

ALAMEDA COUNTY WATER DISTRICT

**REPORT ON WATER QUALITY
RELATIVE TO PUBLIC HEALTH GOALS
2004-2006**

May 2007

Executive Summary

The Alameda County Water District (ACWD) is required by the California Health and Safety Code, Section 116470 (b), to prepare a report regarding Public Health Goals. The report is intended to provide the public and decision makers with specific information regarding drinking water safety and the cost of further reducing contaminant levels to bring them closer to public health goals.

This report documents the drinking water contaminants in our water supply found to be above their respective State Public Health Goal (PHG) or Federal Maximum Contaminant Level Goal (MCLG) during calendar years 2004, 2005, and 2006. PHGs and MCLGs are non-enforceable goals set by the California Environmental Protection Agency's Office of Environmental Health Hazard Assessment (OEHHA) and the US Environmental Protection Agency (USEPA), respectively. PHGs are often not practically achievable from an economic and technological point of view. Nevertheless, the goals are useful tools for regulators when determining enforceable standards such as maximum contaminant levels (MCLs), that water suppliers are required to meet.

The process for establishing a PHG for a chemical contaminant is very rigorous. Scientists first compile all relevant information available, which includes studies of the chemical's effect on laboratory animals and studies of humans who have been exposed to the chemical. The data from these studies is used to perform a health risk assessment, in which scientists determine the levels of the contaminant in drinking water that could be associated with various adverse health effects. Health risk assessments take into consideration health effects on susceptible sub-populations such as pregnant women, children, and the elderly. When calculating a PHG, scientists use the best health effects data available to identify the level of a chemical in drinking water that would not cause significant adverse health effects in people who drink the water every day for 70 years, assuming that an adult will drink two liters per day and a child will drink one liter per day. For cancer-causing chemicals, OEHHA typically establishes the PHG at the "one-in-one million" risk level. This risk is widely accepted in the medical and scientific communities as "negligible risk." As a comparison, the cancer risk from breathing current levels of pollutants in California's ambient air over a 70-year lifetime is estimated to be 760 in one million (see reference 4). For chemicals that do not cause cancer, OEHHA sets the PHG at a level that is not expected to cause any toxic effects, including birth defects and chronic illness. Then OEHHA adds a "safety margin," commonly set at 100 to 3,000 times below the "no observable effect level," to account for uncertainties and gaps in information.

The question at hand is whether or not water is safe to drink if contaminant levels exceed PHGs. According to OEHHA, the present methodology used to calculate theoretical risk at the PHG or at the Action Level (AL) does not provide a numerical determination of public health risk for non-carcinogens. However, as long as drinking water complies with all MCLs, it is considered to be safe to drink, even if some contaminants exceed PHG levels. A PHG is not a boundary line between a "safe" and "dangerous" level of a contaminant, and drinking water can still be considered safe for public consumption even if it contains contaminants at levels exceeding the PHG. Moreover, there is a need to keep in perspective (1) the theoretical nature of the numerical risk associated with exceeding PHGs, (2) the fact that PHGs are set in a very conservative manner, and (3) the need to balance the risk associated from exposure through drinking water with that of other environmental factors (such as ambient air quality) and human behaviors (such as smoking, diet or alcohol consumption).

For nearly 90 years, ACWD has supplied its customers with some of the highest quality water in the world. Our annual Water Quality Reports reflect the fact that we continue to meet or surpass all federal and State drinking water standards. Our 2006 annual water quality report shows that very few of the more than 180 substances that we routinely test for were found in our water supply. The few that were detected were well below all federal and State enforceable standards. In the last three years, of the 90 PHGs and MCLGs currently established, only two (lead and copper) were exceeded.

Lead and copper were non-detectable in the water leaving our treatment plants and in our distribution system in 2004, 2005 and 2006. However, lead and copper compliance is measured *at-the-tap* of customers' homes. Every three years ACWD samples lead and copper at the taps of homes built prior to 1986 (before lead-free solder was required to be used in new construction) because these homes have plumbing conditions that are most likely to leach lead and copper into the drinking water. Considering that the sampling and analysis are done for the "worst case scenario," all other homes and services would be expected to have much better results. Thus, the fact that the PHG was exceeded for lead and copper represents a very small risk to a limited number of customers.

Although PHGs and MCLGs are not enforceable, they are a goal that ACWD, in an effort to continue supplying water of the highest quality to its customers, strives to meet. This is best illustrated by ACWD's continuous efforts to reduce at-the-tap lead and copper levels. In August 1999, ACWD implemented an optimal corrosion control program throughout its service area. Optimizing corrosion control by pH adjustment is considered to be one of the best treatment techniques for minimizing household corrosion and reducing lead and copper levels *at-the-tap*. In addition, ACWD installs lead-free meters in all new residential construction, has implemented a meter replacement program in schools, and requires that all new construction and home remodeling materials comply with current codes and regulations regarding limiting lead content. As required we also evaluated additional options to further reduce lead and copper levels at the customers' taps, including household fixture replacement and point-of-use treatment at customer homes. The capital cost of implementing these options range from \$9.9 to \$26.5 million. However, considering the fact that the benefits are in both cases limited and the cost is considerable, ACWD currently is not recommending that these alternatives be implemented. A more cost-effective use of resources is for ACWD to continue optimizing and complying with its corrosion control program and for customers to follow simple practices that can reduce copper and lead exposure emanating from household plumbing.

