



CITY OF TUSTIN 2013 PUBLIC HEALTH GOAL REPORT

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2013 Public Health Goal Report

City of Tustin

1.0 Introduction

Under the Calderon-Sher Safe Drinking Water Act of 1996 public water systems in California serving greater than 10,000 service connections must prepare a report containing information on 1) detection of any contaminant in drinking water at a level exceeding a Public Health Goal (PHG) 2) estimate of costs to remove detected contaminants to below the PHG using Best Available Technology (BAT), and 3) health risks for each contaminant exceeding a PHG. This report must be made available to the public every three years. The initial report was due on July 1, 1998, and subsequent reports are due every three years thereafter.

This report has been prepared to address the requirements set forth in Section 116470 of the California Health and Safety Code. It is based on water quality analyses during calendar years 2010, 2011, and 2012 or, if certain analyses were not performed during those years, the most recent data available. The report has been designed to be as informative as possible, without unnecessary duplication of information contained in the Consumer Confidence Reports, which are mailed to customers by July 1st of each year.

There are no regulations explaining requirements for the preparation of PHG reports. A workgroup of the Association of California Water Agencies (ACWA) Water Quality Committee has prepared suggested guidelines for water utilities to use in preparing PHG reports. The ACWA guidelines were used in the preparation of this report. These guidelines include tables of cost estimates for BAT. The State of California (State) provides ACWA with numerical health risks and category of health risk information for contaminants with PHGs. This health risk information is appended to the ACWA guidelines.

2.0 California Drinking Water Regulatory Process

California Health and Safety Code Section 116365 requires the State to develop a PHG for every contaminant with a primary drinking water standard or for any contaminant the State is proposing to regulate with a primary drinking water standard. A PHG is the level which poses no significant health risk if consumed for a lifetime. The process of establishing a PHG is a risk assessment based strictly on human health considerations. PHGs are recommended targets and are not required to be met by any public water system.

The State office designated to develop PHGs is the California Environmental Protection Agency's Office of Environmental Health Hazard Assessment (OEHHA). The PHG is then forwarded to the California Department of Public Health (CDPH) Division of Drinking Water and Environmental Management for use in revising or developing a

Maximum Contaminant Level (MCL) in drinking water. The MCL is the highest level of a contaminant that is allowed in drinking water. California MCLs cannot be less stringent than federal MCLs and must be as close as is technically and economically feasible to the PHGs. CDPH is required to take treatment technologies and cost of compliance into account when setting an MCL. Each MCL is reviewed at least once every five years.

Total chromium and two radiological contaminants (gross alpha particle and gross beta particle) have MCLs but do not yet have designated PHGs. For these contaminants, the Maximum Contaminant Level Goal (MCLG), the federal U.S. Environmental Protection Agency (USEPA) equivalent of PHGs, is used in the PHG Report.

N-nitrosodimethylamine (NDMA) has a PHG of 3 nanograms per liter and 1,2,3-trichloropropane (1,2,3-TCP) has a PHG of 0.7 nanogram per liter but both are not regulated in drinking water with a primary drinking water standard. Bromodichloromethane, bromoform, and dichloroacetic acid are three disinfection byproducts that have federal MCLGs of zero but are not individually regulated with primary drinking water standards. According to the ACWA guidance and instructions from CDPH, these five chemicals do not have to be included in the PHG Report because they do not have an existing MCL.

3.0 Identification of Contaminants

Section 116470(b)(1) of the Health and Safety Code requires public water systems serving more than 10,000 service connections to identify each contaminant detected in drinking water that exceeded the applicable PHG. Section 116470(f) requires the MCLG to be used for comparison if there is no applicable PHG.

The City of Tustin water system has approximately 14,000 service connections. The following constituents were detected at one or more locations within the drinking water system at levels that exceeded the applicable PHGs or MCLGs:

- **Arsenic** – naturally-occurring in local groundwater and in surface water purchased from the Metropolitan Water District of Southern California (MWD)
- **Copper** – corrosion of residential plumbing
- **Gross alpha particle activity** (gross alpha) – naturally-occurring in surface water purchased from MWD
- **Gross beta particle activity** (gross beta) – naturally-occurring in surface water purchased from MWD; not required to be tested in groundwater
- **Lead** – corrosion of residential plumbing
- **Total Coliform Bacteria** – naturally-occurring in local groundwater and can also be an indicator of the presence of other pathogenic organisms originating from sewage, livestock or other wildlife.
- **Uranium** – naturally-occurring in surface water purchased from MWD.

