



# Public Health Goal Report

## 2016 to 2018

July 2019

## Background

Provisions of the California Health and Safety Code, Section 116470(b), specify that water utilities serving more than 10,000 service connections prepare a report by July 1 every three years. The report provides information regarding water quality measurements that have exceeded any Public Health Goals (PHGs). PHGs are non-enforceable goals established by the state's Office of Environmental Health Hazard Assessment (OEHHA). The law also requires that where OEHHA has not adopted a PHG for a constituent, the water suppliers are to use the Maximum Contaminant Level Goals (MCLGs) adopted by United States Environmental Protection Agency (USEPA). Only constituents which have a California primary drinking water standard such as a Maximum Contaminant Level (MCL) and for which either a PHG or MCLG has been set are to be addressed in this report.

There are a few constituents that are routinely detected in water systems at levels usually well below the drinking water standards for which no PHG nor MCLG have yet been adopted by OEHHA or USEPA, such as Total Trihalomethanes. These will be addressed in a future required report after a PHG has been adopted.

This report provides the information required by law for constituents detected in Eastern Municipal Water District's (EMWD) water supply in 2016, 2017, or 2018 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, the category or type of risk to health that could be associated with each constituent at the PHG, the Best Available Technology (BAT) for treatment that could be used to reduce the constituent level, and an estimate of the cost for that treatment if it is appropriate and feasible.

## Guidelines

The Association of California Water Agencies (ACWA) prepared guidelines for water utilities to use in preparing the Public Health Goal report. The March 2019 ACWA guidelines and the OEHHA Health Risk Information for Public Health Goal Exceedance Reports, February 2019 were used in the preparation of this report. No guidance was available from state regulatory agencies.

## What Are PHGs?

PHGs are set by OEHHA, which is part of Cal-EPA, and are based solely on public health risk considerations. Practical risk-management factors that are considered by the USEPA or the California State Water Resources Control Board, Department Drinking Water (DDW) in setting drinking water standards (such as MCLs) are not considered in setting PHGs. The factors considered in forming MCLs include analytical detection capability, treatment technology availability, benefits and costs. PHGs are not enforceable and are not required to be met by any public water system. MCLGs are the USEPA equivalent to PHGs.

PHGs are intended to provide estimates of levels of chemical contaminants in drinking water which would pose no significant risk to individuals, including the most sensitive sub-populations, consuming the water every day, over an entire lifetime.

Generally, PHGs are set at lower levels than MCLs. MCLs are the regulated levels at which a contaminant cannot exceed in water served to the public. MCLs determine whether water is "safe" to drink, while PHGs represent the ideal levels.

## Numerical Health Risks

Numerical health risks referenced from OEHHA Health Risk Information from Public Health Goal Exceedance Reports, February 2019, are also included in the discussion. PHGs are based on health risk assessments using the most current scientific methods. PHGs for non-carcinogenic chemicals are set at a concentration at which no known or anticipated adverse health effects will occur, with an adequate margin of safety. For carcinogens, PHGs are set at a concentration that does not pose any *significant* risk to health. Where numerical values are stated for carcinogenicity, the cancer risk is usually no more than one in a million excess cancer risk level for a lifetime of exposure. For example, one in a million means one excess cancer case per million in population. USEPA sets the MCLG for all carcinogens at zero, so the numerical health risk is also zero.

## Best Available Treatment Technology and Cost Estimates

Both the USEPA and DDW adopt what are known as Best Available Technologies (BATs) which are the best known methods of reducing contaminant levels to the MCL. Costs can be estimated for such technologies. However, since many PHGs and MCLGs are set much lower than the MCL, it is not always possible nor is it feasible to determine what treatment is needed to further reduce a constituent downward to or near the PHG or MCLG, many of which are set at zero. Estimating a cost to reduce a constituent to zero is difficult, if not impossible because it is not possible to verify by analytical means that the level has been lowered to zero. In some cases, installing treatment to try and further reduce very low levels of one constituent may have adverse effects on other aspects of water quality.

The cost estimates in this report are referenced from the Association of California Water Agencies guidance manual and are not to be used as a definitive cost for treatment installation. These estimates were created for projects which may or may not reflect treatment to levels which EMWD would have to reach in order to meet PHGs, or any property that might be required to house the facility. The cost estimates per household (or service connection) per year are based on an average annual usage of 0.40 acre-foot (AF) for the years 2016, 2017, and 2018.

## Detected Contaminants

The following is a discussion of constituents that were detected between 2016 and 2018 in one or more of our drinking water sources at levels above the PHG, or if no PHG exists, then above the MCLG. If the value is below the detection level for reporting (DLR) then the value used for averaging was 0. If the average was below the DLR it was not considered a PHG exceedance, even though the average exceeded the PHG. If any drinking water sources are blended or treated before distribution, any detection exceeding a PHG is based on “point of entry”, similar to determining compliance with MCLs.

