Triennial Report on Water Quality Relative to Public Health Goals

July 2022

Prepared in Accordance with California Health and Safety Code, Section 116470(b) for system CA3010030

Santa Margarita Water District

Table of Contents

Background

The area served by Santa Margarita Water District (SMWD) within this report receive imported water treated at the Robert B. Diemer Filtration Plant in Yorba Linda, owned and operated by the Metropolitan Water District of Southern California. Local groundwater is treated at the San Juan Groundwater Plant, owned and operated by Santa Margarita Water District. Both facilities use a state-of-the-art, multiple-barrier treatment approach to ensure the water quality meets or surpasses all the requirements required in the Safe Drinking Water Act. One additional well, the North Open Space Well, was utilized to feed the drinking water system but was removed from service in late 2020. The drinking water quality of the Santa Margarita Water District meets or surpasses all State and Federal drinking water standards set to protect public health.

Provisions of the California Health and Safety Code Section 116470(b) specify that larger (>10,000 service connections) water utilities prepare a special report by July 1, 2022 if their water quality measurements have exceeded any Public Health Goals (PHGs). PHGs are non-enforceable goals established by the Cal-EPA'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 MCLGs adopted by USEPA. Only constituents which have a California primary drinking water standard and for which either a PHG or MCLG has been set are to be addressed[1].

The new law specifies the information to be provided in the report. If a constituent was detected in the District's water supply between 2019 and 2021 at a level exceeding an applicable PHG or MCLG, this report provides the information required by the law. Included 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, the best treatment technology available that could be used to reduce the constituent level, and an estimate of the cost to install that treatment if it is appropriate and feasible.

What Are PHGs?

PHGs are set by the California Office of Environmental Health Hazard Assessment (OEHHA), which is part of Cal-EPA, and are based solely on public health risk considerations of selected chemicals. It is important to recognize that the EPA establishes regulations for water utilities under the Safe Drinking Water Act (SDWA). Utilities must meet specific maximum contaminant levels established by both the EPA and State of California. These regulations are established considering health effects as well as technological feasibility and costs. In addition, the SDWA also establishes requirements for the control of harmful waterborne organisms that are not considered in California's PHGs. As such, PHGs do not consider the need to balance chemical risks with microbial risks. The PHGs are not enforceable and are not required to be met by any public water system. MCLGs are generated by USEPA whereas California's OEHHA establishes the PHGs.

[1] 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 has yet been adopted by OEHHA or USEPA including Total Trihalomethanes. These will be addressed in a future required report after a PHG has been adopted.

Water Quality Data Considered

All of the water quality data collected between 2019 and 2021 for purposes of determining compliance with drinking water standards were considered. Given the transfer of the water system effective November 15, 2021, the majority of the water quality data was collected by the City of San Juan Capistrano. This data was summarized in the 2019, 2020, and 2021 Consumer Confidence Reports, which were made available online before July 1st of each year and can be found at www.smwd.com/WaterQuality. SMWD met the standards for all regulated constituents, i.e., levels of detected compounds were below the MCLs.

Best Available Treatment Technology and Cost Estimates

Both the USEPA and DDW adopt what are known as BATs or Best Available Technologies, which are the best-known proven methods of reducing contaminant levels to the MCL. Costs can be estimated for such technologies. However, since many PHGs and all MCLGs are set well below the MCL, it is not always feasible to determine the treatment that has the capability to further reduce a constituent to attain the PHG or MCLG, many of which are set at zero. The best available treatments are not guaranteed to reduce constituent levels to below PHGs. Estimating the costs to attain these very low levels may not be feasible since these levels can be established below the analytical capability. In some cases, installing treatment in an effort further reduce the levels of one constituent may have adverse effects on other aspects of water quality. For example, reducing the level of disinfection to further minimize DBPs can increase the risk of exposure to waterborne disease.

Constituents Detected That Exceed a PHG or a MCLG:

The following constituents were detected in SMWD drinking water at levels above the PHG or the MCLG. All MCLs were met.

Parameters	Units	Maximum Contaminant Level	Public Health Goal (PHG)	Date of (PHG)	Maximum Contaminant Level Goal (MCLG)	SMWD					
						2019		2020		2021	
						Avg	Range	Avg	Range	Avg	Range
Inorganic Chemicals											
Arsenic	µg/L	10	0.004	4/1/2004	0	0.05	ND-2.2	0.25	ND-3.9	0.03	ND-2.6
Disinfection Byproducts											
Bromodichloromethane	µg/L	none	0.060	2/7/2020	0	4.9	ND-8	5.5	ND-9.8	6.8	3.2-11
Bromoform	µg/L	none	0.500	2/7/2020	0	3.9	ND-15	1.7	ND-4	2.3	1.4-3.5
Chloroform	µg/L	none	0.400	2/7/2020	70	3.2	ND-6	5.3	ND-15	7.3	2.3-13
Dibromochloromethane	µg/L	none	0.100	2/7/2020	60	6.6	ND-12	5.6	ND-12	7.4	4-13
Monochloroacetic Acid	µg/L	none	none	n/a	70	0.9	ND-9	ND	ND	ND	ND
Dichloroacetic Acid	µg/L	none	none	n/a	0	4.1	ND-16	2.6	ND-5.9	2.9	ND-5.1
Trichloroacetic Acid	µg/L	none	none	n/a	20	1.4	ND-3	1.7	ND-4.5	2.3	1.4-2.8
Bromate	µg/L	10	0.100	12/31/2009	0	2*	ND-5.9	1.9*	ND-1.3	ND*	ND-4.6
Radionuclides											
Gross alpha	pCi/L	15	none	12/17/2003	0	ND	ND-13.2	ND	ND-13.4	ND	ND-3
Gross beta	pCi/L	50	none	12/17/2003	0	2	ND-4	3	ND-7	5	4-6
Radium 226	pCi/L	none**	0.05	3/3/2006	none**	0.29	0.29	ND	ND	ND	ND
Radium 228	pCi/L	none**	0.019	3/3/2006	none**	ND	ND	0.763	0.763	ND	ND
Uranium	pCi/L	20	0.43	8/17/2001	0	5.6	ND-6.4	2.0	1.0-3.0	2.0	1.0-3.0

