Main San Gabriel Basin WATERMASTER

CITY OF WHITTIER

2016 Public Health Goal Report

Pursuant to Section 116355 of the California Health and Safety Code

STETSON ENGINEERS INC.

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City of Whittier

1.0 Introduction

The Calderon-Sher Safe Drinking Water Act of 1996 requires public water systems in California serving greater than 10,000 connections to 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 risk of each contaminant exceeding a PHG. This report must be available to the public every three years. The initial PHG Report was due on July 1, 1998, and subsequent reports are due every three years thereafter.

The 2016 PHG 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 2013, 2014, and 2015 or, if certain analyses were not performed during those years, the most recent data available. The 2016 PHG Report has been designed to be as informative as possible, without unnecessary duplication of information contained in the Consumer Confidence Report, which is to be 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 2016 PHG 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 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 that 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). OEHHA submits the PHG to the State Water Resources Control Board, Division of Drinking Water (DDW) for use in revising or developing a Maximum Contaminant Level (MCL) in drinking water. The MCL is the highest level of a contaminant allowed in drinking water. State MCLs cannot be less stringent than federal MCLs and must be as close as is technically and economically feasible to

the PHGs. DDW 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 2016 PHG Report.

N-nitrosodimethylamine (NDMA) has a PHG of 3 nanograms per liter (ng/l) and 1,2,3-trichloropropane (1,2,3-TCP) has a PHG of 0.7 ng/l, 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 0 but are not individually regulated with primary drinking water standards. According to the ACWA guidance and instructions from DDW, these five chemicals do not have to be included in the 2016 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 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 Whittier (City) water system has approximately 11,342 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.

- Coliform Bacteria - naturally occurring in the environment
- Copper – corrosion of residential plumbing
- Gross Alpha Particle Activity (gross alpha) – naturally occurring in local groundwater
- Hexavalent Chromium – naturally-occurring in local groundwater; industrial contamination in groundwater
- Lead – corrosion of residential plumbing
- Tetrachloroethylene (PCE) – industrial contamination in local groundwater
- Uranium - naturally occurring in local groundwater

Table 1 shows the applicable PHG or MCLG; and MCL or Action Level (AL) for each contaminant identified above. Copper and lead are regulated by ALs, not MCLs, and are tested from samples collected at selected customers' indoor faucets or taps. An 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. Table 1 shows the 90th percentile concentrations of copper and lead detected during the at-the-tap sampling event in 2013. Table 1 includes the maximum, minimum, and average concentrations of each contaminant which exceeds a PHG, in drinking water supplied by the City in calendar years 2013 through 2015.

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 Table 1. Only numerical risks associated with cancer-causing chemicals have been quantified by OEHHA.

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

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 70 year lifetime exposure for the most potent alpha emitter.

Hexavalent Chromium – OEHHA has determined that the theoretical health risk associated with the PHG is 1 excess case of cancer in a million people and the risk associated with the MCL is 5 excess cases of cancer in 10,000 people exposed over a 70-year lifetime.

Lead – OEHHA has determined that the theoretical health risk associated with the PHG is less than 1 excess case of cancer in a 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.

PCE - OEHHA has determined that the health risk associated with the PHG is one excess case of cancer in a million people and the risk associated with the MCL is 8 excess cases of cancer in 100,000 people over a 70 year lifetime exposure.

Uranium - OEHHA has determined that the 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 over a lifetime exposure.

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 Table 1.

6.0 Description of Best Available Technology

Section 116470(b)(4) of the Health and Safety Code requires a description of the best available technology (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 Table 1.

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.

Coliform Bacteria **-** The BAT for treating coliform organisms in drinking water has been determined by USEPA to be disinfection. The City already disinfects all the water served to the public. Chlorine is used to treat 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 collects weekly samples for total coliforms at various locations in the distribution system and monthly at each well. If a positive drinking water sample is detected, it indicates a potential problem that needs to be investigated and followed up with additional sampling. Although USEPA set the MCLG for total coliforms at zero percent positive, there is no commercially available technology that will guarantee zero detection every single month; therefore, the cost of achieving the PHG cannot be estimated.

