2025 Public Health Goals Report

MesaWater DISTRICT©

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PREPARED BY: Trussell CREATING THE FUTURE OF WATER

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1 Introduction

California Health and Safety Code §116470(b) requires California public water systems with more than 10,000 service connections to prepare a publicly available report every three years addressing the following:

(a) detection of any contaminant in drinking water at a level exceeding its respective public heath goal (PHG),
(b) discussion of public health risks associated with the detected PHG contaminants,
(c) description of best available technology for reducing the concentration of the detected contaminants, and
(d) aggregate cost estimates for using the technologies identified in part (c) to bring drinking water levels below the PHG.

Mesa Water District (Mesa Water®) is a public water system with approximately 24,475 service connections serving 110,000 people. This document serves as the 2025 PHG Report for Mesa Water and has been prepared to address the requirements from the California Health and Safety Code (§116470), based on water quality analyses for samples collected during calendar years 2022 through 2024.

2 Background Information

2.1 PHGs, MCLs, and MCLGs

PHGs are developed by the California Environmental Protection Agency's Office of Environmental Health Hazard Assessment (OEHHA) for every contaminant with a primary drinking water standard or any contaminant the State is proposing to regulate with a primary drinking water standard, as required under California Health and Safety Code §116365. Each PHG is defined as the level where the drinking water contaminant does not pose any significant risk to human health. This level is based on risk assessments prepared by OEHHA that consider the most current principles, practices, and methods used by experienced public health professionals. PHGs are recommended, non-enforceable targets and public water systems are not required to achieve these levels in the drinking water supplied to customers. Where OEHHA has not adopted a PHG for a constituent, the established maximum contaminant level goal (MCLG) adopted by the United States Environmental Protection Agency (USEPA) is reported instead.

The State Water Resources Control Board Division of Drinking Water (DDW) considers PHGs when revising or developing a maximum contaminant level (MCL) for drinking water contaminants. The MCL is an enforceable regulatory limit defined as the highest level of a contaminant that is allowed in drinking water. MCLs are set as closely as is technically and economically feasible to the PHGs. DDW is required to take treatment technologies and the cost of compliance into account when establishing an MCL. Each MCL is reviewed at least once every five years.

2.2 Water Quality Data

Mesa Water uses local groundwater supplies as the primary source of drinking water. Seven wells pump water from the local clear-water basin. An additional two wells pump from a deeper, amber-colored water basin, and this water is treated with nanofiltration technology at the Mesa Water Reliability Facility (MWRF) before it enters the distribution system. Import water from the Metropolitan Water District of Southern California (Metropolitan) provided by the Municipal Water District of Orange County is used as an emergency backup water supply for Mesa Water.

This report is based on water quality analyses performed during calendar years 2022, 2023, and 2024 for Mesa Water's source waters and drinking water system. The water quality data is also summarized in Mesa Water's Water Quality Reports (also known as Consumer Confidence Reports) for 2023 through 2025, which were available to customers by July 1st of each year.

2.3 Best Available Technologies (BATs) and Cost Estimates

USEPA and DDW adopt what are known as best available technologies, or BATs, which are the best-known methods of reducing contaminant levels to the MCL. Because PHGs and MCLGs are typically set lower than the MCL, determining the type of treatment that is needed to further reduce a contaminant to the PHG or MCLG is not always possible or feasible. An example is when the PHG or MCLG are below the existing detection limit for the purpose of reporting (DLR), which is the statutory level at which a constituent can be measured for a drinking water. Estimating costs to further reduce a constituent below a detectable level is difficult, if not impossible, because it is not possible to verify this reduction by analytical means. Installing treatment technologies to further reduce low levels of one constituent may, in some cases, have adverse effects on other aspects of water quality. As such, the cost estimates used in this report do not account for these unintended consequences and are highly speculative and theoretical. These cost estimates only account for treating to the MCL. The ability to treat to the PHG / MCLG is unknown.

2.4 Reporting Guidelines

The Association of California Water Agencies (ACWA) formed a workgroup to prepare suggested guidelines for water utilities to use in preparing PHG reports. The 2025 ACWA guidelines, which include annualized capital and operational and maintenance (O&M) treatment cost estimates for BATs indexed to 2024 costs, were used in preparation of this report. OEHHA has provided health risk information for PHG reports, which includes health risk categories and numerical health risks based on lifetime exposure for each contaminant with a PHG.