1.0 PURPOSE OF REPORT

This report has been prepared by the Alameda County Water District (ACWD) to inform consumers of constituents in their drinking water that exceeded the Public Health Goals (PHGs) or Maximum Contaminant Level Goals (MCLGs) established by the California Environmental Protection Agency's (Cal-EPA) Office of Environmental Health Hazard Assessment (OEHHA) and the United States Environmental Protection Agency (USEPA), during the calendar years of 2004, 2005, and 2006. This report is intended to provide the public with water quality information beyond the annual water quality report and help consumers understand the cost of achieving better water quality.

1.1 Background Information

PHGs are established by Cal-EPA's Office of Environmental Health Hazard Assessment (OEHHA) and are based solely on public health risk considerations. Health risk assessments of known and potentially harmful chemicals in the environment are provided by OEHHA to State and local environmental regulatory agencies that regulate drinking water. Not all chemicals are harmful. Some chemicals, such as essential nutrients, are necessary for our health. Other chemicals can be either beneficial or harmful, depending on the circumstances of exposure and the amount of chemical to which one is exposed. OEHHA establishes PHGs at levels that pose little or no threat to human health. Most PHGs are set at levels where the potential health risk is considered to be no more than one additional cancer case (beyond what would normally occur) in a population of one million people drinking 2 liters of water per day over a 70-year lifetime. However, some PHGs are set at a zero risk. In determining PHGs, OEHHA does not consider any of the practical risk-management factors that are considered by the USEPA or the California Department of Health Services (CDHS) in setting drinking water Maximum Contaminant Levels (MCLs) such as analytical detection capability, treatment technology available, benefits and costs. The PHGs are not enforceable and public water systems are not required to comply with them. MCLGs are the federal equivalent to PHGs.

In a few instances PHGs are set at levels below the Detection Limit for Reporting Purposes (DLR), which are set by CDHS for each regulated contaminant. The DLR is designated as the minimum level at or above which any analytical finding of a contaminant in drinking water, resulting from monitoring, needs to be reported to CDHS. In those instances where a water sample is found to contain a contaminant at a level less than the DLR, the contaminant is considered to be at non-detectable levels.

As of 2007, OEHHA has established 80 PHGs, USEPA has established 10 MCLGs (see Appendix A), and there are 3 regulated contaminants without PHGs/MCLGs. ACWD has reviewed the data collected in 2004, 2005, and 2006 and has determined that ACWD is required to prepare a report in 2007 and address constituents that were above the PHGs/MCLGs in 2006.

In preparing the following report, all of the water quality data collected by ACWD in 2004-2006 for purposes of determining compliance with drinking water standards were considered. The data is also summarized in each Consumer Confidence Report, which is mailed to all service area addresses by July 1 of each year. The Association of California Water Agencies 2007 guidelines were used in the preparation of this report.

1.2 Summary of Regulation

Alameda County Water District is subject to the provisions of the California Health and Safety Code 116470(b) which specifies that water utilities with more than 10,000 service connections prepare a special report beginning July 1, 1998, and every 3 years thereafter, if their water quality measurements have exceeded any Public Health Goals (PHGs) or Maximum Contaminant Level Goals (MCLGs). Only constituents which have a California primary drinking water standard and for which either a PHG or MCLG has been set are to be addressed. A report for 2004 was required due to the detection of lead and copper above the PHG limits. A report for 2007 is also required due to the detection of lead and copper above the PHG limits.

This report provides the information required by law for years 2004, 2005, and/or 2006 for constituents that were detected in ACWD's water supply at a level exceeding an applicable PHG or MCLG. Included in this report is the numerical public health risk associated with the MCL and the PHG or MCLG (Appendix B), the category or type of risk to health that could be associated with each constituent, the best treatment technology available that could be used to reduce the constituent level, and an estimate of the cost to install that treatment if it is appropriate and feasible.

