FONTANA
WATER COMPANY

2016 Public Health Goal Report

in Response to
California Health and Safety Code
Sections 116365 and 116470

STETSON
ENGINEERS INC.

2016 Public Health Goal Report

Fontana Water Company

1.0 Introduction

California Health and Safety Code Sections 116365 and 116470 requires all public water systems in California serving more than 10,000 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 and include tables of cost estimates for BAT. The State of California (State) provides ACWA with numerical public health risks (cancer risk values) and category of health risk (health effects or hazard traits) 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 connections to identify each contaminant detected in its drinking water that exceeds its applicable PHG. Section 116470(f) requires the Maximum Contaminant Level Goal (MCLG), the U.S. Environmental Protection Agency (USEPA) equivalent of PHG, 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 have been detected in drinking water, the Maximum Contaminant Level Goal (MCLG), the USEPA equivalent of PHG, is used in this PHG Report.

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

Fontana Water Company (FWC) provides water service through approximately 47,938 service connections. From 2013 to 2015, FWC's water supplies included State Water Project water purchased from Inland Empire Utilities Agency, local groundwater, and surface water. A portion of these supplies was treated at FWC's Sandhill Treatment Plant. The following contaminants were detected at one or more locations in FWC's water system at levels that exceeded the applicable PHGs or MCLGs.

- **Arsenic** naturally occurs in local groundwater and in treated surface water.

- **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.

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

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

- **Perchlorate** is the result of industrial contamination in groundwater.

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

Table 1 shows the applicable PHG or MCLG, and MCL for each contaminant identified above and includes the maximum, minimum, and average concentrations of each contaminant in the water supplied by FWC 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 associated with each MCL, AL, PHG and MCLG determined by OEHHA. 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 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 over a lifetime exposure of 70 years.

Chromium, Hexavalent – 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.

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

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

Perchlorate – OEHHA has not established a numerical health risk for perchlorate 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.

PCE – OEHHA has determined that the health risk associated with the PHG is one excess case of cancer in a million people and the health risk associated with the MCL is 8 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 (BAT)

Section 116470(b)(4) of the Health and Safety Code requires a description of the best 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 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 Purposes 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 intends to take to reduce the concentration of the contaminant and the basis for that decision.

Arsenic – BATs for removal of arsenic in water for large water systems are: activated alumina, coagulation/filtration, electrodialysis, lime softening, ion exchange, oxidation/filtration, 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 local groundwater in several FWC wells and treated surface water. The estimated cost to reduce arsenic below the PHG using ion exchange was calculated based on cost estimates provided in the ACWA guidelines. 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 influencing the actual cost of reducing arsenic levels below the DLR. Achieving the water quality goal for arsenic using ion exchange could cost approximately $8,670,000 per year, or $181 per service connection per year.

Chromium, Hexavalent – 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 below the MCL of 10 µg/l but above the PHG of 0.02 µg/l in the local groundwater at several wells. The estimated cost to reduce hexavalent chromium levels in groundwater to below the PHG of 0.02 µg/l using reverse osmosis was calculated, based on cost estimates provided in the ACWA guidelines. 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 that may influence the actual cost of reducing hexavalent chromium levels below the DLR. Achieving the water quality goal for hexavalent chromium using reverse osmosis could range from $5,480,000 to $46,700,000 per year, or between $114 and $974 per service connection per year.

Coliform Bacteria – BAT for treating coliform organisms in drinking water has been determined by USEPA to be disinfection. FWC already disinfects all the water it serves 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. FWC 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 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 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.

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

- Disinfection using chlorine and maintaining a chlorine residual throughout 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 a chlorine residual;
- Cross-connection control program that prevents the accidental entry of non-disinfected water into the drinking water system; and
- Perform a Watershed Sanitary Survey every five years pursuant to Title 22, Article 7, §64665.

Gross Alpha – The only BAT for the removal of gross alpha radioactivity in water for large water systems is reverse osmosis. Gross alpha was detected below the MCL of 15 pCi/l but above the MCLG of 0 pCi/l in local groundwater at two of FWC's wells and in treated surface water. The cost of providing treatment using reverse osmosis to reduce gross alpha levels in water supplied by FWC to the MCLG of 0 pCi/l was calculated, based on cost estimates provided in the ACWA guidelines. Because the DLR for gross alpha is greater than the MCLG, treating gross alpha below the MCLG means treating to below the DLR of 3 pCi/l. Achieving the water quality goal for gross alpha using reverse osmosis could range from $3,410,000 to $29,100,000 per year, or between $71 and $607 per service connection per year.

PCE – BATs for removal of PCE in water are: liquid phase granular activated carbon (LPGAC) and packed tower aeration. FWC currently operates one LPGAC system to treat water with PCE from two wells. PCE was detected below the MCL of 5 µg/l but above the PHG of 0.06 µg/l in local groundwater at several FWC's wells and one reservoir. The estimated cost to reduce PCE levels in groundwater to below the PHG of 0.06 µg/l using LPGAC was calculated, based on cost estimates provided in the ACWA guidelines. Because the DLR for PCE is greater than the PHG, treating PCE below the PHG means treating to below the DLR of 0.5 µg/l. Achieving the water quality goal for PCE using LPGAC could range from $246,000 to $1,380,000 per year, or between $5.14 and $28.80 per service connection per year.

