

2022

PUBLIC HEALTH GOALS REPORT



INTRODUCTION

The 2022 Public Health Goals Report prepared by the Yorba Linda Water District (YLWD or District) provides information on (1) the detection of any contaminant in the District's water supply that is above a Public Health Goal (PHG) or Maximum Contaminant Level Goal (MCLG) for the years 2019, 2020 and 2021, (2) an estimate of costs to remove detected contaminants to below the PHG or MCLG using Best Available Technology, and (3) health risks for each contaminant exceeding a PHG or MCLG. The District also prepares Annual Water Quality Reports – you may know it as the Consumer Confidence Report – available on the District's website. The Public Health Goals Report and the Annual Water Quality Reports include data on the District's two water supplies, treated groundwater from the Orange County Groundwater Basin and surface water imported from Northern California and the Colorado River and treated by the Metropolitan Water District. The District considered all water quality data collected in 2019, 2020, and 2021 to determine this report's compliance with drinking water standards.

BACKGROUND

Under the Calderon-Sher Safe Drinking Water Act of 1996 (Act), public water systems with over 10,000 service connections must report to the public every three years any water quality contaminant level detected above the PHG or MCLG. Where OEHHA has not adopted a PHG for a contaminant, water suppliers are to use the MCLGs adopted by the United States Environmental Protection Agency (USEPA).

The report aims to give customers access to information on levels of contaminants and their potential risks, even if they are below the MCL (Maximum Contaminant Level), which is the enforceable mandatory drinking water standard and different from MCLGs. The District must include contaminants with a California primary drinking water standard and either a PHG or MCLG in this report. In addition, the District includes the numerical health risk associated with the MCL and the PHG or MCLG, the type of health risk possibly associated with each contaminant, the best treatment technology available that could reduce the contaminant level, and an estimate of the cost of treatment.



What is a Public Health Goal?

A PHG is the contaminant level in drinking water that poses no significant health risk if consumed over a lifetime. PHGs are non-enforceable goals established by the California Environmental Protection Agency's (Cal-EPA) Office of Environmental Health Hazard Assessment (OEHHA).

How does OEHHA Establish a Public Health Goal?

Establishing a PHG for a chemical contaminant in drinking water is very rigorous. OEHHA scientists first compile all relevant scientific information available, which includes studies of the chemical's effect on laboratory animals and studies of humans exposed to the chemical. Next, the scientists use data from these studies to perform a health risk assessment, determining the levels of the contaminant in drinking water that could be associated with various adverse health effects. In performing the health risk assessment, OEHHA considers the following factors:

- Certain people, such as pregnant women, young children, the elderly, or persons with pre-existing illnesses, may be especially vulnerable to the chemical's adverse effects. Therefore, the PHG must consider the health effects on individuals in these groups.
- The accumulated effects of exposure to the chemical from other sources, such as food, air, and soil, as well as nondrinking uses of water, such as showering, may pose a risk in addition to drinking water.
- The chemical's potential to interfere with bodily functions in a way that increases the risk of chronic health problems, such as liver damage.
- Possible synergistic effects from the combined exposure to the chemical in question with other chemicals may further increase health risks.

When calculating a PHG, OEHHA uses all the information it has compiled to identify the chemical level in drinking water that would not cause significant adverse health effects in people who drink that water every day for 70 years. OEHHA assumes that an adult will drink two liters of water per day and a child will drink one liter per day. OEHHA must also consider evidence of immediate and severe health effects when setting the PHG.

PHGs Set at Levels That Protect Human Health

OEHHA sets the PHGs for both carcinogens and non-carcinogens. For carcinogens, the PHG is at the “one-in-one-million” risk level. At that level, scientists expect that not more than one person in a population of one million people drinking 2 liters of water daily for 70 years to develop cancer due to exposure to that chemical through drinking water. For chemicals that cause health effects other than cancer, the PHG is at a level that scientists do not expect any toxic effects, including congenital disabilities and chronic illness.



Best Available Treatment Technologies and Cost Estimates

Both the USEPA and SWRCB-DDW adopted what is known as Best Available Technologies (BATs). BATs are the best-known methods of reducing contaminant levels to below the MCL. However, in some cases, it may not be feasible for SWRCB-DDW to set the drinking water standard for a contaminant at the same level as the PHG. For example, the technology to treat the chemicals may not be available, or the cost of treatment may be very high. Therefore, SWRCB-DDW must consider these factors when developing a drinking water standard.

Estimating costs to reduce a contaminant to zero is difficult, if not impossible. It may also be impossible to verify that the level has been reduced to zero. Additionally, in some cases, installing treatment to try and further reduce very low levels of one contaminant may have adverse effects on other aspects of water quality.

CONTAMINANTS DETECTED THAT EXCEED A PHG OR MCLG

YLWD is fully compliant with all state and federal drinking water standards, and its top priority is protecting public health. Six (6) contaminants were detected above PHGs or MCLGs, but were below Maximum Contaminant Levels (MCLs).ⁱⁱⁱ

A table summarizing this information is in the Appendix.