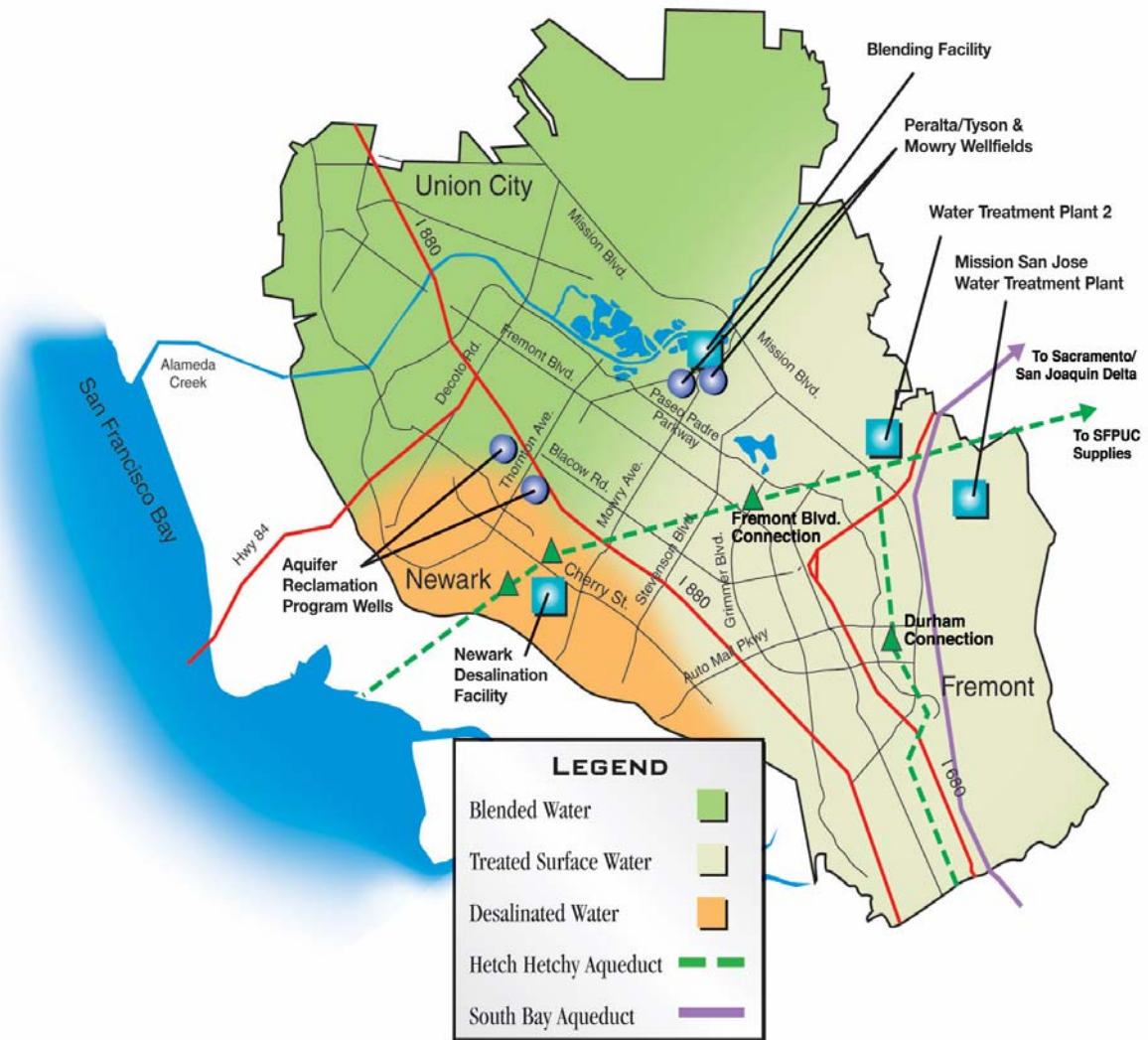
2.0 ACWD SYSTEM DESCRIPTION

ACWD receives water from four sources: 1) water imported from the State Water Project (SWP) via the South Bay Aqueduct (SBA) which originates from the Sacramento/San Joaquin Delta and/or Lake Del Valle, 2) local groundwater pumped from the Niles Cone Groundwater Basin; (Peralta-Tyson and Mowry Wellfields), which is replenished with local rainwater, runoff from the Alameda Creek watershed, and seasonal releases of SBA water, 3) water purchased from the San Francisco Public Utilities Commission (SFPUC) consisting of treated, but unfiltered, water from the Hetch Hetchy Reservoir and augmented by water from the Calaveras or San Antonio Reservoirs which is treated at the Sunol Valley Water Treatment Plant, and 4) desalinated brackish water pumped from two of the Aquifer Reclamation Program (ARP) well sites (Cedar and Darvon).

ACWD's 60 million gallons per day (mgd) Blending Facility blends the softer SFPUC water (from the Fremont Blvd. connection) with relatively hard groundwater from the Peralta-Tyson and Mowry Wellfields prior to delivery to the distribution system. The typical maximum production of the Blending Facility is approximately 45 mgd. Imported SBA water is treated at ACWD's 8 mgd Mission San Jose Water Treatment Plant (MSJWTP) and 21 mgd Water Treatment Plant 2 (WTP2). ACWD operates the Cedar and Darvon ARP wells to extract and control the movement of brackish water within the Niles Cone Groundwater Basin. Groundwater pumped from the ARP wells is treated to drinking water standards using state-of-the-art reverse osmosis (RO) technology at the 5 mgd Newark Desalination Facility (NDF). ACWD currently meets water demand using production from the Blending Facility, MSJWTP, WTP2, and the NDF. There are also several SFPUC connections (Durham, Washington, Central & Cherry, Mission Blvd., Paseo Padre and Sycamore Takeoffs) in Fremont and Newark that may be used to meet emergency and peak summer demands. A sixth connection, the Warren Avenue Takeoff, is presently used to serve industrial needs in south Fremont.

Figure 1 below shows the typical water distribution from ACWD's water sources. The location in the Tri-City area determines the type of water one receives.

Figure 1. Typical Sources of Water in the Distribution System.



3.0 CONSTITUENTS DETECTED THAT EXCEED A PHG OR A MCLG

The following is a discussion of constituents that were detected at levels above the established PHGs, or if no PHG, above the applicable MCLGs during the calendar years of 2004, 2005, and 2006.