The accompanying chart shows the applicable PHG or MCLG and MCL or Action Level (AL) for each contaminant identified above. The chart includes the minimum, maximum,

and average concentrations of each contaminant in drinking water supplied by the City of Tustin in calendar years 2010 through 2012. Copper and lead are regulated by an AL, not an MCL, and are tested from samples collected at selected customers' indoor faucets or taps. The AL is the concentration of copper or lead, which if exceeded in more than 10 percent of the tap samples, triggers treatment or other requirements that a water system must follow. The chart shows the 90th percentile concentration of copper and lead observed during the most recent round of at-the-tap sampling.

4.0 Numerical Public Health Risks

Section 116470(b)(2) of the Health and Safety Code requires disclosure of the numerical public health risk, determined by OEHHA, associated with the MCLs, ALs, PHGs and MCLGs. Available numerical health risks developed by OEHHA for the contaminants identified above are shown on the accompany chart. Only numerical risks associated with cancer-causing chemicals have been quantified by OEHHA.

Arsenic – OEHHA has determined that the theoretical health risk associated with the PHG is one excess case of cancer in a million people and the risk associated with the MCL is 2.5 excess cases of cancer in 1,000 people exposed over a 70-year lifetime.

Copper – OEHHA has not established a numerical health risk for copper because PHGs for non-carcinogenic chemicals in drinking water are set at a concentration at which no known or anticipated adverse health risks will occur, with an adequate margin of safety.

Gross Alpha – USEPA has determined that the theoretical health risk associated with the MCLG is 0 and the risk associated with the MCL is 1 excess case of cancer in 1,000 people over a lifetime exposure.

Gross Beta – USEPA has determined that the health risk associated with the MCLG is 0 and the risk associated with the MCL is 2 excess cases of cancer in 1,000 people over a lifetime exposure.

Lead – OEHHA has determined that the theoretical health risk associated with the PHG is three excess case of cancer in 100 million people and the risk associated with the AL is 2 excess cases of cancer in a million people exposed over a 70-year lifetime.

Total Coliform Bacteria – USEPA has determined that the health risk associated with the MCLG is 0.

Uranium – OEHHA has determined that the theoretical health risk associated with the PHG is one excess case of cancer in a million people and the risk associated with the MCL is 5 excess cases of cancer in 100,000 people exposed over a 70-year lifetime.

5.0 Identification of Risk Categories

Section 116470(b)(3) of the Health and Safety Code requires identification of the category of risk to public health associated with exposure to the contaminant in drinking water, including a brief, plainly worded description of those terms. The risk categories and definitions for the contaminants identified above are shown on the accompanying chart.

6.0 Description of Best Available Technology

Section 116470(b)(4) of the Health and Safety Code requires a description of the BAT, if any is available on a commercial basis, to remove or reduce the concentrations of the contaminants identified above. The BATs are shown on the accompanying chart.

7.0 Costs of Using Best Available Technologies and Intended Actions

Section 116470(b)(5) of the Health and Safety Code requires an estimate of the aggregate cost and cost per customer of utilizing the BATs identified to reduce the concentration of a contaminant to a level at or below the PHG or MCLG. In addition, Section 116470(b)(6) requires a brief description of any actions the water purveyor intends to take to reduce the concentration of the contaminant and the basis for that decision.

The City of Tustin operates two existing treatment facilities (Main Street Treatment Plant and 17th Street Desalter) that treat nitrate and perchlorate in groundwater from five wells, using ion exchange and reverse osmosis.

Arsenic – The BATs for removal of arsenic in water for large water systems are: activated alumina, coagulation/filtration, electrodialysis, ion exchange, lime softening, oxidation/filtration, and reverse osmosis. Arsenic was detected above the PHG in one of the City of Tustin's groundwater wells (Vandenberg Well). The City of Tustin is in compliance with the MCL for arsenic. The estimated cost to reduce arsenic levels in groundwater to below the PHG of 0.004 microgram per liter ($\mu\text{g/l}$) using ion exchange was calculated. Because the CDPH detection limit for purposes of reporting (DLR) for arsenic is 2 $\mu\text{g/l}$, treating arsenic to below the PHG level means treating arsenic to below the DLR of 2 $\mu\text{g/l}$. There are numerous factors that may influence the actual cost of reducing arsenic levels to the PHG. Achieving the water quality goal for arsenic could range from \$716,000 to \$10,233,000 per year, or between \$51 and \$727 per household per year. (Note: The existing ion exchange treatment system at the Main Street Treatment Plant does not process water from the Vandenberg Well.)

Copper – USEPA has determined the BAT to reduce copper in drinking water to be corrosion control optimization. This method is capable of bringing a water system into compliance with the AL of copper at 1,300 $\mu\text{g/l}$. The City of Tustin water system is already in compliance with the copper AL, meets all State and federal requirements, and is therefore deemed by CDPH to have optimized corrosion control. Further

corrosion control optimization would be incapable of achieving the PHG; therefore, the cost of reducing copper to the PHG level cannot be estimated.