* Average shown is highest rolling annual average

** There is no MCL/MCLG for radium 226 or radium 228 but there is an MCL of 5 pCi/L and MCLG of 0 pCi/L for combined radium (radium 226 + radium 228)

Inorganic Chemicals

Arsenic

CONTAMINANT SUMMARY: Arsenic is a naturally occurring element in the earth's crust and is very widely distributed in the environment. All humans are exposed to microgram quantities of arsenic (inorganic and organic) largely from food (25 to 50 ug/day) and to a lesser degree from drinking water and air.

Currently, the MCL for arsenic is 10 ug/L with a PHG of 0.004 ug/L and an MCLG of 0 ug/L.

Additional information on the development of the Arsenic PHG is available at https://oehha.ca.gov/media/downloads/water/chemicals/phg/asfinal.pdf

DETECTION SUMMARY: During the CY2019-2021 timeframe, arsenic levels ranging from ND – 3.9 ug/L were detected in the drinking water which were above the PHG and MCLG but were well under the MCL.

PUBLIC HEALTH RISK: OEHHA has established the cancer risk for this PHG is established a 1×10^{-6} or one per million.

BEST AVAILABLE TECHNOLOGY: The best available technologies for treating arsenic are activated alumina, coagulation/filtration, ion exchange, lime softening, reverse osmosis, electro dialysis, and/or oxidation/filtration. Utilizing a 2012 ACWA PHG Survey on treatment technology costs, to further treat the water with coagulation/filtration would range in costs from $0.45 - $11.96 per thousand gallons of water which would result in additional costs of $1.1 million - $30.5 million per year which would equate to an additional annual cost of $104 - $2,751 per service connection.

These costs are estimated for operating and maintenance costs and do not necessarily include the capital costs of land acquisition, engineering and design, and construction costs of a new facility. The costs estimates provided by ACWA are also 10 years old and have not been revised for inflation.

Additionally, there is no guarantee that treatment with coagulation/filtration would provide water achieving an MCLG of zero. Currently, the Metropolitan Water District of Southern California (MWDSC) uses coagulation/filtration as a best available technology for reducing arsenic levels, while the San Juan Groundwater Plant utilizes reverse osmosis. The effectiveness of the treatment processes to provide any significant reductions at these already low values is uncertain as the best available technologies and costs are based on treatment to the Maximum Contaminant Levels and there is no supporting analytical information that additional treatment will be successful in meeting Public Health Goals, no matter how much money is spent; and both MWDSC and SMWD already uses the best available treatment technology. As a result, no further action is recommended at this time.

SMWD ACTIONS: Both MWDSC and SMWD already utilize the best available treatment technology in order to reduce arsenic levels to below the MCL. The District's San Juan

Groundwater Plant utilizes an arsenic blending plan that ensures arsenic levels remain low entering the treatment plant and continuously monitor these levels to ensure compliance. No further action is recommended at this time.

Disinfection Byproducts

Bromodichloromethane

CONTAMINANT SUMMARY: Disinfection of water is required in order to inactivate disease-causing microorganisms. Commonly disinfectants, such as chlorine or chloramines, results in the formation of trace levels of disinfection byproducts (DBPs). Total Trihalomethanes (TTHM) are a group of 4 DBPs formed and bromodichloromethane is one of these TTHMs.

In considering exposures to DBPs, it is important to keep in mind the hazards of microbial pathogens in drinking water. The World Health Organization in its 2011 report Guidelines for Drinking-Water Quality discusses the issue as follows:

"Disinfection is of unquestionable importance in the supply of safe drinking-water. The destruction of pathogenic microorganisms is essential and very commonly involves the use of reactive chemical agents such as chlorine. […] The use of chemical disinfectants in water treatment usually results in the formation of chemical by-products. However, the risks to health from these by-products are extremely small in comparison with the risks associated with inadequate disinfection, and it is important that disinfection efficacy not be compromised in attempting to control such by-products."

TTHMs are regulated at a level of 80 ug/L and SMWD was well below the MCL. Bromodichloromethane has a public health goal of 0.060 ug/L and an MCLG of 0 ug/L. For all carcinogens, the US EPA sets the MCLG default at zero.