3.1 Lead and Copper

Background

Lead is unusual among drinking water contaminants in that it seldom occurs naturally in water supplies like rivers and lakes. Lead and copper are introduced to drinking water primarily through internal corrosion of household water plumbing. There is no MCL for Lead or Copper. Instead, action levels (ALs) have been established for the 90th percentile value of selected samples from household taps in the distribution system. The 90th percentile values should not exceed an Action Level of 15 micrograms per liter ($\mu\text{g/L}$) for lead and 1.3 milligrams per liter (mg/L) for copper. However, the PHG is 2 $\mu\text{g/L}$ for lead and 0.17 mg/L for copper. The DLR for lead is 5 $\mu\text{g/L}$ and the DLR for copper is 0.05 mg/L .

Between 1994 and 2000, ACWD met and/or surpassed the requirements of the Lead and Copper Rule (LCR) for large water systems. Furthermore, ACWD's 90th percentile lead and copper monitoring results were below the appropriate action levels of 15 $\mu\text{g/L}$ for Lead and 1.3 mg/L for copper, respectively. Due to these favorable sampling results, in September 2003 the California Department of Health Services per Section 64685 (c) (2), Title 22, CCR, allowed ACWD to reduce LCR tap sampling from annually to once every three years. ACWD was not required to conduct LCR tap sampling in 2004 and 2005. Data for the 2006 LCR tap sampling is provided for the purposes of this report.

Health Risks

Lead is a common, natural and often useful metal found throughout the environment in lead-based paint, air, soil, household dust, food, certain types of pottery porcelain, and water. More common sources of lead in the home are found in lead-based paint used prior to 1978 that has chipped off walls or window sills, household dust, and soil brought into the home on shoes. Lead is classified as a neurotoxin. The PHG is based on lead's non-carcinogenic effects, which include lead's neurological effects on children and its hypertensive effect on adults. EPA has classified lead as a probable human carcinogen, and established an MCLG of zero. People who drink water containing lead levels greater than the Action Level (15 $\mu\text{g/L}$) over many years may develop kidney problems or high blood pressure. Infants and children who drink water containing lead in excess of the action level may experience delays in their physical or mental development. Children with lead poisoning may show slight deficits in attention span and learning abilities. The principal acute effect of lead in humans is colic. According to OEHHA, the present methodology does not allow a numerical determination of public health risk at the PHG for non-carcinogens. The numerical risk at the AL has not been determined.

Copper is an essential nutrient, but at high doses it has been shown to be acutely toxic to humans, causing gastrointestinal effects such as stomach and intestinal distress. Copper at high doses can also result in liver and kidney damage, and anemia. The PHG is based on gastrointestinal effects of copper in children, the sensitive group for this chemical. Copper is not

considered to be a human carcinogen. Some people who drink water containing copper in excess of the Action Level (1.3 mg/L) over a relatively short amount of time may experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years may suffer liver or kidney damage. According to OEHHA, the present methodology does not allow a numerical determination of public health risk at the PHG for non-carcinogens. The numerical risk at the AL has not been determined.

PHG Exceedance for Lead and Copper

In 2004, 2005, and 2006, lead and copper levels measured after treatment and at dedicated sampling stations in the distribution system were non-detectable. However, compliance monitoring for lead and copper is “at-the-tap” of customer homes. Every three years, ACWD collects at-the-tap samples from homes built prior to 1986. At-the-tap samples are first-draw 1-liter samples from taps where the water has stood in the pipes for a stagnation period of at least 6 hours (e.g. no flushing, showering, etc.). Due to the stagnation period, Lead and Copper at-the-tap samples do not serve as a good representation of average levels in household tap water. These at-the-tap samples are the most likely to have high lead and copper levels. As such, they are not comparable to the PHG, which is based upon the average intake level. Samples collected *at-the-tap* for lead in 2006 had a 90th percentile value for lead of 9.8 µg/L, over the PHG of 2 µg/L (Figure 2a) but below the Action Level of 15 µg/L. The 90th percentile value for copper in 2006 was 1.03 mg/L, above the PHG of 0.17 mg/L (Figure 2b), but below the Action Level of 1.3 mg/L.