3 Contaminants Exceeding PHGs or MCLGs

This section covers the requirements set forth by Sections 116470(b)(1) through 116470(b)(5) of the California Health and Safety Code. This includes a discussion of the following:

(1) Identification of each contaminant detected in drinking water that exceeds the PHG,
(2) Disclosure of the numerical public health risks determined by OEHHA associated with the MCL and PHG of each detected contaminant,
(3) Identification of the category of risk to public health for each detected contaminant,
(4) Description of any commercially available BATs to remove or reduce the concentration of the contaminants to a level at or below the PHG,
(5) Estimate of the aggregate cost and cost per connection of utilizing the BATs.

The following subsections discuss contaminants that were detected at one or more locations within the Mesa Water drinking water system at levels that exceeded the applicable PHGs or MCLGs. This information is summarized in Table A at the end of this report.

3.1 Arsenic

Arsenic is a naturally occurring element present in rocks and sediments. It can enter drinking water through natural deposits or as a result of industrial activities. The PHG for arsenic is 0.004 micrograms per liter (µg/L), which is significantly below the current DLR defined by DDW for arsenic at 2 µg/L. Arsenic was measured above the PHG at four of Mesa Water's groundwater wells. The concentration of arsenic from all impacted wells ranged from non-detect (ND) to 3.0 µg/L. All of these values are well below the MCL of 10 µg/L.

The health risk category for arsenic is carcinogenicity, meaning it is a substance capable of causing cancer. The numerical health risk associated with the PHG is 1 excess case of cancer in 1,000,000 people (1×10^{-6}). The risk associated with the MCL is 2.5 excess cases of cancer in 1,000 people (2.5×10^{-3}).

The BATs for removal of arsenic to levels at or below the MCL include activated alumina, coagulation/filtration, granular ferric oxide resin, ion exchange (IX), lime softening, oxidation/filtration, and reverse osmosis (RO). IX was used to estimate the cost to reduce arsenic concentrations to below the PHG (effectively, below the DLR of 2 µg/L based on DDW-approved methods) in the four local groundwater wells with detections above the PHG, however there is no information available to indicate that any of the BAT methods can reduce arsenic concentrations to this level. Numerous factors may influence the actual cost of reducing arsenic to the PHG including efforts to establish that these technologies could treat to the low levels of the PHG. Without accounting for these efforts, the total estimated cost to reduce arsenic levels in all clearwater wells, based on the average well water production during 2022 through 2024, is $12,010,000 per year, or $490 per service connection per year.

3.2 Bromate

Bromate is a byproduct of drinking water disinfection processes, formed when water containing naturally occurring bromide ions react with ozone. The PHG for bromate is 0.1 µg/L, and the

DLR is 1 μg/L. Bromate was measured above the PHG in treated surface water from Metropolitan. The running annual average bromate concentrations in Metropolitan's water ranged from below the DLR (ND) to 2.4 μg/L. This is well below the 10 μg/L MCL for bromate.

The health risk category for bromate is carcinogenicity. The numerical health risk associated with the PHG is 1 excess case of cancer in 1,000,000 people (1×10^{-6}). The risk associated with the MCL is 1 excess case of cancer in 10,000 people (1×10^{-4}).

Bromate is a disinfection byproduct that can be formed with ozonation of water containing bromide. The imported water supplied from Metropolitan is treated with ozonation, and the most cost-effective means of reducing the bromate levels below the PHG (effectively, below the DLR of 1 μg/L based on DDW-approved methods) is likely through improved control of the ozone treatment process to further limit bromate formation. Once formed, the BATs for removal of bromate in water include coagulation/filtration optimization, granular activated carbon (GAC), and RO. If Mesa Water were to use import water and target bromate from the emergency connections maintained for accessing import water, high-cost RO treatment could be implemented from a single import water location. Consistent with PHG reporting guidelines, the cost estimate for reducing bromate is based on the use from the current period, which reflects testing at the emergency turnouts only. As such, the total estimated cost based on the maximum annual imported volume for the 2022-2024 period, ranges from $9,700 to $18,400 per year, or $0.40 to $0.75 per service connection per year. Numerous factors may influence the actual cost of reducing bromate levels to the PHG, particularly the need to provide on-demand treatment for multiple emergency import water connections. These recommended BATs are also only proven to reduce bromate levels to the MCL and not the PHG which limits the accuracy of the given cost estimates.