Additional information on the development of the Bromodichloromethane PHG is available at
https://oehha.ca.gov/media/downloads/water/chemicals/phg/thmsphg020720.pdf

DETECTION SUMMARY: During the CY2019-2021 timeframe, bromodichloromethane levels ranged from ND – 11.0 ug/L in the District's drinking water which exceeded the PHG and MCLG. While there is no individual MCL for bromodichloromethane, the collective group of TTHMs has an MCL which SMWD water remained well under.

PUBLIC HEALTH RISK: OEHHA has established this PHG at a 1×10^{-6} or one per million risk level for cancer. At that level, not more than one person in a population of one million people drinking the water daily for 70 years would be expected to develop cancer as a result of exposure to the PHG for this DBP.

BEST AVAILABLE TECHNOLOGY: The BAT for minimizing the production of bromodichloromethane is by reducing water age through improving distribution system and storage tank maintenance plus the use of chloramines for disinfect residual maintenance.

SMWD ACTIONS: The primary imported water supply to the District is treated by Metropolitan Water District of Southern California (MWDSC) utilizes several best available treatment technologies to reduce the development of disinfection byproducts (DBP). MWDSC converted their treatment plants to utilize ozonation as a treatment process in order to minimize the formation of disinfection byproducts, while, at the same time, provide effective control of disease-causing microbes that are resistant to chlorination. Additionally, MWDSC utilizes chloramines to maintain a disinfectant residual which also minimizes the formation of disinfection byproducts.

The District is constantly evaluating better ways to improve the management of its water distribution system. These measures include the installation of reservoir management systems to ensure appropriate chloramine residual maintenance, analyzers to monitor chloramine residuals throughout the District's reservoirs, and practices which encourage turnover and decreasing the age of the water.

Since the District already utilizes chloramines for disinfection, the remaining best available treatment is improving the distribution system and storage tank maintenance. The effectiveness of any increased maintenance processes to provide any significant reductions at these already low values is uncertain as the best available technologies and costs are based on treatment to the Maximum Contaminant Levels. Reducing the level of chloramine to further minimize the formation of this DBP increases the risk of waterborne disease. There is no supporting analytical information that additional treatment will be successful in meeting Public Health Goals. No further action is recommended at this time.

Bromoform

CONTAMINANT SUMMARY: Disinfection of water is required in order to inactivate disease-causing microorganisms. Commonly disinfectants, such as chlorine or chloramines, results in the formation of trace levels of disinfection byproducts (DBPs). Total Trihalomethanes (TTHM) are a group of 4 DBPs formed and bromoform is one of these TTHMs.

In considering exposures to DBPs, it is important to keep in mind the hazards of microbial pathogens in drinking water. The World Health Organization in its 2011 report Guidelines for Drinking-Water Quality discusses the issue as follows:

"Disinfection is of unquestionable importance in the supply of safe drinking-water. The destruction of pathogenic microorganisms is essential and very commonly involves the use of reactive chemical agents such as chlorine. […] The use of chemical disinfectants in water treatment usually results in the formation of chemical by-products. However, the risks to health from these by-products are extremely small in comparison with the risks associated with inadequate disinfection, and it is important that disinfection efficacy not be compromised in attempting to control such by-products."

Currently, there is no MCL for bromoform but there is a public health goal of 0.5 ug/L and an MCLG of 0 ug/L. For all carcinogens, the US EPA sets the MCLG default at zero.

Additional information on the development of the bromoform PHG is available at https://oehha.ca.gov/media/downloads/water/chemicals/phg/thmsphg020720.pdf

DETECTION SUMMARY: During the CY2019-2021 timeframe, bromoform levels ranged from ND – 15.0 ug/L in the District's drinking water which exceeded the PHG and MCLG. While there is no individual MCL for bromoform, the collective group of TTHMs has an MCL which SMWD water remained well under.

PUBLIC HEALTH RISK: OEHHA has established this PHG at a 1 x 10^{-6} or one per million risk level for cancer. At that level, not more than one person in a population of one million people drinking the water daily for 70 years would be expected to develop cancer as a result of exposure to this PHG.

BEST AVAILABLE TECHNOLOGY: The best available technology for treating bromoform is improving distribution system and storage tank maintenance to reduce residence time plus the use of chloramines for disinfect residual maintenance.

SMWD ACTIONS: The primary imported water supply to the District is treated by Metropolitan Water District of Southern California (MWDSC) utilizes several best available treatment technologies to reduce the development of disinfection byproducts (DBP). MWDSC converted their treatment plants to utilize ozonation as a treatment process in order to minimize the formation of disinfection byproducts, while, at the same time, provide effective control of disease-causing microbes that are resistant to chlorination. Additionally, MWDSC utilizes chloramines to maintain a disinfectant residual which also minimizes the formation of disinfection byproducts.

The District is constantly evaluating better ways to improve the management of its water distribution system. These measures include the installation of reservoir management systems to ensure appropriate chloramine residual maintenance, analyzers to monitor chloramine residuals throughout the District's reservoirs, and practices which encourage turnover and decreasing the age of the water.