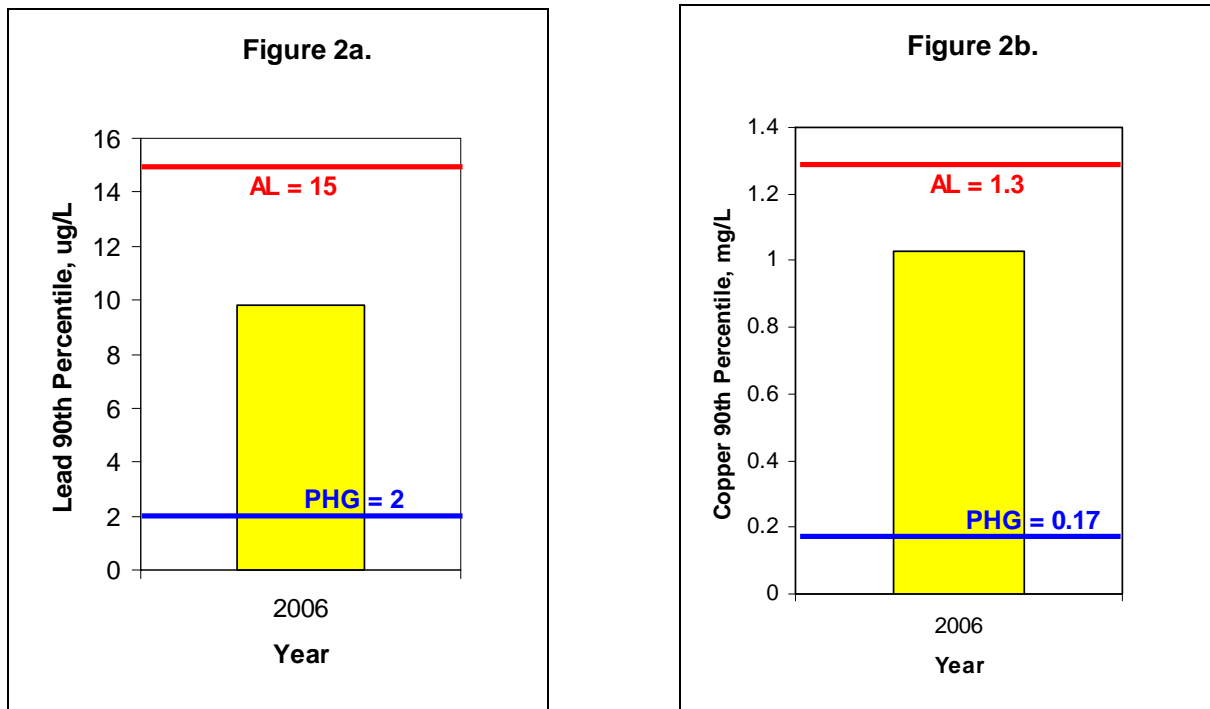


Figure 2. a) Lead results of samples collected from household taps in 2006
 b) Copper results of samples collected from household taps in 2006

3.2 ACWD's Activities to Reduce Levels of Lead and Copper at the Tap

As previously mentioned, copper and lead enter drinking water primarily through the internal corrosion of household plumbing. In addition, older household plumbing (in homes built prior to 1986) may contain lead-based solder and/or brass fixtures that contribute lead to drinking water. In order to determine how ACWD could reduce the potential of internal corrosion of household plumbing, ACWD completed a corrosion control study in 1994. Results from the study showed that water with pH greater than 7.8 was more likely not to exceed the copper action limit and that lower lead levels were found to be associated with higher alkalinities.

From 1995-1999, ACWD executed plans to improve corrosion control treatment district-wide, including the provision of pH adjustment capabilities at the Blending Facility. Follow-up monitoring was conducted in 1999 and 2000, and formal submission of a Lead and Copper Rule Compliance Report, including proposed Optimal Water Quality Parameters (OWQPs) was made in August 2000 to CDHS. According to EPA criteria, the optimal corrosion control treatment technique was determined to be pH adjustment using sodium hydroxide (NaOH) at both treatment plants, the Blending Facility, and the NDF. Corrosion control by adjusting the pH is considered to be the best treatment technique for minimizing household corrosion and reducing lead and copper levels *at-the-tap* at this time.

While increasing pH is probably the single most effective and most widely accepted way to ensure a reduction in copper corrosion, care must be taken to ensure that pH is not increased to the point that it could raise the calcium carbonate precipitation potential to excessively high levels, which could cause a significant quantity of calcium carbonate to precipitate in the distribution system and eventually clog pipes. Accordingly, pH is targeted to maintain a positive Calcium Carbonate Precipitation Potential (CCPP) around 4 mg/L (as CaCO₃).

The Newark Desalination Facility, which began operation in November 2003, treats brackish groundwater and produces finished water that meets the District's treated water objectives, including a hardness target of 150 mg/L. The reduction in water hardness (and low alkalinity) requires the pH of the product water to be adjusted slightly higher than other sources for optimal corrosion control.

Local building departments are also furthering the reduction of lead in homes by limiting the types of materials (pipes, solders, pipe fittings, and fixtures) used for drinking water plumbing to be "lead-free" as required by the federal Safe Drinking Water Act (SDWA). The 1996 SDWA amendments included limiting lead content in solder material to 0.2 percent lead and limiting lead in pipes and fittings used in drinking water plumbing to no more than 8.0 percent. Furthermore, the State of California has additionally defined "lead-free" to be less than 4 percent lead after August 6, 2002, as it applies to the scale and installation of household plumbing fixtures and fittings.

In 1999 larger (> 2") water meters at all of the public elementary schools, middle-schools, and high schools have been replaced with meters that have a special interior epoxy coating to prevent lead leaching from brass parts in contact with the water. For the past several years, ACWD has installed only "lead-free" meters in all new residential construction and has replaced old water meters with "lead-free" meters.

3.3 Cost/Benefits of Implementing Additional Programs to Reduce Lead and Copper

1) Lead Reduction

As mentioned earlier, corrosion control is considered to be the best available technology for reducing both lead and copper *at-the-tap*. However, lead in drinking water *at-the-tap* can potentially be further reduced by replacing household brass fixtures installed prior to 1996 (when the more restrictive limits on lead content were federally mandated) with “lead-free” fixtures. The economic feasibility and benefits are discussed in detail in the next two sections.