The City 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 coliform bacteria 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; and
- Cross-connection control program that prevents the accidental entry of non-disinfected water into the drinking water system.

Copper and Lead - USEPA has determined the BAT to reduce copper and lead 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 µg/l and the AL of lead at 15 µg/l. The City is

already in compliance with the copper and lead ALs, meets all state and federal requirements and is considered by DDW to have optimized corrosion control. Further corrosion control optimization would be incapable of achieving the PHGs; therefore, the cost of reducing copper and lead to their respective PHGs cannot be estimated.

The principal reason for this is that the largest source of copper and lead in tap water is the pipe and fixtures in the customer's own household plumbing. Neither copper nor lead has been detected in the City's source waters. Factors that increase the amount of copper and lead 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 collected extensive lead and copper tap samples in 2013. The copper and lead levels in all of the most recent samples were below the AL. The City 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 and Uranium - The only BAT for the removal of gross alpha radioactivity in water for large water systems is reverse osmosis, which can also remove uranium. Gross alpha and uranium were detected above the MCLG and PHG, respectively, at several City wells. The cost of providing reverse osmosis treatment to reduce gross alpha levels in groundwater to the MCLG of 0 (and consequently uranium below the PHG) was calculated. Because the detection limit for purposes of reporting (DLR) for gross alpha is 3 picocuries per liter (pCi/l), treating gross alpha to 0 means treating to below the DLR of 3 pCi/l. Achieving the water quality goals for gross alpha and uranium could range from $2,010,000 to $17,200,000 per year, or between $178 and $1,510 per service connection per year.

Hexavalent Chromium – The BATs for removal of hexavalent chromium in water are: reduction to chromium III (trivalent chromium) prior to coagulation/filtration, ion exchange, and reverse osmosis. Hexavalent chromium was detected above the PHG at one of the City's wells. The City is in compliance with the MCL for hexavalent chromium. The estimated cost to reduce hexavalent chromium levels in local groundwater to below the PHG of 0.02 µg/l using ion exchange was calculated. Because the DLR for hexavalent chromium is 1 µg/l, treating hexavalent chromium to below the PHG level means treating hexavalent chromium to below the DLR of 1 µg/l. There are numerous factors that may influence the actual cost of reducing hexavalent chromium levels to the PHG. Achieving the water quality goal for hexavalent chromium could range from $1,790,000 to $7,510,000 per year, or between $158 and $662 per service connection per year.

PCE - The BATs for removing PCE are granular activated carbon (GAC) and packed tower aeration (PTA). PCE was detected above the PHGs at three wells owned by the City. The City

complies with the MCL for PCE. The cost of installing and operating PTA and GAC units to remove PCE to the PHG levels was calculated. It should be pointed out these are theoretical calculations and rough cost estimates. Achieving the PHG for PCE could range from $357,000 to $942,000 per year, or between $31 and $83 per service connection per year using PTA treatment. Using GAC, achieving the PHG for PCE could range from $331,000 to $1,860,000 per year, or between $29 and $164 per service connection per year.

All Contaminants - In addition, a cost estimate to treat all water produced by the City using reverse osmosis to remove all the contaminants detected above the PHGs or MCLGs was calculated. Most of contaminants listed in the attached table may be removed to non-detectable levels by PTA and reverse osmosis, except coliform bacteria, copper, and lead. Coliform bacteria, copper, and lead can be introduced and detected anywhere in the distribution system. As shown on the attached table, achieving the water quality goals for all contaminants, except for coliform bacteria, copper and lead, using reverse osmosis and PTA could range from $2,370,000 to $18,100,000 per year, or between $209 and $1,600 per service connection per year.

For additional information, please contact Mr. David Schickling, Director of Public Works, at (562) 567-9500, or write to the City of Whittier, Department of Public Works, 13230 Penn Street, Whittier, CA 90602.

This report was prepared for the City of Whittier by Stetson Engineers Inc. based on data provided by the City and previously reported to the State Water Resources Control Board, Division of Drinking Water (DDW).

