

2016 Public Health Goals Report

Mesa Water District

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 Public Health Goal using best available technology, and 3) health risks for each contaminant exceeding a Public Health Goal. 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 2013, 2014, and 2015 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 made available to customers by July 1st of each year.

There is no regulatory guidance explaining requirements for the preparation of Public Health Goal reports. However, a workgroup of the Association of California Water Agencies Water Quality Committee has prepared suggested guidelines for water utilities to use in preparing Public Health Goal reports. These guidelines were used in the preparation of this report, and include tables of cost estimates for best available technology. The State of California provides the Association of California Water Agencies with numerical health risks and category of health risk information for contaminants with Public Health Goals. This health risk information is appended to the Association of California Water Agencies guidelines.

2.0 California Drinking Water Regulatory Process

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

The State office designated to develop Public Health Goals is the California Environmental Protection Agency's Office of Environmental Health Hazard Assessment (OEHHA). The Public Health Goal is then forwarded to the California State Water Resources Control Board, Division

of Drinking Water (DDW) 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 Public Health Goals. The DDW is required to take treatment technologies and cost of compliance into account when setting a 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 drinking water that exceeded the applicable PHG.

Section 116470(f) requires that where OEHHA has not adopted a PHG for constituent, water suppliers are to use the established maximum contamination level goals (MCLGs) adopted by the United States Environmental Protection Agency (USEPA). MCLGs are the federal equivalent to PHGs.

3.0 Identification of Contaminants

The Mesa Water District (Mesa Water®) system has approximately 23,500 service connections serving 110,000 people. The following constituents were detected at one or more locations within the drinking water system at levels that exceed the applicable PHGs or MCLGs:

- **Arsenic** – Arsenic is a naturally occurring contaminant. In addition, arsenic is a waste product from many industrial production processes. Arsenic was measured above the PHG level in Mesa Water® groundwater and in surface water purchased from the Metropolitan Water District of Southern California (Metropolitan);
- **Hexavalent Chromium** – Hexavalent chromium is present in several industrial waste products. Internal corrosion of household pipes is also a source of hexavalent chromium. Hexavalent chromium was measured above the PHG level in Mesa Water® groundwater and in surface water purchased from Metropolitan;
- **Gross Alpha Particle Activity (Gross Alpha)** – Gross Alpha is naturally occurring contaminant. It is present above the PHG level in surface water purchased from Metropolitan;
- **Gross Beta Particle Activity (Gross Beta)** – Gross Beta is naturally occurring contaminant. It is present above the PHG level in surface water purchased from Metropolitan;
- **Uranium** – Uranium is naturally occurring contaminant. It was measured above the PHG level in Mesa Water® groundwater and in surface water purchased from Metropolitan;
- **Coliform** – Coliform bacteria are naturally present in the surface and groundwater, and are used as an indicator that other, potentially-harmful, microorganisms may be present.

Chart A shows the applicable PHG or MCLG and MCL for each contaminant identified above. The chart includes the maximum, minimum, and average concentrations of each contaminant in drinking water supplied by Mesa Water® in calendar years 2013 to 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 the OEHHA, associated with the MCLs, Action Levels, PHGs and MCLGs. Available numerical health risks developed by the OEHHA for the contaminants identified above are shown on Chart A. Only numerical risks associated with cancer-causing chemicals have been quantified by the OEHHA.

Arsenic – OEHHA has determined that the health risk associated with the PHG is one theoretical excess case of cancer in a million people and the risk associated with the MCL is 2 theoretical excess cases of cancer in 1,000 people exposed for a 70-year lifetime.

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

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

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

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, if any, that are available on a commercial basis, to remove or reduce the concentrations of the contaminants identified above. The best available technology are discussed in Section 7.0 and shown on Chart A.

7.0 Costs of Compliance 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 household of utilizing the best available technologies identified to reduce the concentration of a contaminant to a level at or below the PHG or MCLG.

The following sections summarize the estimated cost of compliance and cost per Mesa Water® household to reduce the concentration of contaminants to a level at or below the PHG or MCLG. All costs estimates are adjusted to 2015 cost of construction.