➤ Cost for Replacing Brass Fixtures

In determining the economic feasibility for replacing brass fixtures, ACWD determined that homes built prior to 1996 would be considered for replacement since the 1996 SDWA was amended to prohibit the use of fittings and fixtures that contain more than 8.0 percent lead. ACWD estimates that approximately 66,345 homes were built in the Tri-City area prior to 1996 and that each household contains an average of 3-4 fixtures. The cost of each fixture ranges between \$50-\$100 each. ACWD estimates that it would cost approximately \$9.9-26.5 million dollars to replace the brass fixtures in 66,345 homes (see Table 1).

Table 1. Estimated cost for replacing brass fixtures

Cost per household	\$150-400
Number of Residences	66,345
Total Cost for Replacement	\$9.9-26.5 million

➤ Benefit for Replacing Brass Fixtures

The benefits of replacing household brass fixtures with “lead-free” fixtures are difficult to quantify. There is no guarantee that the lead levels measured *at-the-tap* will decrease, since the SDWA allows “lead-free” drinking water materials to contain 0.2-8.0% lead content and the State of California allows “lead-free” fixtures and plumbing fittings to contain 4.0% lead. In addition, fixture replacement only addresses reduction of lead and does not address copper reduction. Due to the high cost involved for questionable public health benefit, the expenditure of \$9.9-26.5 million does not appear justified.

Accordingly, as part of its ongoing public education program, ACWD will continue to educate consumers on how to minimize lead in drinking water by adopting some simple practices, such as:

- a) **Flushing Your Tap:** When water stands in lead soldered pipes or brass fixtures for several hours or more, the lead may dissolve into drinking water. Water in a faucet that has gone unused for more than six hours may contain lead. The leached lead can be significantly reduced by running the water from the tap for approximately one minute before using it for drinking or cooking. Conserve water whenever possible by using the first flush to wash the dishes or water the plants.

- b) **Using Cold Water for Cooking:** Remind consumers to avoid cooking with water from the hot water tap. Hot water can dissolve more lead more quickly than cold water. If hot water is needed, water can be drawn from the cold tap and heated on the stove or microwave.
- c) **Checking Home Wiring:** Have an electrician check the house wiring. If grounding wires from electrical system are attached to household plumbing, corrosion and lead exposure may be greater.

2) Lead and Copper Reduction

Lead and copper at-the-tap can be reduced by 98% with the use of under-the-sink point-of-use (POU) reverse osmosis (RO) units.

➤ **Cost of RO POU units**

According to manufacturers the effective lifetime of the under-the-sink RO devices is 10 years or longer. Most RO under-the-sink units have pre-filter cartridges, a membrane cartridge, and carbon filters for polishing as a final step. The frequency of replacement of the pre-filter and carbon cartridges is once per year and every 4 or 5 years for the membrane cartridge.

In estimating the economic feasibility of installing POU units, ACWD assumed that only one unit per household would be installed (under the kitchen sink), and that the annual operating expenses would be according to the manufacturer’s recommendations described above. According to a study conducted by the American Water Works Association Research Foundation^[3] RO devices range in price from \$175 to \$400. Assuming that each household installs a single POU device and approximately 66,345 homes were built prior to 1996, ACWD estimates that it would cost approximately \$11.6-26.5 million dollars to supply the RO POU devices, not including installation costs. In addition, there would be a total annual cartridge replacement cost of \$3.3-6.6 million (see Table 2).

Table 2. Estimated cost for RO under-the-sink POU units

Capital cost per household	\$175-400
Number of Residences	66,345
Total Capital Cost for RO POU unit	\$11.6-26.5 million
Annual operating expense (cartridge / membrane replacement)	\$50-100
Total Annual Cost per RO POU unit	\$3.3-6.6 million

➤ **Benefit for Installing RO POU devices**

The benefits of installing RO POU devices are reduction of lead and copper levels by 98%, which could potentially bring the levels at-the-tap where the unit is installed very close to the PHG level. One of the limitations is that, unless the fixture associated with the RO POU is replaced, it could contain more than 8.0% lead, and because water treated with RO units is corrosive, more lead could leach into the water from the existing household fixture. Also the

benefits are limited to only the tap that is receiving pre-treatment from the RO POU unit (most likely the kitchen tap), leaving lead and copper levels at the rest of the household taps unchanged.

4.0 RECOMMENDATION

4.1 Lead and Copper

Alameda County Water District has an optimal corrosion control program that reduces the potential of corrosion of lead and copper *at-the-tap*.

Adopting simple practices at the home will reduce the amount of lead introduced to drinking water. Replacing brass fixtures to reduce lead at each home is not advisable since there is no assurance that already low lead levels will be further reduced and result in a measurable public health benefit for the substantial cost involved.

Although installing under-the-counter RO POU devices in the kitchen would significantly reduce both lead and copper levels, the benefits are limited to one tap per household and lead from the kitchen fixture can still leach into the water after it is treated by the RO POU device. In light of these limitations and considering the significant capital and annual maintenance costs involved, RO POU units are not recommended to further reduce the already low lead and copper levels.