Since the District already utilizes chloramines for disinfection, the remaining best available treatment is improving the distribution system and storage tank maintenance. The effectiveness of any increased maintenance processes to provide any significant reductions at these already low values is uncertain as the best available technologies and costs are based on treatment to the Maximum Contaminant Levels. Reducing the level of chloramine to further minimize the formation of this DBP increases the risk of waterborne disease. There is no supporting analytical information that additional treatment will be successful in meeting Public Health Goals. No further action is recommended at this time.

Chloroform

CONTAMINANT SUMMARY: Disinfection of water is required in order to inactivate disease-causing microorganisms. Commonly disinfectants, such as chlorine or chloramines, results in the formation of trace levels of disinfection byproducts (DBPs). Total Trihalomethanes (TTHM) are a group of 4 DBPs formed and chloroform is one of these TTHMs.

In considering exposures to DBPs, it is important to keep in mind the hazards of microbial pathogens in drinking water. The World Health Organization in its 2011 report Guidelines for Drinking-Water Quality discusses the issue as follows:

"Disinfection is of unquestionable importance in the supply of safe drinking-water. The destruction of pathogenic microorganisms is essential and very commonly involves the use of reactive chemical agents such as chlorine. […] The use of chemical disinfectants in water treatment usually results in the formation of chemical by-products. However, the risks to health from these by-products are extremely small in comparison with the risks associated with inadequate disinfection, and it is important that disinfection efficacy not be compromised in attempting to control such by-products."

Currently there is no MCL for chloroform but there is a public health goal of 0.4 ug/L and an MCLG of 70 ug/L.

Additional information on the development of the Chloroform PHG is available at https://oehha.ca.gov/media/downloads/water/chemicals/phg/thmsphg020720.pdf

DETECTION SUMMARY: During the CY2019-2021 timeframe, chloroform levels ranged from ND – 15.0 ug/L in the District's drinking water which exceeded the PHG and MCLG. While there is no individual MCL for chloroform, the collective group of TTHMs has an MCL which SMWD water remained well under.

PUBLIC HEALTH RISK: OEHHA has established this PHG at a 1×10^{-6} or one per million risk level for cancer. At that level, not more than one person in a population of one million people drinking the water daily for 70 years would be expected to develop cancer as a result of exposure to that chemical.

BEST AVAILABLE TECHNOLOGY: The best available technology for treating chloroform is improving distribution system and storage tank maintenance to reduce residence time plus the use of chloramines for disinfect residual maintenance.

SMWD ACTIONS: The primary imported water supply to the District is treated by Metropolitan Water District of Southern California (MWDSC) utilizes several best available treatment technologies to reduce the development of disinfection byproducts (DBP). MWDSC converted their treatment plants to utilize ozonation as a treatment process in order to minimize the formation of disinfection byproducts, while, at the same time, provide effective control of disease-causing microbes that are resistant to chlorination. Additionally, MWDSC utilizes chloramines to maintain a disinfectant residual which also minimizes the formation of disinfection byproducts.

The District is constantly evaluating better ways to improve the management of its water distribution system. These measures include the installation of reservoir management systems to ensure appropriate chloramine residual maintenance, analyzers to monitor chloramine residuals throughout the District's reservoirs, and practices which encourage turnover and decreasing the age of the water.

Since the District already utilizes chloramines for disinfection, the remaining best available treatment is improving the distribution system and storage tank maintenance.

The effectiveness of any increased maintenance processes to provide any significant reductions at these already low values is uncertain as the best available technologies and costs are based on treatment to the Maximum Contaminant Levels. Reducing the level of chloramine to further minimize the formation of this DBP increases the risk of waterborne disease. There is no supporting analytical information that additional treatment will be successful in meeting Public Health Goals. No further action is recommended at this time.

Dibromochloromethane

CONTAMINANT SUMMARY: Disinfection of water is required in order to inactivate disease-causing microorganisms. Commonly disinfectants, such as chlorine or chloramines, results in the formation of trace levels of disinfection byproducts (DBPs). Total Trihalomethanes (TTHM) are a group of 4 DBPs formed and dibromochloromethane is one of these TTHMs.

In considering exposures to DBPs, it is important to keep in mind the hazards of microbial pathogens in drinking water. The World Health Organization in its 2011 report Guidelines for Drinking-Water Quality discusses the issue as follows:

"Disinfection is of unquestionable importance in the supply of safe drinking-water. The destruction of pathogenic microorganisms is essential and very commonly involves the use of reactive chemical agents such as chlorine. […] The use of chemical disinfectants in water treatment usually results in the formation of chemical by-products. However, the risks to health from these by-products are extremely small in comparison with the risks associated with inadequate disinfection, and it is important that disinfection efficacy not be compromised in attempting to control such by-products."

At the time of this report, there is no MCL for dibromochloromethane but there is a public health goal of 0.1 ug/L and an MCLG of 60 ug/L.

Additional information on the development of the dibromochloromethane PHG is available at
https://oehha.ca.gov/media/downloads/water/chemicals/phg/thmsphg020720.pdf

DETECTION SUMMARY: During the CY2019-2021 timeframe, dibromochloromethane levels ranged from ND – 13.0 ug/L in the District's drinking water which exceeded the PHG and MCLG. While there is no individual MCL for dibromochloromethane, the collective group of TTHMs has an MCL which SMWD water remained well under.