The principal reason for this is that the largest source of copper in tap water is the pipe and fixtures in the customer's own household plumbing. Copper has not been detected in the City of Tustin's source waters. Factors that increase the amount of copper in the water include:

- Household faucets or fittings made of brass;
- Copper plumbing materials;
- Homes less than five years old or constructed before 1980;
- Water supplied to the home is naturally soft or corrosive; or
- Water often sits in the household plumbing for several hours.

The City of Tustin collected extensive lead and copper tap samples in 2012. The copper levels in over 90 percent of the most recent samples were below the AL. The City of Tustin will continue to monitor the water quality parameters that relate to corrosivity, such as pH, hardness, alkalinity and total dissolved solids, and will take action if necessary to maintain the water system in an optimized corrosion control condition.

Gross Alpha, Gross Beta, and Uranium – The only BAT for the removal of gross alpha in water for large water systems is reverse osmosis, which can also remove gross beta and uranium, if detected. Gross alpha and gross beta were detected above the MCLG in the surface water supplied by MWD. Uranium was detected above the PHG in five of the City of Tustin's groundwater wells (17th Street Well 4, Newport Well 3, Pasadena Well, Prospect Well, and Yorba Street Well) and in water supplied by MWD. The cost of providing treatment using reverse osmosis to reduce gross alpha levels in MWD water to the MCLG of 0 picoCurie per liter (pCi/l) (and consequently gross beta in MWD water and uranium in groundwater and MWD water below the MCLG and PHG, respectively) was calculated. Because the DLR for gross alpha is 3 pCi/l, treating gross alpha to 0 pCi/l means treating it to below the DLR of 3 pCi/l. Achieving the water quality goal for gross alpha could range from \$1,571,000 to \$13,463,000 per year, or between \$112 and \$957 per household per year. (Note: The existing reverse osmosis system at the 17th Street Desalter also processes water from 17th Street Well 4 and Newport Well 3; therefore, the costs calculated above for providing treatment using reverse osmosis do not include water from these two wells.)

Lead – USEPA has determined the BAT to reduce lead in drinking water to be corrosion control optimization. This method is capable of bringing a water system into compliance with the AL of lead at 15 µg/l. The City of Tustin water system is already in compliance with the lead AL, meets all State and federal requirements, and is therefore deemed by CDPH to have optimized corrosion control. Further corrosion control optimization would be incapable of achieving the PHG; therefore, the cost of reducing lead to the PHG level cannot be estimated.

The principal reason for this is that the largest source of lead in tap water is the pipe and fixtures in the customer's own household plumbing. Lead has not been detected in the City of Tustin's source waters. Factors that increase the amount of lead in the water include:

- Household faucets or fittings made of brass;
- Lead plumbing materials;
- Homes less than five years old or constructed before 1980;
- Water supplied to the home is naturally soft or corrosive; or
- Water often sits in the household plumbing for several hours.

The City of Tustin collected extensive lead and copper tap samples in 2012. The lead levels in over 90 percent of the most recent samples were below the AL. The City of Tustin will continue to monitor the water quality parameters that relate to corrosivity, such as pH, hardness, alkalinity and total dissolved solids, and will take action if necessary to maintain the water system in an optimized corrosion control condition.

Total Coliform Bacteria – The BAT for removal of coliform bacteria in drinking water has been determined by USEPA to be disinfection. The City of Tustin already disinfects all water served to the public. Chlorine is used to disinfect the water because it is an effective disinfectant and residual concentrations can be maintained to guard against biological contamination in the water distribution system.

Coliform bacteria are indicator organisms that are ubiquitous in nature. They are a useful tool because of the ease in monitoring and analysis. The City of Tustin collects weekly samples for total coliforms at various locations in the distribution system and monthly at each well. If coliform bacteria are detected in the drinking water sample, it indicates a potential problem that needs to be investigated and followed up with additional sampling. It is not unusual for a system to have an occasional positive sample. Although USEPA set the MCLG for total coliforms at zero percent positive, there is no commercially available technology that will guarantee zero percent positive every single month; therefore, the cost of achieving the PHG cannot be estimated.

The City of Tustin will continue several programs that are now in place to prevent contamination of the water supply with microorganisms. These include:

- Disinfection using chlorine and maintenance of a chlorine residual at every point in the distribution system
- Monitoring throughout the distribution system to verify the absence of total coliforms and the presence of a protective chlorine residual
- Flushing program in which water pipelines known to have little use are flushed to remove stagnant water and bring in fresh water with residual disinfectant
- Cross-connection control program that prevents the accidental entry of non-disinfected water into the drinking water system.

