10]	Drinking water disinfectant added for treatment.

LEAD AND COPPER RULE STUDY	Unit	AL	PHG	Range	90th Percentile	Typical Sources in Drinking Water
Lead	ppb	15	2	<2-3	<2 [16]	Corrosion of household plumbing systems
Copper	ppb	1300	170	<10-120	40 [15]	Corrosion of household plumbing systems

(1) All results met State and Federal drinking water regulations.
(2) Turbidity is a water clarity indicator; it also indicates water quality and treatment syste
(3) The turbidity standard for unfiltered supplies is 5 NTU.
(4) Results are based on monthly average turbidities measured at Tesla Portal.
(5) Higher turbidities occurred in the Hetch Hetchy system but the water was not servec
(6) For filtered supplies, two turbidity standards apply.
These are: turbidity should be less than 0.3 NTU at least 95% of the time and 1NTU n
(7) The reported data is the minimum percent of time that the filtered water has turbidity
(8) DOHS has approved SFPUC's request for a waiver of 76 additional synthetic organi
(9) Total Organic Carbon is a precursor for disinfection byproducts formation.
Data obtained from effluent monitoring at Sunol Valley Water Treatment Plant.
(10) The reported data is the highest running annual average value.
(11) Data are source water fluoride levels obtained from Hetch Hetchy, Calaveras and Sar
(12) Results are published as percent of positive samples per month.
(13) Stanford University added fluoride in 2003, as reported above to prevent dental caviti
(14) The 90th percentile level of lead or copper must be less than the action level.
(15) In 2001, all Stanford residence sampled were below the copper Action Level at consu
(16) In 2001, all Stanford residence sampled were below the lead Action Level at consume

Definitions

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

Primary Drinking Water Standard (PDWS): MCLs and MRDLs 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. PHGs are set by the California Environmental Protection Agency.

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.

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

Maximum Residual Disinfectant Level (MRDL): The level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap.

Maximum Residual Disinfectant Level Goal (MRDLG): The level of disinfectant added for water treatment below which there is no known or expected risk of health. MRDLGs are set by the U.S. EPA.

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

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

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

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

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 has 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. The next sampling will take place June 2004.

"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 cold water 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)." (DOHS)

Successful Implementation of Chloramine

Beginning February 2, 2004, the San Francisco Pubic Utilities Commission (SFPUC) successfully implemented a system-wide change to chloramine as drinking water residual disinfectant

The change to chloramine will help the SFPUC and Stanford Utilities consistently meet current and future water quality regulations and enhance water quality. Chloramine, a combination of chlorine and ammonia, is a more stable, longer-lasting disinfectant that produces lower levels of disinfection byproducts such as trihalomethane, a possible carcinogen. The majority of Bay Area residents outside the SFPUC service area have received chloraminated water for many years.

The SFPUC and Stanford Utilities have conducted extensive public awareness campaigns prior to the conversion to notify sensitive users of the change in disinfection, such as people with fish or amphibian tanks, kidney dialysis patients, and industrial/ biotechnology businesses that use highly processed water. Chloramine must be removed from water for these sensitive uses.

Additional information is provided at the Stanford University—Water Group web site: http://facilities.stanford.edu/ environment.

Making Great Water Better!

Monitoring Violation At SFPUC Tesla Portal

Due to a lightning storm and power outage, on-line instruments did not record the turbidity of the water at Tesla Portal from 5:00 AM to 5:45 PM on August 26, 2003. The Tesla Portal is located on the Eastern side of the East Bay Coastal Range and joins the three San Joaquin SFPUC distribution pipelines into the Coastal Range Tunnel for transmission to the Bay Division pipelines. Turbidity measured at upstream and downstream locations indicated that the Hetch Hetchy water remained in compliance with the filtration avoidance criteria during that time. The monitoring failure did not result in any adverse health effects to customers.

To prevent similar occurrences, the SFPUC has been working diligently to implement corrective measures, including relocation of the turbidity monitoring point with a new uninterruptible power supply, and improved communications procedures.

Water Conservation Tips for the Lawn & Garden

Stanford Utilities needs your help conserving water on campus. Follow these tips to save water this summer.

? Water your lawn only when it needs it. Wait until your lawn does not spring back when stepped on to water.

? Deep-soak your lawn. Make sure you water long enough for the moisture to soak down all the way to the root zone.

? Set your irrigation system to run in the early morning or late evening. Prevent wasting water by positioning sprinklers to water lawn or garden, not paved areas.

? Mulch around trees and plants to slow evaporation of moisture and discourage weed growth.

? Plant native and drought resistant plants.

? Check hoses, faucets, sprinklers and couplings for small leaks that can add up to large water losses.

You can find more water conservation tips on our water conservation web site at http://facilities.stanford.edu/conservation.

Stanford's Waterwise Demonstration Garden is located on Raimundo Way. For more information visit http://grounds.stanford.edu/points/waterwise.htm.

WaterWise Demonstration Garden, 2004.

ADDITIONAL INFORMATION

Stanford Water Group Internet Homepage:
http//facilities.stanford.edu/environment

SFPUC's Internet Homepage:
http://sfwater.org

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

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.

Stanford University
Facilities Operations-Utilities Division
327 Bonair Siding
Stanford, CA 94305-7272