Perchlorate – BATs for removal of perchlorate in water are: ion exchange and biological fluidized bed reactor. FWC currently operates a perchlorate treatment system to treat water from wells F17B and F17C. Perchlorate was detected below the MCL of 6 µg/l but above the PHG of 1 µg/l in the local groundwater from one other well (F21A). The estimated cost to reduce perchlorate levels in local groundwater to below the PHG of 1 µg/l using ion exchange was calculated, based on cost estimates provided in the ACWA guidelines. Because the DLR for perchlorate is greater than the PHG, treating perchlorate to below the PHG level means treating perchlorate to below the DLR of 4 µg/l. There are numerous factors that may influence the actual cost of reducing perchlorate levels below the DLR. Achieving the water quality goal for perchlorate using ion exchange could range from $31,100 to $67,100 per year, or between $0.65 and $1.40 per service connection per year.

All Contaminants – A cost estimate was completed to treat all water supplied by FWC using LPGAC, ion exchange and reverse osmosis to remove all the contaminants detected above the PHGs or MCLGs. All of the contaminants listed in Table 1 (except total coliform) can be removed to non-detectable levels by LPGAC, ion exchange and reverse osmosis. Total coliform can be introduced and detected anywhere in the distribution system. As shown on Table 1, achieving the water quality goals for all contaminants, except total coliform, using LPGAC, ion exchange and reverse osmosis could range from $9,150,000 to $77,100,000 per year, or between $191 and $1,610 per service connection per year.

For additional information, please contact Mr. Cristopher Fealy, Fontana Water Company's Water Resources Manager, at cifealy@fontanawater.com or call him at (909) 201-7338, you may also write to Fontana Water Company, P.O. Box 987, Fontana, CA 92334. This report is posted on Fontana Water Company's website at www.fontanawater.com.

TABLE 1
2016 PUBLIC HEALTH GOAL REPORT
FONTANA WATER COMPANY

PARAMETER	UNITS OF MEASUREMENT	PHG OR (MCLG)*	MCL	DLR	CONCENTRATION				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
					GROUNDWATER		SURFACE WATER							
					AVERAGE	RANGE	AVERAGE	RANGE						
MICROBIOLOGICAL														
Total Coliform Bacteria (a)	% samples positive	(0)	5	NA	0.68	NA	NA	NA	NA	NA	NA	D	(b)	(b)
INORGANIC CHEMICALS														
Arsenic	µg/l	0.004	10	2	<2	ND - 5.5	<2	ND - 3.9	C	1×10^{-6}	2.5×10^{-3}	AA,C/F,E,IE,LS,O/F,RO	$8,670,000 (c)	$181 (c)
Chromium, Hexavalent	µg/l	0.02	10	1	2	ND - 5.1	ND	ND	C	1×10^{-6}	5×10^{-4}	R-C/F, IE, RO	$5,480,000 - $46,700,000 (d)	$114 - $974 (d)
Perchlorate	µg/l	1	6	4	<4	ND - 4.1	ND	ND	E	NA	NA	IE, BFBR	$31,100 - $67,100 (e)	$0.65 - $1.40 (e)
ORGANIC CHEMICALS														
Tetrachloroethylene (PCE)	µg/l	0.06	5	0.5	<0.5	ND - 0.7	ND	ND	C	1×10^{-6}	8×10^{-5}	GAC, PTA	$246,000 - $1,380,000 (f)	$5.14 - $28.80 (f)
RADIOLOGICAL														
Gross Alpha Particle Activity	pCi/l	(0)	15	3	<3	ND - 5.5	<3	ND - 3.9	C	0	1×10^{-3}	RO	$3,410,000 - $29,100,000 (g)	$71 - $607 (g)
ALL CONTAMINANTS	--	--	--	--	--	--	--	--	--	--	--	GAC, IE and RO	$9,150,000 - $77,100,000 (h)	$191 - $1,610 (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.
E (Endocrine Toxicity; Developmental Toxicity) = A substsance that affects the thyroid; causes neurodevelopmental deficits

NOTES
PHG = Public Health Goal
MCL = Maximum Contaminant Level
MCLG = Maximum Contaminant Level Goal
NA = Not Appplicable or Available
ND = Not Detected
ug/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

TREATMENT/CONTROL TECHNOLOGIES
AA = Activated Aluminum
BFBR = Biological Fluidized Bed Reactor
C/F = Coagulation/Filtration
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 RO.
(e) Estimated cost to remove perchlorate using IE.
(f) Estimated cost to remove PCE using GAC.
(g) Estimated cost to remove gross alpha particle activity using RO.
(h) Assuming treating the entire production by GAC, IE and RO, which can remove all contaminants listed in the above table to below the detectable levels, except for total coliform, which can be detected anywhere in the distribution system