For more information on health risks, refer to OEHHA’s website at <https://oehha.ca.gov/water/public-health-goals-phgs>

Arsenic

Arsenic is a naturally occurring element in the soil and may be in the air and water. Arsenic may also be a waste product from industrial facilities and products. Arsenic has been detected in the District’s groundwater at an average level of 4.9 ppb, above the PHG (.004 ppb) but below the MCL (10 ppb).

Category of Risk to Public Health

OEHHA has determined arsenic to be a carcinogen.

Numerical Health Risks

OEHHA has determined that the health risk associated with the PHG is 1 excess case of cancer per million people. USEPA has determined the risk related to the MCL is 2.5 excess cases of cancer per 1,000 people over a 70-year exposure.

Best Available Technology to Remove or Reduce and Approximate Treatment Cost

Ion exchange, reverse osmosis, blending granular ferric oxide resin/adsorption, and coagulation/filtration are the water treatment technologies available for reducing the concentration of arsenic below the PHG. The District complies with a state-approved blending plan to reduce the concentration of arsenic conveyed to the water distribution system and complies with the MCL for arsenic. If the District implemented reverse osmosis, this would cost approximately \$14.3 million in annualized capital and operations and maintenance costs to reduce arsenic levels of all its well water to the PHG level of 0.004 ppb. In addition, this treatment would result in an average monthly increase of \$46.92 to each customer’s bill.^{iv}



Bromate

Bromate forms when naturally occurring bromide reacts with ozone during the disinfection process. Bromate was detected in the District's treated imported surface water at an average level of 1.3 ppb, above the PHG (0.1 ppb) but below the MCL (10 ppb). In 2021, the Metropolitan Water District of Southern California did not detect bromate in its imported surface water.

Category of Risk to Public Health

OEHHA has determined bromate to be a carcinogen.

Numerical Health Risks

OEHHA has determined that the health risk associated with the PHG is 1 excess case of cancer per million people. USEPA has determined the risk related to the MCL is 1 excess case of cancer per 10,000 people over a 70-year exposure.

Best Available Technology to Remove or Reduce and Approximate Treatment Cost

The BAT for bromate reduction is reverse osmosis. Reverse osmosis treatment reduces the naturally-occurring bromide in source water by lowering the natural organic matter (NOM) in water. When this is reduced, the ozone demand decreases, reducing bromate formation. However, since the detection limit for reporting (DLR) for bromate (1 ppb) is greater than the PHG (0.1 ppb), it would be impractical to assess the effectiveness of reverse osmosis treatment in reaching the PHG level. Moreover, it is not feasible for the District to construct a separate reverse osmosis treatment plant to treat the Metropolitan Water District's water at the point of distribution to YLWD's system as there is no available location for a treatment plant.

Copper

The District's distribution system, well water, and treated imported surface water do not contain detectable levels of copper. The copper inside homes is generally the result of a chemical reaction of the District's water with household plumbing fixtures containing copper and brass.

There is no MCL for copper. However, as the USEPA Lead and Copper Rule requires, the District tests representative residential taps for copper every three years. If more than 10 percent of these samples exceed the established Action Level (AL) of 1.3 milligrams per liter (mg/L), a water system must provide treatment or inject additives to reduce corrosion in the distribution system.

OEHHA has established a PHG of 0.3 mg/L. In 2019, 2020, and 2021, the District's 90th percentile of all samples taken for the copper inside the customers' homes was 0.5 mg/L, 0.5 mg/L, and 0.4 mg/L, respectively. These values are above the PHG but below the Action Level.

Category of Risk to Public Health

OEHHA and the SWRCB-DDW have determined the following risk for copper: "Based on human data, the health risk category for copper is acute toxicity. Acute toxicity is an adverse health effect that develops after short-term exposure to copper. Short-term exposure to high levels of copper can temporarily cause problems in the gastrointestinal system."

Numerical Health Risks

OEHHA has not established a numerical health risk for copper because PHGs for non-carcinogenic chemicals in drinking water are at a concentration at which no known or anticipated adverse health risks will occur, with an adequate margin of safety.

Best Available Technology to Remove or Reduce and Approximate Treatment Cost

Optimizing corrosion control is the best available technology to reduce the level of copper in drinking water. Reduction is achieved by effectively adjusting and maintaining alkalinity, pH, and calcium hardness and adding phosphate or silica-based corrosion inhibitors, or a combination of all. Optimizing corrosion control also includes an intensive process of collecting and analyzing water quality data to determine the effectiveness of corrosion control. The District already has optimized corrosion control, and the District's water is non-corrosive. Undertaking additional corrosion control efforts is not recommended because (1) the USEPA and SWRCB-DDW classified the District's system as having optimized corrosion control, and (2) adding chemicals for more corrosion control will cause other water quality problems. These could reduce the effectiveness of the current disinfection process, which could increase the presence of total coliforms. Copper content could result from the water chemistry in customers' taps due to the type and age of plumbing and plumbing fixtures, point-of-use and point-of-entry water treatment devices, or electrochemical-induced pipe corrosion.