All Contaminants – In addition, a cost estimate to treat all water produced or purchased by the City of Tustin using reverse osmosis to remove all the contaminants detected above the PHGs or MCLGs was calculated (excluding the 17th Street Well 4 and Newport Well 3 water which is currently processed by the reverse osmosis system at the 17th Street Desalter). All the contaminants listed in the attached table may be removed to non-detectable levels by reverse osmosis, except copper and lead. As shown on the attached table, achieving the water quality goals for all contaminant, except for copper and lead, using reverse osmosis could range from \$1,980,000 to \$16,965,000 per year, or between \$141 and \$1,206 per household per year.

For additional information, please contact Mr. Art Valenzuela at (714) 573-3382, or write to the City of Tustin Water Services, 300 Centennial Way, Tustin, California 90780.

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PARAMETER	UNITS OF MEASUREMENT	PHG OR (MCLG)*	MCL or OR AL	DLR	CONCENTRATION			HEALTH RISK CATEGORY	Cancer Risk at PHG or MCLG	Cancer Risk at MCL	BEST AVAILABLE TECHNOLOGIES	AGGREGATE COST PER YEAR	COST PER HOUSEHOLD PER YEAR
					AVERAGE		RANGE						
					TUSTIN GROUNDWATER	MWD SURFACE WATER							
INORGANIC CHEMICALS													
Arsenic	µg/l	0.004	10	2	ND	2.3	ND - 3.2	C	1 x 10 ⁻⁶	2.5 x 10 ⁻³	AA,C/F,E,IE,LS,O/F,RO	\$716,000 - \$10,233,000 (a)	\$51 - \$727 (a)
Copper (b)	µg/l	300	1,300 (AL)	50	327		300 - 380	D	NA	NA	CC	(c)	(c)
Lead (b)	µg/l	0.2	15 (AL)	5	9		7 - 10	C, CV, N	3 x 10 ⁻⁸	2 x 10 ⁻⁶	CC	(c)	(c)
RADIOLOGICAL													
Gross Alpha Particle Activity	pCi/l	(0)	15	3	ND	3.9	ND - 9.3	C	0	1 x 10 ⁻³	RO	\$1,571,000 - \$13,463,000 (d)	\$112 - \$957 (d)
Gross Beta Particle Activity	pCi/l	(0)	50	4	NR	4.3	ND - 6.4	C	0	2 x 10 ⁻³	IE, RO	--	--
Uranium	pCi/l	0.43	20	1	2	2.4	ND - 4.4	C	1 x 10 ⁻⁶	5 x 10 ⁻⁵	IE, C/F, LS, RO	--	--
All Contaminants	--	--	--				--	--	--	--	RO	\$1,980,000 - \$16,965,000 (e)	\$141 - \$1,206 (e)

* MCLGs are shown in parentheses. MCLGs are provided only when no applicable PHG exists.

HEALTH RISK CATEGORIES

- C (Carcinogenicity) = causes cancer
- D (Digestive System Toxicity) = causes nausea, vomiting, diarrhea
- N (Developmental Neurotoxicity) = causes neurobehavioral effects in children
- CV (Cardiovascular Toxicity) = causes high blood pressure

TREATMENT/CONTROL TECHNOLOGIES

- AA = Activated Aluminum
- C/F = Coagulation/Filtration
- CC = Corrosion Control
- E = Electrodialysis
- GAC = Granular Activated Carbon
- IE = Ion Exchange
- LS = Lime Softening
- O/F = Oxidation/Filtration
- RO = Reverse Osmosis

NOTES

- PHG = Public Health Goal
- MCL = Maximum Contaminant Level
- MCLG = Maximum Contaminant Level Goal
- NA = Not Applicable or Available
- NR = Not Required
- AL = Action Level
- ug/l = micrograms per liter or parts per billion
- pCi/l = picoCuries per liter
- DLR = Detection Limit for Purposes of Reporting

- (a) Estimated cost to remove arsenic using ion exchange
- (b) An action level has been established for lead and copper. The action level is exceeded if the 90th percentile concentration in samples collected throughout the distribution system is higher than the action level.
The table shows the 90th percentile concentration of the most recent group of samples collected.
- (c) Cost could not be estimated
- (d) Estimated cost to remove gross alpha particle activity using reverse osmosis, which also removes gross beta particle activity and uranium.
- (e) Assuming treating the entire production by RO, which can remove all contaminants listed in the above table to below the detectable levels, except for copper and lead, which can be detected anywhere in the distribution system.