**Arsenic:** Arsenic is a naturally-occurring mineral in soils. The PHG for arsenic is 0.004 parts per billion (ppb), and the MCL is 10 ppb. The category of health risk associated with arsenic is that people who drink water containing levels above the MCL throughout their lifetime could experience an increased risk of contracting cancer. The numerical health risk for the PHG is one in a million, and the numerical health risk for the MCL is 2.5 per one thousand.

Arsenic was detected at Mills Treatment Plant at 2.5 ppb, Hemet Water Filtration Plant at 2.4 ppb, Perris Water Filtration Plant at levels ranging from <2 to 2.2 ppb, and East Valley Wells that blend at the Washington Forebay

range from <2 ppb to 4.7 ppb.

The Best Available Technology (BAT) to lower the level of arsenic at Mills Treatment Plant, Hemet Water Filtration Plant, Perris Water Filtration Plant, and the East Valley Wells that blend at the Washington Forebay to below the PHG of 0.004 ppb are ion exchange (IX) and reverse osmosis (RO). The estimated cost of treatment is about \$2.19 per 1,000 gallons of treated water for IX or about \$285 per service connection per year. RO treatment at the filtration plants is estimated to cost \$2.01 to \$3.24 per 1,000 gallons of treated water or about \$262 to \$422 per service connection per year. The estimated cost for treating East Valley wells that blend at the Washington Forebay by RO is \$4.33 to \$7.33 per 1,000 gallons of treated water or about \$564 to \$955 per service connection per year and does not include the costs of brine disposal. IX and RO both concentrate the contaminant so the spent resin or brine may need to be treated as a hazardous waste which will incur more costs for disposal.

Another BAT to lower the level of arsenic in the East Valley wells that blend at the Washington Forebay to below the PHG is blending with other wells. The estimated cost for blending is \$0.62 per 1,000 gallons treated or about \$81 per service connection per year.

**Bromate:** Bromate forms as a by-product of ozone disinfection of drinking water. Ozone reacts with naturally-occurring bromide in the water to form bromate. Ozone is used in the disinfection of drinking water to decrease disinfection by-products formed by the use of chlorine or chlorine products. The PHG for bromate is 0.1 ppb and the MCL is 10 ppb. The category of health risk associated with bromate is that people who drink water containing levels above the MCL throughout their lifetime could experience an increased risk of contracting cancer. The numerical health risk for the PHG is one in a million and the numerical health risk for the MCL is one per ten thousand.

Bromate has been detected in the Mills Treatment Plant effluent at levels ranging from 3.2 to 4.5 ppb and at the Skinner Treatment Plant effluent at levels ranging from 3.7 to 4.2 ppb. The bromate MCL is determined by a running annual average which was below the MCL for both treatment plants at all times.

The BAT for bromate is to control the ozone treatment in order to reduce the formation of Bromate. The Mills Filtration Plant and Skinner Filtration Plant are owned and operated by Metropolitan Water District. The cost to reduce bromate levels for large Treatment Plants using Coagulation/Filtration Optimization technology averages about \$0.91 per 1,000 gallons treated or about \$119 per service connection per year.

**Coliform Bacteria:** From 2016 to 2018, the District collected a minimum of 55 samples per week from the distribution system for coliform analysis. Occasionally, a sample was found to be positive for coliform bacteria and follow up actions were taken. In June 2018, 2.1% of the coliform samples were positive. The MCL for coliform is 5% positive samples of all samples per month and the MCLG is 0%. The reason for the coliform drinking water standard is to minimize the possibility of the water containing pathogens, organisms that cause waterborne diseases. Because coliform bacteria are only an indicator of the potential presence of pathogens, it is not possible to state a specific numerical health risk.

Coliform bacteria are ubiquitous in nature and are generally not considered harmful, but are used as an indicator of more harmful organisms. As such, it is impossible to say that any action taken would result with certainty that any system would have 0% coliform every single month. The BAT to meet the MCL as specified in Title 22, Section 64447 is as follows:

- Protection of wells from coliform contamination by appropriate placement and construction;
- Maintenance of a disinfectant residual throughout the distribution system;

- Proper maintenance of the distribution system; and
- Filtration and/or disinfection of approved surface water or disinfection of groundwater.

EMWD adheres to these actions in addition to preventive maintenance, main flushing, special monitoring of reservoirs, sources and shutdowns, preventive sanitary surveys, and cross connection control. Since all possible action to prevent coliform bacteria in the distribution system is already being performed, no cost estimates will be provided.