3.3 Gross Alpha Particle Activity (Gross Alpha)

Radionuclides are naturally occurring elements that can be found in natural deposits and have unstable nuclei that spontaneously decay, releasing radiation. Gross alpha is a measure of the overall radioactivity in water attributed to alpha particles. OEHHA has not established a PHG for gross alpha, concluding in its 2003 review that a PHG was not practical. The MCLG is zero, the DLR is 3 picocuries per liter (pCi/L), and the MCL is 15 pCi/L. Of eighteen measurements analyzed from 2022 through 2024, only one well was detected at a concentration of 3.58 pCi/L, which is well below the MCL.

The health risk category for gross alpha is carcinogenicity. The numerical health risk associated with an MCLG of zero is zero. The health risk associated with the MCL is 1 excess case of cancer in 1,000 people (1×10^{-3}).

The BAT to treat gross alpha is RO, but this will be expensive to implement at a single groundwater well location. Since RO will also remove other radionuclides and contaminants, the cost of implementing this treatment in a centralized facility is discussed in Section 3.6.

3.4 Gross Beta Particle Activity (Gross Beta)

Gross beta is a measure of the overall radioactivity in water attributed to a total 168 individual beta particles and photon emitters. OEHHA has not established a PHG for gross beta, concluding in its 2003 review that a PHG was not practical. The MCLG is zero, the DLR is 4 pCi/L, and the MCL is 4 mrem/year (millirem per year). OEHHA has determined a level of 50 pCi/L to be equivalent to the MCL. Gross beta was measured above the PHG in treated surface water from Metropolitan. The gross beta concentration in Metropolitan's water ranged from below the DLR (ND) to 6 pCi/L, with all values well below the MCL.

The health risk category for gross beta is carcinogenicity. The numerical health risk associated with an MCLG of zero is zero. The health risk associated with the MCL is 2 excess cases of cancer in 1,000 people (2×10^{-3}).

The BATs for removal of gross beta in water are IX and RO. Numerous factors may influence the actual costs of reducing gross beta levels to the MCLG of zero (effectively, below the DLR of 4 pCi/L based on DDW-approved methods). The total estimated cost of reducing gross beta levels using IX is $10,900 per year or $0.45 per service connection per year, which only accounts for treating to the MCL. As discussed in Section 3.2, this treatment is assumed to be limited to a single location and would thus require limiting the use of emergency import water supplies to a single turnout. The costs to reduce gross beta using RO in a centralized facility, which will also reduce other contaminant concentrations, is discussed in Section 3.6.

3.5 Hexavalent Chromium

Hexavalent chromium (CrVI) is a naturally occurring heavy metal that has been used in industrial applications. While the trivalent form of chromium is nontoxic, the hexavalent form has demonstrated carcinogenicity and toxicity upon the liver. CrVI has a MCL of 10 µg/L, PHG of 0.02 µg/L, and DLR of 0.1 µg/L. CrVI was detected in nine wells with concentration levels ranging from ND (below the DLR) to 0.77 µg/L. These values are significantly lower than the 10 µg/L MCL for CrVI.

The health risk for CrVI is carcinogenicity. The numerical health risk associated with the PHG of 0.02 µg/L is 1 excess case of cancer in 1,000,000 people (1×10^{-6}). The health risk associated with the MCL is 5 excess cases of cancer in 10,000 people (5×10^{-4}).

The BATs for removal of CrVI to 1 µg/L in water are reduction/coagulation/filtration and IX (weak base anion (WBA) resin). The total estimated cost of reducing CrVI levels in all groundwater wells (i.e., clear and amber water wells) using IX is $12,760,000 to $53,360,000 per year or $520 to $2,200 per service connection per year. Current BATs can only treat to the MCL, which is already met despite being detected above the PHG. Numerous factors may influence the actual costs of reducing CrVI levels to the PHG (effectively, below the DLR of 0.1 µg/L based on DDW-approved methods), including efforts to prove the BAT could treat to below the DLR.

3.6 Uranium

Uranium is a naturally occurring radionuclide in natural deposits that is introduced into drinking water through erosion. The PHG for uranium is 0.43 pCi/L, and the DLR is 1 pCi/L. Uranium was measured above the PHG at two of Mesa Water's groundwater wells. The concentration of uranium at these wells ranged from 1.08 to 1.78 pCi/L. Uranium was also detected in treated surface water purchased from Metropolitan at a range of ND to 2 pCi/L. These values are well below the MCL of 20 pCi/L.