Arsenic - The best available technologies for removal of arsenic in water for large water systems are: activated alumina, coagulation/filtration, lime softening, ion exchange, and reverse osmosis. Arsenic was detected above the Public Health Goal in treated surface water purchased from Metropolitan and in two Mesa Water® wells. One of these two wells are currently inactivated and planned to be destroyed and hence, not factored in the treatment cost estimate. Mesa Water® is in compliance with the MCL for arsenic. The estimated cost to reduce arsenic levels in Metropolitan water and in the Mesa Water® well to below the Public Health Goal of 0.004 µg/L using ion exchange was calculated. Because the Detection Limit for the purpose of Reporting (DLR; i.e., the level at which the DDW is confident about quantification being reported) for arsenic is 2 µg/L, treating arsenic to below the PHG level means treating arsenic to below the DLR of 2 µg/L. There are numerous factors, including feasibility, that may influence the actual cost of reducing arsenic levels to below the Public Health Goal. Achieving the water quality goal for arsenic could range from \$2,499,000 to \$2,688,000 per year, or between \$106 and \$114 per household per year.

Hexavalent Chromium – The best available technologies for removal of hexavalent chromium are reduction/coagulation/filtration, strong or weak anion exchange and reverse osmosis. Groundwater from Mesa Water® wells and surface water purchased from Metropolitan were sampled twice between 2013 and 2015 as federally required in the third Unregulated Contaminant Monitoring Rule (UCMR3). The method detection limit of 0.03 µg/L used for UCMR3 is significantly lower than the State’s DLR of 1 µg/L for hexavalent chromium compliance monitoring. Hexavalent chromium levels measured in Mesa Water® wells and Metropolitan water were below the DLR of 1 µg/L. However, at the method detection limit of 0.03 µg/L used for UCMR3, hexavalent chromium was detected above the Public Health Goal in five Mesa Water® wells and in treated surface water purchased from Metropolitan. One of these wells is since inactivated. Mesa Water® is in compliance with the MCL for hexavalent chromium. The estimated cost to reduce hexavalent chromium levels in the four groundwater wells and Metropolitan water to below the Public Health Goal of 0.02 µg/L using reduction/coagulation/filtration was calculated. There are numerous factors, including feasibility, that may influence the actual cost of reducing hexavalent chromium levels to below the Public Health Goal. Achieving the water quality goal for hexavalent chromium could range from \$7,383,000 to \$46,492,000 per year, or between \$314 and \$1,978 per household per year.

Gross Alpha, Gross Beta, and Uranium - The only best available technology for the removal of gross alpha in water for large water systems is reverse osmosis, which can also remove gross beta, and uranium (and arsenic). Gross alpha and beta were detected above the MCLG in surface water purchased from Metropolitan. Uranium was detected above the PHG in one groundwater well and in water purchased from Metropolitan. However, the groundwater well has since been inactivated and planned to be destroyed. The estimated cost of providing treatment using reverse osmosis to reduce radionuclide levels in Metropolitan water to the applicable MCLG or PHG was calculated. Achieving the water quality goals for all the radionuclides could range from \$1,452,000 to \$2,575,000 per year, or between \$62 and \$110 per household per year.

Total Coliform - During 2013 to 2015, approximately 100 to 125 samples were collected each month for coliform analysis. During four of these thirty six months, the coliform levels were found positive in 1 to 2% of the samples. The MCL for coliform is 5% positive samples of all samples per month and the MCLG is zero. The reason for the coliform drinking water standard is to minimize the possibility of the water containing pathogens which are organisms that cause waterborne disease. Because coliform is only a surrogate indicator of the potential presence of pathogens, it is not possible to state a specific numerical health risk. While USEPA normally sets MCLGs “at a level where no known or anticipated adverse effects on persons would occur”, it indicates that it cannot do so with coliforms.

Coliform bacteria are “indicator” organisms that are ubiquitous in nature and are not generally considered harmful. They are used because of the ease of monitoring and analysis. If a positive sample is found, it indicates a potential problem that needs to be investigated and follow up sampling must be completed. It is not at all unusual for a system to have an occasional positive sample. It is difficult, if not impossible, to assure that a system will never get a positive sample. Therefore, no estimate of cost has been included.

