SAN GABRIEL VALLEY WATER COMPANY EL MONTE / WHITTIER SYSTEM

2016 Public Health Goal Report

Required by

California Health and Safety Code Sections 116365 and 116470

2016 Public Health Goal Report

San Gabriel Valley Water Company - El Monte/Whittier System

1.0 Introduction

California Health and Safety Code Sections 116365 and 116470 requires all public water systems in California serving more than 10,000 service connections to prepare a report containing information on 1) the detection of any contaminant in drinking water at a level exceeding a Public Health Goal (PHG) 2) the estimated costs to remove detected contaminants to below the PHG using Best Available Technology (BAT), and 3) the health risk associated with each contaminant exceeding a PHG. The report must be updated and made 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 California Health and Safety Code Section 116470. It is based on water quality analyses performed during calendar years 2013, 2014, and 2015 or, if certain analyses were not performed during those years, the most recent data available. This 2016 PHG Report is 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 that explain the requirements or methodology for preparing PHG reports. However, 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 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 and 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 the contaminant is 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 California Environmental Protection Agency's Office of Environmental Health Hazard Assessment (OEHHA) is the State office responsible for developing PHGs. OEHHA submits the PHGs 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. The 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.

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 its drinking water that exceeded its applicable PHG. Section 116470(f) requires the Maximum Contaminant Level Goal (MCLG), the U.S. Environmental Protection Agency (USEPA) equivalent of PHGs, to be used for comparison if there is no applicable PHG.

Total chromium and two radiological contaminants (gross alpha particle and gross beta particle) have MCLs but do not yet have designated PHGs. If any of these contaminants was detected in drinking water, the MCLG was used in lieu of a designated PHG.

N-Nitrosodimethylamine (NDMA) has a PHG of 3 nanograms per liter (ng/l) and 1,2,3-trichloropropane has a PHG of 0.7 ng/l, but neither one is 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 DDW, these five chemicals do not have to be included in this 2016 PHG Report because they do not have an existing MCL.

3.0 Identification of Contaminants

San Gabriel Valley Water Company - El Monte/Whittier System (San Gabriel) provides water service through approximately 45,682 service connections. The following contaminants were detected at one or more locations in San Gabriel's water system at levels that exceeded the applicable PHGs or MCLGs.

- **Arsenic** naturally occurs in local groundwater.

- **Benzo(a)Pyrene (BAP)** is generally a result of leaching from linings of water storage tanks and distribution lines.

- **Coliform Bacteria** (total coliform) are naturally occurring in the environment and can indicate the presence of other pathogenic organisms originating from sewage, livestock or other wildlife.

- **Copper** in drinking water is generally the result of corrosion of residential plumbing. As required by the USEPA Lead and Copper Rule, San Gabriel tests representative residential taps for copper every three years. If more than 10 percent (90^{th} percentile) of these samples exceed the established Action Level (AL), a water system must provide treatment or inject additives to reduce corrosion in the distribution system. San Gabriel tested for copper in 2014. In accordance with DDW requirements, samples did not exceed the AL for copper in more than 10 percent of the samples.

- **Gross Alpha Particle Activity** (gross alpha) occurs naturally in local groundwater.

- **Hexavalent Chromium** is generally naturally occurring and can be the result of industrial contamination in groundwater.

- **Tetrachloroethylene (PCE)** is a result of industrial contamination in local groundwater.

- **Uranium** occurs naturally in local groundwater.

Table 1 shows the applicable PHG or MCLG; and MCL or AL for each contaminant listed above. Copper is regulated by an AL, not an MCL, and its presence is measured in samples collected from selected customers' indoor faucets or taps. The AL, 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 90^{th} percentile concentration of copper observed during the most recent round of customer tap sampling. Table 1 includes the maximum, minimum, and average concentrations of arsenic, BAP, Coliform bacteria, copper, gross alpha, hexavalent chromium, PCE, and uranium in the water supplied by San Gabriel during 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 each MCL, AL, PHG and MCLG. OEHHA has only quantified numerical risks associated with cancer-causing chemicals. Available numerical health risks developed by OEHHA for the contaminants identified above are shown on Table 1.

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

BAP – 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 3 excess cases of cancer in 100,000 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 per 1,000 people, over a lifetime exposure to the most potent alpha emitter.

Hexavalent Chromium – OEHHA has determined that the health risk associated with the PHG is 5 excess cases of cancer in 10,000 people over a lifetime exposure.