6/29/16

David Schickling, PE Date
Director of Public Works
City of Whittier

TABLE 1

2016 PUBLIC HEALTH GOAL REPORT
CITY OF WHITTIER

PARAMETER	UNITS OF MEASUREMENT	PHG OR (MCLG)*	MCL OR AL	DLR	CONCENTRATION GROUNDWATER		CATEGORY OF RISK	CANCER RISK AT PHG OR MCLG	CANCER RISK AT MCL	BEST AVAILABLE TECHNOLOGIES	AGGREGATE COST PER YEAR	COST PER SERVICE CONNECTION PER YEAR
					VALUE	RANGE						
MICROBIOLOGICAL												
Total Coliform Bacteria (a)	% samples positive	(0)	5	NA	1.8	NA	NA	NA	NA	D	(b)	(b)
INORGANIC CHEMICALS												
Chromium, Hexavalent	µg/l	0.02	10	1	<1	ND - 1.6	C	1×10^{-6}	5×10^{-4}	R-C/F, IE, RO	$1,790,000 - $7,510,000 (c)	$158 - $662 (c)
Copper (d)	µg/l	300	1,300 (AL)	50	440	NA	G	NA	NA	CC	(b)	(b)
Lead (d)	µg/l	0.2	15 (AL)	5	5.6	NA	C,CV,N	$< 1 \times 10^{-6}$	2×10^{-6}	CC	(b)	(b)
ORGANIC CHEMICALS												
Tetrachloroethylene (PCE)	µg/l	0.06	5	0.5	<0.5	ND - 1.6	C	1×10^{-6}	8×10^{-5}	GAC PTA	$331,000 - $1,860,000 (e) $357,000 - $942,000 (f)	$29 - $164 (e) $31 - $83 (f)
RADIOLOGICAL												
Gross Alpha Particle Activity	pCi/l	(0)	15	3	<3	ND - 11	C	0	1×10^{-3}	RO	$2,010,000 - $17,200,000 (g)	$178 - $1,510 (g)
Uranium	pCi/l	0.43	20	1	1.8	ND - 5.4	C	1×10^{-6}	5×10^{-5}	IE, C/F, LS, RO	--	--
ALL CONTAMINANTS	--	--	--	--	--	--	--	--	--	PTA and RO	$2,370,000 - $18,100,000 (h)	$209 - $1,600 (h)

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

RISK CATEGORIES
C (Carcinogen) = A substance that is capable of producing cancer.
G (Gastrointestinal Effects) = A substance that may adversely affect the gastrointestinal tract after short-term exposure
CV (Cardiovascular Toxicity) = A substance that can cause high blood pressure
N (Developmental Neurotoxicity) = A substance that can cause neurobehavioral effects in children

TREATMENT/CONTROL TECHNOLOGIES
CC = Corrosion Control
C/F = Coagulation/Filtration
D = Disinfection
GAC = Granular Activated Carbon
IE = Ion Exchange
LS = Lime Softening
PTA = Packed Tower Aeration
R-C/F = Requires Reduction to Chromium III (Trivalent Chromium) Prior to C/F
RO = Reverse Osmosis

NOTES
AL = Action Level
PHG = Public Health Goal
MCL = Maximum Contaminant Level
MCLG = Maximum Contaminant Level Goal
NA = Not Appplicable or Available
ND = Not Detected
NR = Not Required
µg/l = micrograms per liter or parts per billion
pCi/l = picoCuries per liter
DLR = Detection Limit for Purposes of Reporting
< = Value is less than the DLR

(a) The table shows highest monthly percentage of positive samples as the detected value. Samples were collected in the distribution system.
(b) Cost could not be estimated
(c) Estimated cost to remove hexavalent chromium using IE.
(d) An action level has been established for 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.
(e) Estimated cost to remove PCE using GAC.
(f) Estimated cost to remove PCE using PTA.
(g) Estimated cost to remove gross alpha particle activity using RO, which also removes uranium.
(h) Assuming treating the entire production by PTA and RO, which can remove all contaminants listed in the above table to below the detectable levels, except for total coliform, copper, and lead, which can be detected anywhere in the distribution system.