PUBLIC HEALTH RISK: OEHHA has established this PHG at a 1×10^{-6} or one per million risk level for cancer. At that level, not more than one person in a population of one million people drinking the water daily for 70 years would be expected to develop cancer as a result of exposure to that chemical.

BEST AVAILABLE TECHNOLOGY: The best available technology for treating dibromochloromethane is improving distribution system and storage tank maintenance to reduce residence time plus the use of chloramines for disinfect residual maintenance.

SMWD ACTIONS: The primary imported water supply to the District is treated by Metropolitan Water District of Southern California (MWDSC) utilizes several best available treatment technologies to reduce the development of disinfection byproducts (DBP). MWDSC converted their treatment plants to utilize ozonation as a treatment process in order to minimize the formation of disinfection byproducts, while, at the same time, provide effective control of disease-causing microbes that are resistant to chlorination. Additionally, MWDSC utilizes chloramines to maintain a disinfectant residual which also minimizes the formation of disinfection byproducts.

The District is constantly evaluating better ways to improve the management of its water distribution system. These measures include the installation of reservoir management systems to ensure appropriate chloramine residual maintenance, analyzers to monitor chloramine residuals throughout the District's reservoirs, and practices which encourage turnover and decreasing the age of the water.

Since the District already utilizes chloramines for disinfection, the remaining best available treatment is improving the distribution system and storage tank maintenance. The effectiveness of any increased maintenance processes to provide any significant reductions at these already low values is uncertain as the best available technologies and costs are based on treatment to the Maximum Contaminant Levels. Reducing the level of chloramine to further minimize the formation of this DBP increases the risk of waterborne disease. There is no supporting analytical information that additional treatment will be successful in meeting Public Health Goals. No further action is recommended at this time.

Dichloroacetic Acid

CONTAMINANT SUMMARY: Disinfection of water is required in order to inactivate disease-causing microorganisms. Commonly disinfectants, such as chlorine or chloramines, results in the formation of trace levels of disinfection byproducts (DBPs) such as haloacetic acids (HAA) with dichloroacetic acid being one of the most common.

In considering exposures to DBPs, it is important to keep in mind the hazards of microbial pathogens in drinking water. The World Health Organization in its 2011 report Guidelines for Drinking-Water Quality discusses the issue as follows:

"Disinfection is of unquestionable importance in the supply of safe drinking-water. The destruction of pathogenic microorganisms is essential and very commonly involves the use of reactive chemical agents such as chlorine. […] The use of chemical disinfectants in water treatment usually results in the formation of chemical by-products. However, the risks to health from these by-products are extremely small in comparison with the risks associated with inadequate disinfection, and it is important that disinfection efficacy not be compromised in attempting to control such by-products."

Currently there is no MCL or PHG for dichloroacetic acid but there is an MCLG of 0 ug/L.

Additional information on the development of the dichloroacetic acid PHG is available at https://oehha.ca.gov/media/downloads/crnr/haaphg013120.pdf

DETECTION SUMMARY: During the CY2019-2021 timeframe, dichloroacetic acid levels ranged from ND – 16.0 ug/L in the District's drinking water which exceed the MCLG. While there is no individual MCL for dichloroacetic acid, the collective group of HAA5 has an MCL which SMWD water remained well under.

PUBLIC HEALTH RISK: While OEHHA has not established a PHG for this constituent, the US EPA has an MCLG at zero. For all carcinogens, the US EPA sets the MCLG default at zero.

BEST AVAILABLE TECHNOLOGY: The best available technology for treating dichloroacetic acid is improving distribution system and storage tank maintenance to reduce residence time plus the use of chloramines for disinfect residual maintenance.

SMWD ACTIONS: The primary imported water supply to the District is treated by Metropolitan Water District of Southern California (MWDSC) utilizes several best available treatment technologies to reduce the development of disinfection byproducts (DBP). MWDSC converted their treatment plants to utilize ozonation as a treatment process in order to minimize the formation of disinfection byproducts, while, at the same time, provide effective control of disease-causing microbes that are resistant to chlorination. Additionally, MWDSC utilizes chloramines to maintain a disinfectant residual which also minimizes the formation of disinfection byproducts.

The District is constantly evaluating better ways to improve the management of its water distribution system. These measures include the installation of reservoir management systems to ensure appropriate chloramine residual maintenance, analyzers to monitor chloramine residuals throughout the District's reservoirs, and practices which encourage turnover and decreasing the age of the water.

Since the District already utilizes chloramines for disinfection, the remaining best available treatment is improving the distribution system and storage tank maintenance. The effectiveness of any increased maintenance processes to provide any significant reductions at these already low values is uncertain as the best available technologies and costs are based on treatment to the Maximum Contaminant Levels. Reducing the level of chloramine to further minimize the formation of this DBP increases the risk of waterborne disease. There is no supporting analytical information that additional treatment will be successful in meeting Public Health Goals. No further action is recommended at this time.