PCE – 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 8 excess cases of cancer in 100,000 people exposed over a 70-year lifetime.

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

Uranium – OEHHA has determined that the health risk associated with the PHG is 1 excess case of cancer per million people and the risk associated with the MCL is 5 excess cases of cancer per 100,000 people, over a lifetime exposure.

5.0 Identification of Risk Categories

Section 116470(b)(3) of the California 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 California 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 Table 1.

7.0 Costs of Using Best Available Technologies and Intended Actions

Section 116470(b)(5) of the California 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 many instances, a contaminant's PHG level is much lower than its Detection Limit for the purpose of Reporting (DLR). The DLR is a designated minimum level that if any analytical finding of a contaminant in drinking water is at or above shall be reported to DDW. Any analytical finding below the DLR is non-detect. In such instances, estimates will be based on removing contaminants to below their respective DLRs.

In addition, Section 116470(b)(6) requires a brief description of any actions the water purveyor plans to take to reduce the concentration of the contaminant and the basis for that decision.

***Arsenic* –** The BATs for the removal of arsenic from water for large water systems are: activated alumina, coagulation/filtration, lime softening, ion exchange, and reverse osmosis. Arsenic was detected below the MCL of 10 micrograms per liter (µg/l) but above the PHG of 0.004 µg/l in groundwater wells owned by San Gabriel. Because the DLR for arsenic is greater than the PHG, treating arsenic to below the PHG level means treating arsenic to below the DLR of 2 µg/l. There are numerous factors that influence the cost of reducing arsenic levels below the DLR, therefore an estimate will be based on the use of ion exchange technology only. The estimated cost to reduce arsenic below the DLR of 2 µg/l using ion exchange technology is approximately $16,600,000 per year, or $364 per service connection per year.

BAP and PCE **–** The only BAT for the removal of BAP in water for large water systems is granular activated carbon (GAC), which can also effectively remove PCE. BAP was detected below the MCL of 200 ng/l but above the PHG of 7 ng/l at San Gabriel's B5 Reservoir. This was the only BAP detection observed out of all samples collected at the B5 Reservoir to date. PCE was detected below the MCL of 5 µg/l but above the PHG of 0.06 µg/l at several of San Gabriel's wells and reservoirs. San Gabriel currently uses GAC treatment to reduce PCE to levels below the MCL of 5 µg/l at several of its wells with high PCE levels. Because the DLRs for BAP and PCE are greater than their respective PHGs, treating BAP and PCE to their respective PHG levels means treating to below their respective DLRs of 100 ng/l and 0.5 µg/l. The cost of providing treatment using GAC to reduce BAP and PCE levels in groundwater to their respective DLRs is estimated to range from $2,310,000 to $12,600,000 per year, or between $51 and $276 per service connection per year.

Copper **–** USEPA has determined that the BAT to reduce copper in drinking water is corrosion control optimization. This method is capable of bringing a water system into compliance with the AL. San Gabriel is already in compliance with the copper AL, 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 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 San Gabriel'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; and
- Stagnant water in the household plumbing for several hours or longer.

San Gabriel collected extensive copper tap samples in 2014. The copper levels in over 90 percent of the samples were below the AL. San Gabriel 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 optimize corrosion control in its water system.

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 effectively remove uranium. Gross alpha and uranium were detected below their respective MCLs of 15 picoCuries per liter (pCi/l) and 1 pCi/l but above their respective MCLG of 0 pCi/l and PHG of 0.43 pCi/l, in many of San Gabriel's wells. Because the DLRs for gross alpha and uranium are greater than their respective MCLG and PHG, treating gross alpha and uranium below their respective MCLG and PHG means treating to below their DLRs of 3 pCi/l and 1 pCi/l, respectively. The cost of providing treatment using reverse osmosis to reduce gross alpha and uranium levels in groundwater to their DLRs is estimated to range from $9,350,000 to $79,700,000 per year, or between $205 and $1,740 per service connection per year.

Hexavalent Chromium – The BATs for removal of hexavalent chromium in water for large water systems are: reduction-coagulation/filtration, ion exchange, and reverse osmosis. Hexavalent chromium was detected below the MCL of 10 µg/L but above the PHG of 0.02 µg/L at most of San Gabriel's wells. The estimated cost to reduce hexavalent chromium levels in water supplied by San Gabriel's wells to non-detectable levels using ion exchange was calculated. Because the DLR for hexavalent chromium is greater than the PHG, treating hexavalent chromium to below the PHG level means treating hexavalent chromium to below the DLR of 1 µg/L. There are numerous factors influencing the actual cost of reducing hexavalent chromium levels to the DLR. Achieving the water quality goal for hexavalent chromium could range from $17,300,000 to $72,200,000 per year, or between $378 and $1,580 per service connection per year.