**Gross Alpha:** Gross Alpha is a radiological contaminant that occurs naturally in the soil. There is no PHG for gross alpha, but the MCLG is 0 picoCuries per Liter (pCi/L); the MCL or drinking water standard is 15 pCi/L. The category of health risk associated with gross alpha and the reason that a drinking water standard was adopted for it, is that people who drink water containing levels above the MCL throughout their lifetime could experience an increased risk of contracting cancer. The numerical health risk at the MCLG is zero and the numerical health risk at the MCL is one per one thousand.

EMWD has detected gross alpha in samples collected at Perris Water Filtration Plant at levels ranging from 3.4 to 5.6 pCi/L, Well 56 at 7.6 pCi/L, Well 57 at 16 pCi/L, and the East Valley wells that blend at the Washington Forebay ranged from <3 to 6.3 pCi/L.

The BAT to lower the level of gross alpha in the water to the MCLG is RO. Treatment at Perris Water Filtration Plant with RO is estimated to cost \$2.01 to \$3.24 per 1,000 gallons treated or about \$262 to \$422 per service connection per year. To treat Wells 56, 57, and the East Valley wells that blend at the Washington Forebay with RO is estimated to cost \$4.33 to \$7.33 per 1,000 gallons treated or about \$564 to \$955 per service connection per year. RO concentrates the contaminant and subsequently the brine may need to be treated as a hazardous waste and will incur more costs for disposal.

**Gross Beta:** Gross Beta is a radiological contaminant that occurs naturally in the soil. There is no PHG for gross beta, but the MCLG is 0 pCi/L; the MCL or drinking water standard is 50 pCi/L. The category of health risk associated with gross beta is that people who drink water containing levels above the MCL throughout their lifetime could experience an increased risk of contracting cancer. The numerical health risk at the MCLG is zero and the numerical health risk at the MCL is two per one thousand.

EMWD has detected gross beta at the Mills Filtration Plant at 5 pCi/L, Hemet Water Filtration Plant at 6.5 pCi/L, the Menifee and Perris Desalter at 13 pCi/L, Well 56 at 4.8 pCi/L, and the East Valley wells that blend at the Washington Forebay at 5.6 pCi/L.

The BAT to lower the level of gross beta to the MCLG at Mills Filtration Plant, Hemet Filtration Plant, Well 56, and the East Valley wells that blend at the Washington Forebay is RO. The estimated cost of RO treatment at the Mills Filtration Plant or Hemet Filtration Plant is \$2.01 to \$3.24 per 1,000 gallons of treated water or about \$262 to \$422 per service connection per year. To treat Well 56 and the East Valley wells that blend at the Washington Forebay with RO is estimated to cost \$4.33 to \$7.33 per 1,000 gallons of treated water or about \$564 to \$955 per service connection per year. RO concentrates the contaminant and subsequently the brine may need to be treated as a hazardous waste and will incur more costs for disposal.

Since Menifee and Perris Desalter currently utilize RO treatment, the BAT to further reduce gross beta to the MCLG would be IX. The estimated cost for treating with IX is about \$2.19 per 1,000 gallons of water treated or about \$285 per service connection per year. IX will concentrate the contaminant and subsequently the spent resin may need to be treated as a hazardous waste and will incur more costs for disposal.

**Uranium:** Uranium is a radiological contaminant that occurs naturally in the soil. The PHG for uranium is 0.43 pCi/L and the MCL is 20 pCi/L. The category of health risk associated with uranium is that people who drink water containing levels above the MCL throughout their lifetime could experience an increased risk of contracting cancer. The numerical health risk associated with uranium at the PHG is one in a million and the numerical health risk at the MCL is five per one hundred thousand.

EMWD has detected uranium at Hemet Filtration Plant at 1.2 pCi/L, Perris Filtration Plant at levels ranging from <1 to 2.2 pCi/L, the East Valley Wells that source and blend at the Washington Forebay range from 1.6 to 2.8 pCi/L, Well 90 at 4.5 pCi/L, Well 56 at 4.5 pCi/L, and Well 57 at 10 pCi/L.

The BATs to lower the uranium level below the PHG of 0.43 pCi/L at the Hemet and Perris Water Filtration Plants is RO. The estimated cost of treatment at Hemet Water Filtration Plant and Perris Water Filtration Plant with RO is \$2.01 to \$3.24 per 1,000 gallons of treated water or about \$262 to \$422 per service connection per year. RO concentrates the contaminant and subsequently the brine may need to be treated as a hazardous waste which will incur more costs for disposal.

The BAT to lower the uranium level below the PHG of 0.43 pCi/L at the wells is also RO. The estimated cost to treat at each well is \$4.33 to \$7.33 per 1,000 gallons of treated water or about \$564 to \$955 per service connection per year. RO concentrates the contaminant so the brine may need to be treated as a hazardous waste which will incur more costs for disposal.