Bromate

CONTAMINANT SUMMARY: Bromate is a disinfection byproduct produced during the disinfection process where ozonation is utilized.

At the time of this report, the MCL for bromate is 10 ug/L with a public health goal of 0.1 ug/L and an MCLG of 0 ug/L. For all carcinogens, the US EPA sets the MCLG default at zero.

Additional information on the development of the Bromate PHG is available at https://oehha.ca.gov/media/downloads/water/chemicals/phg/bromatephg010110.pdf

DETECTION SUMMARY: During the CY2019-2021 timeframe, bromate levels ranging from ND – 5.9 ug/L were detected in the District's drinking water which exceed the PHG and MCLG but fell well under the MCL.

PUBLIC HEALTH RISK: OEHHA developed a public health goal (PHG) of 0.1 ug/L for bromate in drinking water based on the carcinogenicity. The OEHHA has established the cancer risk for this PHG is established a 1×10^{-6} or one per million. This is the upper bound estimate of excess cancer risk from lifetime exposure.

BEST AVAILABLE TECHNOLOGY: The best available technologies for treating bromate are controlling the ozone treatment process to reduce production of bromate. Metropolitan Water District of Southern California utilizes ozonation as a disinfection process and is one of the largest drinking water providers in the world.

SMWD ACTIONS: The primary imported water supply to the District is treated by Metropolitan Water District of Southern California (MWDSC) utilizes several best available treatment technologies to reduce the development of disinfection byproducts (DBP). MWDSC converted their treatment plants to utilize ozonation as a treatment process in order to minimize the formation of disinfection byproducts, while, at the same time, provide effective control of disease-causing microbes that are resistant to chlorination[2]. MWDSC minimizes the formation of bromate by adding chloramines during the ozonation process.

[2] Metropolitan Water District of Southern California has an informational packet covering the ozonation process available at https://www.mwdh2o.com/media/18355/642_water_quality_ozonation.pdf .

Radionuclides

Gross alpha

CONTAMINANT SUMMARY: Gross alpha is the total amount of energy that is released from naturally-occurring radionuclides as they breakdown or decay. The US EPA has determined that that alpha emitters, such as gross alpha, are carcinogens and has established an MCLG of 0 picocuries per liter (pCi/L) and an MCL of 15 pCi/L. In 2003, OEHHA concluded that the development of a PHG for gross alpha was not practical.

At the time of this report, the MCL for gross alpha is 15 pCi/L with an MCLG of 0 pCi/L. For all carcinogens, the US EPA sets the MCLG default at zero.

Additional information on the decision to not pursue a gross alpha PHG is available at https://oehha.ca.gov/media/downloads/water/chemicals/grossabmemo.pdf

DETECTION SUMMARY: During the CY2019-2021 timeframe, gross alpha levels ranging from ND – 13.4 pCi/L were detected in the drinking water which exceed the MCLG but fall well under the MCL.

PUBLIC HEALTH RISK: In 2003, OEHHA determined that the present regulatory limits (MCLs) for both gross alpha and gross beta/photon emission are far in excess of the de minimis risk level of one in a million of a cancer risk. This resulted in no PHG being developed for gross alpha or gross beta. However due to the requirements of this report, the US EPA's MCLG of zero is utilized due to gross alpha being a carcinogen.

BEST AVAILABLE TECHNOLOGY: The best available technology for treating gross alpha is reverse osmosis. Utilizing a 2012 ACWA PHG Survey on treatment technology costs, to further treat the imported water with reverse osmosis would range in costs from $0.94 - $8.04 per thousand gallons of water which would result in additional costs of $2.4 million - $20.5 million per year which would equate to an additional annual cost of $216 – $1,849 per service connection.

These costs are estimated for operating and maintenance costs and do not necessarily include the capital costs of land acquisition, engineering and design, construction costs, and excess water needed for operation of an RO facility. The costs estimates provided by ACWA are also 10 years old and have not been revised for inflation.

Additionally, there is no guarantee that treatment with RO would provide water achieving an MCLG of zero. The effectiveness of the treatment processes to provide any significant reductions at these already low values is uncertain as the best available technologies and costs are based on treatment to the Maximum Contaminant Levels and there is no supporting analytical information that additional treatment will be successful in meeting Public Health Goals, no matter how much money is spent; and both MWDSC and SMWD already uses the best available treatment technology. As a result, no further action is recommended at this time.

SMWD ACTIONS: Current methods of removal of gross alpha emitters do not provide complete reduction to meet the level of public health goals (or MCLG) at this time. The

District will continue to monitor available removal technologies and explore their implementation.

Gross beta

CONTAMINANT SUMMARY: Gross beta is the total amount of energy that is released from naturally-occurring radionuclides as they breakdown or decay. The US EPA has determined that beta emitters, such as gross beta, are carcinogens and has established an MCLG of 0 picocuries per liter (pCi/L) and an MCL of 50 pCi/L. For all carcinogens, the US EPA sets the MCLG default at zero.

Additional information on the decision to not pursue a gross beta PHG is available at https://oehha.ca.gov/media/downloads/water/chemicals/grossabmemo.pdf

DETECTION SUMMARY: During the CY2019-2021 timeframe, gross beta levels ranging from ND - 7 pCi/L were detected in the drinking water which exceed the MCLG but fall well under the MCL. For all carcinogens, the US EPA sets the MCLG default at zero.