REFERENCES

1. Association of California Water Agencies. (2004) "Suggested Guidelines for Preparation of Required Reports on Public Health Goals (PHGs) to Satisfy Requirements of California Health and Safety Code section 116470 (b)."
2. Jacobs, S. (1998). "Alameda County Water District: Evaluation of Distribution System Hardness and Corrosion Control Report." January 1998.
3. American Water Works Association Research Foundation (2003). "Conventional and Unconventional Approaches to Water Service Provision, AWWARF Project #2761." October 2003.
4. California Environmental Protection Agency, Office of Environmental Health Hazard Assessment (OEHHA). "A Guide to Health Risk Assessment."
5. California Environmental Protection Agency, Office of Environmental Health Hazard Assessment (OEHHA). "Guide to Public Health Goals (PHGs) for Chemicals in Drinking Water. October 2003.

APPENDIX A

The following table is a summary of monitoring results for constituents with Primary Drinking Water Standards and Public Health Goals or Maximum Contaminant Level Goals for 2004, 2005, and 2006.

Important Notes Regarding Data in the Summary of Monitoring Results:

- MCLG/PHG exceedences must be reported only for those contaminants that have a primary drinking water standard in place. Although EPA has adopted MCLGs for some individual THMs and HAAs (such as dibromochloromethane or dichloroacetic acid), there are no MCLs in effect for these individual constituents. EPA has adopted standards for the cumulative byproduct groups but there are no MCLGs or PHGs established for them. However, individual MCLs and MCLGs have been adopted for byproducts such as bromate and chlorite so they must be included in the report if detected.
- Results that are reported below the State regulatory Detection Limit for Purposes of Reporting (DLR) are shown as 0 (zero) which is accepted CDHS practice.
- The MCLs for N-nitrosodimethylamine and perchlorate are being established. The PHGs for N-nitrosodimethylamine and perchlorate were established in December 2006 and March 2004 respectively.

APPENDIX B

Health Risk Categories and Cancer Risk Values for Chemicals with California Public Health Goals (PHGs)

The following table was adapted from the Office of Environmental Health Hazard Assessment's Table 1, "Health Risk Categories and Cancer Risk Values for Chemicals with California Public Health Goals (PHGs)."

Table 1. Health Risk Categories and Cancer Risk Values for Chemicals with California Public Health Goals (PHGs)

Chemical	Health Risk Category ¹ (more specific information in parentheses)	California PHG (mg/L) ²	Cancer Risk ³ @ PHG	California MCL ⁴ (mg/L)	Cancer Risk @ California MCL
Copper	Acute toxicity (gastrointestinal effects in children, human data)	0.17	NA ⁵	1.3 (AL) ⁶	NA
Lead	Chronic toxicity (neurobehavioral effects in children, hypertension in adults), and carcinogenicity (cancer)	0.002	3 in 10 million (PHG is not based on this effect)	0.015 (AL)	2 in 1 million

¹ Health risk category based on experimental animal testing data evaluated in the OEHHA PHG technical support document unless otherwise specified.

² mg/L = milligrams per liter of water or parts per million (ppm) (PHGs are expressed here in milligrams per liter for consistency with the typical unit used for MCLs and MCLGs.); 1.3 mg/L is equal to 1300 µg/L.

³ Cancer Risk = theoretical 70-year lifetime excess cancer risk at the statistical upper confidence limit. Actual cancer risk may be lower or zero. Cancer risk is stated in terms of excess cancer cases per million (or fewer) population, e.g., 1×10^{-6} means one excess cancer case per million people; 5×10^{-5} means five excess cancer cases per 100,000 people.

⁴ MCL = maximum contaminant level.

⁵ NA = not applicable. Non-carcinogenic, or a cancer risk cannot be calculated. The PHG for these chemicals is set at a level that is believed to be without any significant public health risk to individuals exposed to that chemical over a lifetime.

⁶ AL = action level.

Appendix A

Summary of monitoring results for constituents with Primary Drinking Water Standards and Public Health Goals or Maximum Contaminant Level Goals for 2004, 2005, and 2006.