## Recommendations for Further Action:

Eastern Municipal Water District is committed to providing safe, reliable, economical and environmentally sustainable water, wastewater and recycled water services. Drinking water delivered by EMWD is in full compliance with Federal and State regulations and meets all California Department Drinking Water and USEPA drinking water MCLs. PHGs are non-enforceable, idealistic goals that are protective of public health, but do not consider feasibility or economic possibility of attainment.

To further reduce the levels of constituents identified in this report that are already in compliance with the Maximum Contaminant Levels would require additional costly treatment processes. The effectiveness of these treatment processes would not necessarily achieve PHG levels or provide further health protection benefits to our customers.

The recommendations for further action are spelled out in Strategic Plan 2016-2018 "Protection of Public and Environmental Health" to achieve the Strategic Goal:

*"Protect the health and safety of the community and the environment and meet all regulatory requirements"*

**"Water Quality:** *Ensure all supplies introduced into the District's distribution systems are of a water quality that protects the health and safety of the community and is in full compliance with all applicable Federal and State standards."*

EMWD strives to be proactive through innovative treatment, monitoring programs, flushing programs, and cross connection protection programs.

## Acronyms:

<: less than

>: greater than

**ACWA:** Association of California Water Agencies

**AF:** Acre-Foot

**BAT:** Best Available Technology

**Cal-EPA:** California Environmental Protection Agency

**DLR:** Detection Level for Reporting

**DDW:** California Department of Drinking Water

**EMWD:** Eastern Municipal Water District

**IX:** Ion Exchange

**MCL:** Maximum Contaminant Level

**MCLG:** Maximum Contaminant Level Goal

**OEHHA:** Office of Environmental Health Hazard Assessment

**pCi/L:** picoCuries per liter

**PHG:** Public Health Goal

**ppb:** parts per billion

**RO:** Reverse Osmosis

**USEPA:** United States Environmental Protection Agency

**EASTERN MUNICIPAL WATER DISTRICT PUBLIC HEALTH GOAL COST ESTIMATES 2016 to 2018**

SOURCE	CONSTITUENT	BEST AVAILABLE TECHNOLOGY (BAT)	COST PER 1,000 GAL	COST PER SERVICE CONNECTION PER YEAR*
<b>MILLS FILTRATION PLANT</b>	Arsenic	IX	\$2.19	\$285
		RO	\$2.01 to \$3.24	\$262 to \$422
	Bromate	Control Ozone	\$0.91	\$119
	Gross Beta	RO	\$2.01 to \$3.24	\$262 to \$422
<b>SKINNER FILTRATION PLANT</b>	Bromate	Control Ozone	\$0.91	\$119
<b>HEMET FILTRATION PLANT</b>	Arsenic	IX	\$2.19	\$285
		RO	\$2.01 to \$3.24	\$262 to \$422
	Gross Beta	RO	\$2.01 to \$3.24	\$262 to \$422
	Uranium	RO	\$2.01 to \$3.24	\$262 to \$422
<b>PERRIS FILTRATION PLANT</b>	Arsenic	IX	\$2.19	\$285
		RO	\$2.01 to \$3.24	\$262 to \$422
	Gross Alpha	RO	\$2.01 to \$3.24	\$262 to \$422
	Uranium	RO	\$2.01 to \$3.24	\$262 to \$422
<b>MENIFEE/PERRIS DESALTER</b>	Gross Beta	IX	\$2.19	\$285
<b>EAST VALLEY WELLS at WASHINGTON FOREBAY</b>	Arsenic	IX	\$2.19	\$285
		RO	\$4.33 to \$7.33	\$564 to \$955
		Blending	\$0.62	\$81
	Gross Alpha	RO	\$4.33 to \$7.33	\$564 to \$955
	Gross Beta	RO	\$4.33 to \$7.33	\$564 to \$955
	Uranium	RO	\$4.33 to \$7.33	\$564 to \$955
<b>WELL 90</b>	Uranium	RO	\$4.33 to \$7.33	\$564 to \$955
<b>WELL 56</b>	Gross Alpha	RO	\$4.33 to \$7.33	\$564 to \$955
	Gross Beta	RO	\$4.33 to \$7.33	\$564 to \$955
	Uranium	RO	\$4.33 to \$7.33	\$564 to \$955
<b>WELL 57</b>	Gross Alpha	RO	\$4.33 to \$7.33	\$564 to \$955
	Uranium	RO	\$4.33 to \$7.33	\$564 to \$955

IX: Ion Exchange

RO: Reverse Osmosis

\*Cost based on an average annual usage of 0.40 acre-foot (AF) per service connection