PUBLIC HEALTH RISK: In 2003, OEHHA determined that the present regulatory limits (MCLs) for both gross alpha and gross beta/photon emission are far in excess of the de minimis risk level of one in a million of a cancer risk. This resulted in no PHG being developed for gross alpha or gross beta. However due to the requirements of this report, the US EPA's MCLG of zero is utilized due to gross beta being a carcinogen.

BEST AVAILABLE TECHNOLOGY: The best available technology for treating gross beta is reverse osmosis. Utilizing a 2012 ACWA PHG Survey on treatment technology costs, to further treat the imported water with reverse osmosis would range in costs from $0.94 - $8.04 per thousand gallons of water which would result in additional costs of $2.4 million - $20.5 million per year which would equate to an additional annual cost of $216 – $1,849 per service connection.

These costs are estimated for operating and maintenance costs and do not necessarily include the capital costs of land acquisition, engineering and design, construction costs, and excess water needed for operation of an RO facility. The costs estimates provided by ACWA are also 10 years old and have not been revised for inflation.

Additionally, there is no guarantee that treatment with RO would provide water achieving an MCLG of zero. The effectiveness of the treatment processes to provide any significant reductions at these already low values is uncertain as the best available technologies and costs are based on treatment to the Maximum Contaminant Levels and there is no supporting analytical information that additional treatment will be successful in meeting Public Health Goals, no matter how much money is spent; and both MWDSC and SMWD already uses the best available treatment technology. As a result, no further action is recommended at this time.

SMWD ACTIONS: Current methods of removal of gross beta emitters do not provide complete reduction to meet the MCLG level at this time. The District will continue to monitor available removal technologies and explore their implementation.

Radium 226

CONTAMINANT SUMMARY: Radium is formed when uranium and thorium undergo radioactive decay in the environment. One of the main radium isotopes found in the environment is radium-226. In 2006, OEHHA established a PHG of 0.05 pCi/L for Radium 226. This PHG value was based on the known carcinogenic effects of radiation observed in humans.

At the time of this report, there is no MCL or MCLG for radium 226 (but there is an MCL for combined radium set at 5 pCi/L and an MCLG of 0 pCi/L) while the PHG is set at 0.05 pCi/L. During the CY2019-2021 timeframe, the North Open Space well had a 0.29 pCi/L detection of radium 226 which was above the PHG.

Additional information on the development of the Radium 226 PHG is available at https://oehha.ca.gov/media/downloads/water/chemicals/phg/phgradium030306.pdf

DETECTION SUMMARY: During the CY2019-2021 timeframe, radium 226 levels ranging from ND – 0.29 pCi/L were detected in the drinking water which exceed the MCLG but fall well under the MCL for combined radium. For all carcinogens, the US EPA sets the MCLG default at zero.

PUBLIC HEALTH RISK: OEHHA developed a public health goal (PHG) of 0.05 pCi/L for radium 226 in drinking water based on the carcinogenicity. The OEHHA has established the cancer risk for this PHG is established a 1 x 10-6 or one per million. This is the upper bound estimate of excess cancer risk from lifetime exposure.

BEST AVAILABLE TECHNOLOGY: The best available technology for treating radium 226 is ion exchange, reverse osmosis, and/or lime softening. Utilizing a 2012 ACWA PHG Survey on treatment technology costs, to further treat the groundwater volumes seen at the North Open Space well with reverse osmosis would range in costs from $0.94 - $8.04 per thousand gallons of water which would result in additional costs of $100,000 - $850,000 per year which would equate to an additional annual cost of $180 – 1,540 per service connection that receives this water.

These costs are estimated for operating and maintenance costs and do not necessarily include the capital costs of land acquisition, engineering and design, construction costs, and excess water needed for operation of an RO facility. The costs estimates provided by ACWA are also 10 years old and have not been revised for inflation.

Additionally, there is no guarantee that treatment with RO would provide water achieving an MCLG of zero. The effectiveness of the treatment processes to provide any significant reductions at these already low values is uncertain as the best available technologies and costs are based on treatment to the Maximum Contaminant Levels and there is no supporting analytical information that additional treatment will be successful in meeting Public Health Goals, no matter how much money is spent; and both MWDSC and SMWD already uses the best available treatment technology. As a result, no further action is recommended at this time.

SMWD ACTIONS: The North Open Space well was removed from service in 2020 and is no longer producing water and no other water sources have detections of radium 226. The District is currently investigating treatment techniques to be utilized in order to return the well into service.

Radium 228

CONTAMINANT SUMMARY: Radium is formed when uranium and thorium undergo radioactive decay in the environment. One of the main radium isotopes found in the environment is radium-226. In 2006, OEHHA established a PHG of 0.019 pCi/L for Radium 228. This PHG value was based on the known carcinogenic effects of radiation observed in humans.

At the time of this report, there is no MCL or MCLG for radium 228 (but there is an MCL for combined radium set at 5 pCi/L and an MCLG of 0 pCi/L) while the PHG is set at 0.019 pCi/L.