Total Coliform **–** The BAT for treating coliform organisms in drinking water has been determined by USEPA to be disinfection. San Gabriel's system 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. San Gabriel collects weekly samples for total coliform 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 additional sampling will be conducted. It is not unusual for a system to have an occasional positive sample. Although USEPA set the MCLG for total coliform 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.

San Gabriel 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 coliform 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.

All Contaminants – The use of GAC in conjunction with reverse osmosis can remove all of the contaminants detected above the PHGs or MCLGs in San Gabriel's wells to non-detect levels except total coliform and copper, which can be introduced and detected anywhere in the distribution system or at-the-tap. As shown on the attached table, achieving the water quality goals for all contaminants using GAC in conjunction with reverse osmosis could range from $12,200,000 to $97,000,000 per year, or between $267 and $2,120 per service connection per year.

For additional information, please contact Mr. David Van, San Gabriel's Water Quality Superintendent, at dvan@sgvwater.com or call him at (626) 448-6183, you may also write to San Gabriel Valley Water Company, P.O. Box 6010, El Monte, CA 91734.

This report is posted on San Gabriel's website at www.sgvwater.com.

TABLE 1
2016 PUBLIC HEALTH GOAL REPORT
SAN GABRIEL VALLEY WATER COMPANY

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 HOUSEHOLD PER YEAR
					AVERAGE	RANGE						
MICROBIOLOGICAL												
Total Coliform Bacteria (a)	% samples positive	(0)	5	NA	0.52	NA	NA	NA	NA	D	(b)	(b)
INORGANIC CHEMICALS												
Arsenic	µg/l	0.004	10	2	<2	ND - 3.8	C	1 x 10^{-6}	2.5 x 10^{-3}	AA,C/F,E,IE,LS,O/F,RO	$16,600,000 (c)	$364 (c)
Chromium, Hexavalent	µg/l	0.02	10	1	3.0	ND - 7.3	C	1 x 10^{-6}	5 x 10^{-4}	R-C/F, IE, RO	$17,300,000 - $72,200,000 (d)	$378 - $1,580 (d)
Copper (e)	µg/l	300	(1300)	50	320	NA	G	NA	NA	CC	(b)	(b)
ORGANIC CHEMICALS												
Benzo(a)Pyrene	ng/l	7	200	100	<100	ND - 130	C	1 x 10^{-6}	3 x 10^{-5}	GAC GAC,	$2,310,000 - $12,600,000 (f)	$51 - $276 (f)
Tetrachloroethylene (PCE)	µg/l	0.06	5	0.5	<0.5	ND - 0.9	C	1 x 10^{-6}	8 x 10^{-5}	PTA	--	--
RADIOLOGICAL												
Gross Alpha Particle Activity	pCi/l	(0)	15	3	2.6	ND - 14	C	0	1 x 10^{-3}	RO	$9,350,000 - $79,700,000 (g)	$205 - $1,740 (g)
Uranium	pCi/l	0.43	20	1	2.7	ND - 9.5	C	1 x 10^{-6}	5 x 10^{-5}	IE, C/F, LS, RO	--	--
All Contaminants	--	--	--				--	--	--	GAC, RO	$12,200,000 - $97,000,000 (h)	$267 - $2,120 (h)

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

NOTES

PHG = Public Health Goal
MCL = Maximum Contaminant Level
MCLG = Maximum Contaminant Level Goal
NA = Not Appplicable or Available
ND = Not Detected
NR = Not Required
AL = Action Level
ng/l = nanograms per liter or parts per trillion
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

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.

TREATMENT/CONTROL TECHNOLOGIES

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

(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 arsenic using IE.
(d) Estimated cost to remove hexavalent chromium using IE.
(e) 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 recent group of samples collected in 2014.
(f) Estimated cost to remove benzo(a)pyrene using GAC, which also removes PCE.
(g) Estimated cost to remove gross alpha particle activity using RO, which also removes uranium.
(h) Assuming treating the entire production by GAC and RO, which can remove all contaminants listed in the above table to below the detectable levels, except for total coliform and copper, which can be detected anywhere in the distribution system.