The health risk category for uranium is carcinogenicity. The theoretical health risk associated with the PHG is 1 excess case of cancer in 1,000,000 (1×10^{-6}). The health risk associated with the MCL is 5 excess cases of cancer in 100,000 people (5×10^{-5}).

The BAT for removal of uranium in water is RO. Since uranium is present in both local groundwater and import water, centralized treatment would likely be required. This form of treatment would also reduce the concentrations of contaminants identified in Sections 3.1 to 3.5. The estimated cost to reduce all identified contaminant levels using reverse osmosis, based on the maximum annual total water production of all groundwater wells and potential use of import water, ranges from $15,500,000 to $24,300,000 per year, or $635 to $995 per service connection per year. This cost estimate does not include construction of pipelines that would be necessary to connect the impacted sources (wells and import water connections) supplying a centralized facility.

4 Recommendations for Further Action

Drinking water delivered by Mesa Water meets or exceeds all state and federal drinking water standards set to protect public health. To further reduce the levels of the constituents identified in this report, all of which are well below the health-based MCL, additional costly treatment processes would be required. The effectiveness of the identified best-available treatment processes to provide any significant reductions at beyond these low levels is uncertain and may not realistically be possible. The health protection benefits of these hypothetical reductions are unclear and may not be quantifiable. Therefore, no further 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 Ave, Costa Mesa, California 92627.

Table A. Summary of information related to contaminants exceeding PHGs in water delivered by Mesa Water, including concentration levels, health risk information, and estimated treatment costs

Parameter	Unit	PHG or (MCLG)	MCL	DLR	Concentration Groundwater	Concentration Surface Water	Category of Risk	Cancer Risk at PHG or MCLG	Cancer Risk at MCL	Best Available Technologies	Aggregate Cost Per Year	Cost Per Connection Per Year
INORGANIC CHEMICALS												
Arsenic	µg/L	0.004	10	2	ND – 3	ND	Carcinogen	1×10^{-6}	2.5×10^{-3}	AA, C/F, IX, LS, O/F, RO	$12,010,000 (IX)	$490 (IX)
Chromium, Hexavalent	µg/L	0.02	10	0.1	ND – 0.8	ND	Carcinogen	$1\text{x}10^{-6}$	$5\text{x}10^{-4}$	IX (WBA)	$12,760,000 - $53,360,000	$520 - $2,200
DISINFECTION BYPRODUCTS												
Bromate	µg/L	0.1	10	1	ND	ND – 2.4	Carcinogen	$1\text{x}10^{-6}$	$1\text{x}10^{-4}$	C/F, GAC, RO	$9,700 - $18,400 (RO)	$0.40 - $0.75
RADIOACTIVITY												
Gross Alpha Particle Activity	pCi/L	(0)	15	3	ND – 3.58	ND	Carcinogen	0	1×10^{-3}	RO	Note 1	Note 1
Gross Beta Particle Activity	pCi/L	(0)	50[2]	4	NA	ND – 6	Carcinogen	0	2×10^{-3}	IX, RO	$10,900 (IX)	$0.45 (IX)
Uranium	pCi/L	0.43	20	1	1.08 – 1.78	ND – 2	Carcinogen	1×10^{-6}	5×10^{-5}	RO	Note 1	Note 1
ALL CONTAMINANTS[1]	--	--	--	--	--	--	--	--	--	**RO**	**$15,500,000 - $24,300,000**	**$635 - $995**

1 – Estimated cost to remove all contaminants by RO, assuming entire production volume is treated in a centralized facility. Estimate does not include costs associated with conveyance or construction of a facility.
2 – Judged equivalent to 4 mrem/year per OEHHA 2022 Health Risk Information for PHG Exceedance Reports.

NOTES
PHG = Public Health Goal
MCLG = Maximum Contaminant Level Goal
MCL = Maximum Contaminant Level
DLR = Detection Limit for Purposes of Reporting
ND = Non-detect
NA = Not Applicable
µg/L = micrograms per liter or parts per billion
pCi/L = picocuries per liter
mrem = millirem

TREATMENT/CONTROL TECHNOLOGIES
AA = activated alumna
C/F = coagulation/filtration
IX = ion exchange
GAC = granular activated carbon
LS = lime softening
O/F = oxidation/filtration
RO = reverse osmosis
WBA = weak base anion