Additional information on the development of the Radium 228 PHG is available at https://oehha.ca.gov/media/downloads/water/chemicals/phg/phgradium030306.pdf

DETECTION SUMMARY: During the CY2019-2021 timeframe, radium 226 levels ranging from ND – 0.763 pCi/L were detected in the drinking water which exceed the MCLG but fall well under the MCL for combined radium. For all carcinogens, the US EPA sets the MCLG default at zero.

PUBLIC HEALTH RISK: OEHHA developed a public health goal (PHG) of 0.019 pCi/L for radium 228 in drinking water based on the carcinogenicity. The OEHHA has established the cancer risk for this PHG is established a 1 x 10-6 or one per million. This is the upper bound estimate of excess cancer risk from lifetime exposure.

BEST AVAILABLE TECHNOLOGY: The best available technology for treating radium 228 is ion exchange, reverse osmosis, and/or lime softening. Utilizing a 2012 ACWA PHG Survey on treatment technology costs, to further treat the groundwater volumes seen at the North Open Space well with reverse osmosis would range in costs from $0.94 - $8.04 per thousand gallons of water which would result in additional costs of $100,000 - $850,000 per year which would equate to an additional annual cost of $180 – 1,540 per service connection that receives this water.

These costs are estimated for operating and maintenance costs and do not necessarily include the capital costs of land acquisition, engineering and design, construction costs, and excess water needed for operation of an RO facility. The costs estimates provided by ACWA are also 10 years old and have not been revised for inflation.

Additionally, there is no guarantee that treatment with RO would provide water achieving an MCLG of zero. The effectiveness of the treatment processes to provide any significant reductions at these already low values is uncertain as the best available technologies and costs are based on treatment to the Maximum Contaminant Levels and there is no supporting analytical information that additional treatment will be successful in meeting Public Health Goals, no matter how much money is spent; and both MWDSC and

SMWD already uses the best available treatment technology. As a result, no further action is recommended at this time.

SMWD ACTIONS: The North Open Space well was removed from service in 2020 and is no longer producing water and no other water sources have detections of radium 226. The District is currently investigating treatment techniques to be utilized in order to return the well into service.

Uranium

CONTAMINANT SUMMARY: Uranium is a naturally occurring radioactive element that is ubiquitous in the earth's crust. Uranium is found in ground and surface waters due to its natural occurrence in geological formations. Because its abundance in geological formations varies from place to place, uranium is a highly variable in drinking water.

Currently, the State MCL for uranium is 20 pCi/L with a public health goal of 0.43 pCi/L and an MCLG of 0. For all carcinogens, the US EPA sets the MCLG default at zero.

Additional information on the development of the Uranium PHG is available at https://oehha.ca.gov/media/downloads/water/chemicals/phg/uranium801.pdf

DETECTION SUMMARY: During the CY2019-2021 timeframe, uranium levels ranging from ND – 6.4 pCi/L were detected in the drinking water which exceed the PHG and MCLG but fall well under the MCL.

PUBLIC HEALTH RISK: OEHHA developed a PHG for uranium based on its radioactivity. OEHHA has established the cancer risk for this PHG is established a 1×10^{-6} or one per million. This is the upper bound estimate of excess cancer risk from lifetime exposure. Actual cancer risk may be lower or zero.

BEST AVAILABLE TECHNOLOGY: The best available technologies for treating uranium are ion exchange, reverse osmosis, lime softening, and/or coagulation/filtration. Utilizing a 2012 ACWA PHG Survey on treatment technology costs, to further treat the water with coagulation/filtration (the lowest cost option) would range in costs from $0.94 - $8.04 per thousand gallons of water which would result in additional costs of $2.4 million - $20.5 million per year which would equate to an additional annual cost of $216 - $1,849 per service connection.

These costs are estimated for operating and maintenance costs and do not necessarily include the capital costs of land acquisition, engineering and design, construction costs, and excess water needed for operation of an RO facility. The costs estimates provided by ACWA are also 10 years old and have not been revised for inflation.

Additionally, there is no guarantee that treatment with RO would provide water achieving an MCLG of zero. The effectiveness of the treatment processes to provide any significant reductions at these already low values is uncertain as the best available technologies and costs are based on treatment to the Maximum Contaminant Levels and there is no supporting analytical information that additional treatment will be successful in meeting Public Health Goals, no matter how much money is spent; and both MWDSC and

SMWD already uses the best available treatment technology. As a result, no further action is recommended at this time.

SMWD ACTIONS: Current methods of removal of uranium do not provide complete reduction to meet the level of public health goals (or MCLG) at this time. The District will continue to monitor available removal technologies and explore their implementation.

Recommendations for Further Action:

The drinking water quality of the Santa Margarita Water District meets or surpasses all State and Federal drinking water standards set to protect public health. To further reduce the levels of the constituents identified in this report that are already significantly below the health-based Maximum Contaminant Levels established to provide "safe drinking water", additional costly treatment processes would be required. The effectiveness of the treatment processes to provide any significant reductions 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. Furthermore, efforts to attain very low levels of these constituents may affect compliance with other regulated constituents. Therefore, no further action is proposed.