Chloramine is added at sources to assure that the water served is microbiologically safe. The chlorine residual levels are carefully controlled to provide the best health protection without causing the water to have undesirable taste and odor or increasing disinfection byproduct level. This careful balance of treatment process is essential to continue supplying our customers with safe drinking water.

Total Cost of Compliance: The estimated cost of compliance to meet PHG level for all the constituents (except coliform) identified for Mesa Water® sources can vary from approximately \$9 Million to \$49 Million, or between approximately \$376 to \$2,088 per household per year.

8.0 Recommendations for Further Action

Section 116470(b)(6) also 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. Mesa Water’s drinking water quality meets or exceeds all state and federal drinking water standards set to protect public health. To further reduce levels of the constituents identified in this report that are already below the health-based MCLs established to provide “safe drinking water”, additional costly treatment processes would be required. The effectiveness of the treatment

processes to provide significant reduction in constituent levels at these already low values is uncertain. The health protection benefits of these further hypothetical reductions are not at all clear and may not be quantifiable. Therefore, no action is proposed.

For additional information, please contact Ms. Kaying Lee, Water Quality and Compliance Supervisor at (949) 207-5491, or write to Mesa Water District, 1965 Placentia Avenue, Costa Mesa, CA 92627.

Chart A
2016 PUBLIC HEALTH GOALS REPORT
Mesa Water District

PARAMETER	UNITS OF MEASUREMENT	PHG OR (MCLG)*	MCL	CONCENTRATION		CATEGORY OF RISK	Cancer Risk at PHG or MCLG	Cancer Risk at MCL	BEST AVAILABLE TECHNOLOGIES	AGGREGATE COST PER YEAR (a)	COST PER HOUSEHOLD PER YEAR
				AVERAGE	RANGE						
INORGANIC CHEMICALS											
Arsenic	µg/L	0.004	10	ND	ND - 2.8	C	1 X 10 ⁻⁶	2.5 X 10 ⁻³	AA,C/F,IX,LS,RO	\$2,499,000 - \$2,688,000 (b)	\$106 - \$114
Hexavalent Chromium	µg/L	0.02	10	0.29	0.06-0.68	C	1 X 10 ⁻⁶	5 X 10 ⁻⁴	R/C/F, IX, RO	\$7,383,000 - \$46,492,000 (c)	\$314 - \$1,978
RADIOLOGICAL											
Gross Alpha Particle Activity	pCi/L	(0)	15	1.75	ND- 4	C	0	1 X 10 ⁻³	RO	\$1,452,000 - \$2,575,000(d)	\$62 - \$110
Gross Beta Particle Activity	pCi/L	(0)	50**	3.5	ND- 6	C	0	2 X 10 ⁻³	IX,RO	\$1,452,000 - \$2,575,000(d)	\$62 - \$110
Uranium	pCi/L	0.43	20	2.5	1- 3	C	1 X 10 ⁻⁶	5 X 10 ⁻⁵	RO	\$1,452,000 - \$2,575,000(d)	\$62 - \$110
All Radionuclides (and Arsenic)									RO	\$1,452,000 - \$2,575,000(d)	\$62 - \$110
Total Cost of Compliance										\$8,835,000 - \$49,067,000	\$376 - \$2,088

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

**Judged by OEHHA

RISK CATEGORIES

C (Carcinogen) = A substance that is potentially capable of producing cancer.

ABBREVIATIONS

PHG = Public Health Goal

MCL = Maximum Contaminant Level

MCLG = Maximum Contaminant Level Goal

µg/L = micrograms per liter or parts per billion

pCi/l = picoCuries per liter

FOOTNOTES

(a) Wells that are inactivated and planned to be destroyed are not included in cost estimates.

(b) Estimated cost to remove Arsenic using Ion Exchange.

(c) Estimated cost to remove hexavalent chromium by reduction/coagulation/filtration

(d) Estimated cost to remove radionuclides (and arsenic) by reverse osmosis.

TREATMENT/CONTROL TECHNOLOGIES

AA = Activated Aluminum

LS = Lime Softening

C/F = Coagulation/Filtration

IX - Ion Exchange

R/C/F = Reduction/Coagulation/Filtration

RO = Reverse Osmosis