PARAMETERS/ CONSTITUENTS	Units	STATE MCL	DLR	PHG or (MCLG)	MISSION SAN JOSE WATER TREATMENT PLANT			WATER TREATMENT PLANT 2			BLENDING FACILITY			PURCHASED SAN FRANCISCO WATER			NEWARK DESALINATION FACILITY		
					2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006
HEPTACHLOR EPOXIDE	mg/L	0.0001	0.00001	0.000006	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	
HEXACHLORO BENZENE	mg/L	0.001	0.0005	0.00003	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
HEXACHLOROCYCLOPENTADIENE	mg/L	0.05	0.001	0.05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
LINDANE	mg/L	0.0002	0.0002	0.000032	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	
METHOXYCHLOR	mg/L	0.03	0.01	0.03	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
METHYL TERTIARY BUTYL ETHER (MTBE)	mg/L	0.013	0.003	0.013	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	
MOLINATE	mg/L	0.02	0.002	none	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	
MONOCHLORO BENZENE	mg/L	0.07	0.0005	0.2	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
N-NITROSODIMETHYLAMINE	mg/L		0.000002	0.000003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
OXAMYL	mg/L	0.05	0.02	0.05	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	
PENTACHLOROPHENOL	mg/L	0.001	0.0002	0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	
PERCHLORATE	mg/L		0.004	0.006	< 0.004	< 0.004	-	< 0.004	< 0.004	-	< 0.004	< 0.004	-	< 0.004	< 0.004	-	< 0.004	< 0.004	
PICLORAM	mg/L	0.5	0.001	0.5	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
POLYCHLORINATED BIPHENYLS [PCBs]	mg/L	0.0005	0.0005	(0)	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
SILVEX [2,4,5-TP]	mg/L	0.05	0.001	0.025	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
SIMAZINE	mg/L	0.004	0.001	0.004	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
STYRENE	mg/L	0.1	0.0005	(0.1)	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
1,1,2,2-TETRACHLOROETHANE	mg/L	0.001	0.0005	0.0001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
TETRACHLOROETHYLENE [PCE]	mg/L	0.005	0.0005	0.00006	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
THIOBENCARB	mg/L	0.07	0.001	0.07	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
TOLUENE	mg/L	0.15	0.0005	0.15	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
TOXAPHENE	mg/L	0.003	0.001	0.00003	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
TRANS-1,2-DICHLOROETHYLENE	mg/L	0.01	0.0005	0.06 ^b	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
1,2,4-TRICHLORO BENZENE	mg/L	0.005	0.0005	0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
1,1,1-TRICHLOROETHANE [1,1,1-TCA]	mg/L	0.2	0.0005	1.0 ^b	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
1,1,2-TRICHLOROETHANE [1,1,2-TCA]	mg/L	0.005	0.0005	0.0003 ^b	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
TRICHLOROETHYLENE [TCE]	mg/L	0.005	0.0005	0.0008	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
TRICHLOROFLUOROMETHANE (FREON 11)	mg/L	0.15	0.005	0.7	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
TRICHLOROTRIFLUOROETHANE (FREON 113)	mg/L	1.2	0.01	4.0	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
TRIHALOMETHANES, TOTAL [THMS]	mg/L	0.1	0.0005	none	0.065	0.072	0.030	0.006	0.003	0.003	0.013	0.020	0.011	0.037	0.066	0.039	< 0.0005	< 0.0005	
XYLENES [SUM OF ISOMERS]	mg/L	1.750	0.0005	1.8	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	

RADIOLOGICAL

ALPHA ACTIVITY, GROSS	pCi/L	15	3	(0)			< 3			< 3			< 3			< 3	< 3		< 3
BETA ACTIVITY, GROSS	pCi/L	4 MREM/YR	4	(0)			< 4			< 4			< 4			< 4	< 4		< 4
RADIUM 226	pCi/L	5	1	0.05 ^b			< 1			< 1			< 1			< 1	< 1		< 1
RADIUM 228	pCi/L	5	1	0.019 ^b			< 1			< 1			< 1			< 1	< 1		< 1
STRONTIUM 90	pCi/L	8	2	0.35 ^b			< 2			< 2			< 2			< 2	< 2		< 2
TRITIUM	pCi/L	20000	1000	400 ^b			< 1000			< 1000			< 1000			< 1000	< 1000		< 1000
URANIUM	pCi/L	20	2	0.0005			< 2			< 2			< 2			< 2	< 2		< 2

**AT-THE-TAP SAMPLING
90th Percentile**

LEAD AND COPPER SAMPLING PROGRAM⁶

	2004	2005	2006				
COPPER (at-the-tap; 90th percentile) ⁷	mg/L	AL = 1.3	0.05	0.17	-	-	1.03
LEAD (at-the-tap; 90th percentile) ⁷	mg/L	AL = 0.015	0.005	0.002	-	-	0.0098

DISTRIBUTION SYSTEM SAMPLING

	2004	2005	2006				
COLIFORM % POSITIVE SAMPLES	%	5		(0)	0	0	0

1. Abbreviations:

MCL = Maximum Contaminant Level
MCLG = Maximum Contaminant Level Goal
AL = Regulatory Action Level, set by U.S. EPA
PHG = Public Health Goal
DLR = Detection Limit for Purposes of Reporting; set by CDHS
TT = Treatment Technique

■ = Parameters that exceeded the PHGs.

a - USEPA adopted an arsenic level of 10 ppb that became effective in California on Jan. 23, 2006.

b - PHG revised, MCL to be reviewed and may also be revised.

c - Total Chromium PHG withdrawn-awaiting revised PHG for Chromium 6

NOTES:

- Constituents reported in table were collected as per ACWD's CDHS approved (2003) Water Quality Monitoring Plan.
- ACWD is not required to monitor for acrylamide and epichlorohydrin
- Stage 1 Disinfectants/Disinfection Byproducts Rule went into effect January 1, 2003. Bromate sampling only required for Water Treatment Plant 2.
- Stage 1 Disinfectants/Disinfection Byproducts Rule went into effect January 1, 2003. Chlorite monitoring is only required for systems using chlorine dioxide. ACWD does not use chlorine dioxide as a disinfectant.
- Compliance is based on the 90th percentile values of samples collected at customer taps.
- Due to favorable sampling results. The CDHS approved reduced lead and copper monitoring (every 3 years). Next sampling round is scheduled for 2009.