Gross Alpha Particle

Radionuclides such as alpha in water supplies are from erosion of natural deposits. The term radionuclide refers to naturally occurring elemental radium, radon, uranium, and thorium with unstable atomic nuclei that spontaneously decay, producing ionizing radiation. Gross alpha is the sum of these radionuclides. Exposure to ionizing radiation in concentrations exceeding the maximum contaminant level may have carcinogenic (cancer-causing), mutagenic (causing the mutation of cells), or teratogenic (causing abnormalities in offspring) effects.

The USEPA's Maximum Contaminant Level Goal (MCLG) for the gross alpha particle is zero (0), and the California Maximum Contaminant Level (MCL) is 15 pCi/L. The District's average level of gross alpha is 0.77 pCi/L. Therefore, the levels detected were below the MCL at all times.

Category of Risk to Public Health

USEPA has determined gross alpha particle is a carcinogen.

Numerical Health Risks

OEEHA has not established a PHG. USEPA has determined that the theoretical health risk associated with the MCLG is zero (0) and the risk related to the MCL is 1 excess case of cancer per 1,000 people over a lifetime exposure.

Best Available Technology to Remove or Reduce and Approximate Treatment Cost

Reverse osmosis is the BAT for achieving compliance with the MCLG for gross alpha. Like arsenic removal and reduction, if reverse osmosis were implemented, this would cost the District approximately \$14.3 million in annualized capital and operations and maintenance costs, resulting in an average monthly increase of \$46.92 to each customer's bill.ⁱⁱⁱ

Gross Beta Particle

Gross beta particles in water supplies are predominantly from the decay of natural and man-made deposits. The MCL for gross beta particles is 50 pCi/L, and MCLG is 0 pCi/L. This contaminant was detected in the treated imported surface water.

Category of Risk to Public Health

USEPA has determined gross beta particle is a carcinogen.

Numerical Health Risks

OEEHA has not established a PHG. USEPA has determined that the theoretical health risk associated with the MCLG is zero (0) and the risk related to the MCL is 2 excess cases of cancer per 1,000 people over a lifetime exposure.

Best Available Technology to Remove or Reduce and Approximate Treatment Cost

The BAT for gross beta reduction is reverse osmosis. It is not feasible for the District to construct a separate reverse osmosis treatment plant to treat the Metropolitan Water District's water at the point of distribution to YLWD's system as there is no available location for a treatment plant.



Uranium

Naturally occurring uranium is found in groundwater supplies due to leaching from uranium-bearing sandstone, shale, and other rock formations. Uranium may also be present in surface water, carried through runoff from areas with mining operations.

The PHG for uranium is 0.43 pico-Curies per liter (pCi/L), and the MCL is 20 pCi/L. The District's average uranium level is 7.0 pCi/L for groundwater, and the treated imported surface water has an average uranium level of 1.3 pCi/L. The levels detected were below the MCL at all times.

Category of Risk to Public Health

OEHHA has determined uranium to be a carcinogen.

Numerical Health Risks

OEHHA has determined that the health risk associated with the PHG is 1 excess case of cancer per million people. USEPA has determined the risk related to the MCL is 5 excess cases of cancer per 100,000 people over a lifetime of exposure.

Best Available Technology to Remove or Reduce and Approximate Treatment Cost

The BAT for uranium reduction is reverse osmosis. Like arsenic and gross alpha particle removal and reduction, if reverse osmosis were implemented, this would cost the District approximately \$14.3 million in annualized capital and operations and maintenance costs, resulting in an average monthly increase of \$46.92 to each customer's bill.ⁱⁱⁱ

Additionally, this contaminant was detected in the treated imported surface water. It is not feasible for the District to construct a separate reverse osmosis treatment plant to treat the Metropolitan Water District's water at the point of distribution to YLWD's system as there is no available location for a treatment plant.

CONCLUSION

Drinking water provided by the Yorba Linda Water District meets 100% of all enforceable State of California, SWRCB-DDW, and USEPA primary drinking water standards. Because Public Health Goal levels are not enforceable water quality standards, and no action to meet them is mandated.

For arsenic, the SWRCB-DDW approved the District's blending plan, and the District is meeting performance requirements to keep the level of arsenic below the enforceable standard (MCL). Providing additional treatment for 100% removal to meet the PHG would be cost-prohibitive.

The District already has optimized corrosion control for copper, and the District's water is non-corrosive. Undertaking additional corrosion control efforts is not recommended because (1) the USEPA and SWRCB-DDW classified the District's system as having optimized corrosion control, and (2) adding chemicals for more corrosion control will cause other water quality problems. These could reduce the effectiveness of the current disinfection process, which could increase the presence of total coliforms. In addition, contributing factors such as the type and age of plumbing and plumbing fixtures, point-of-use and point-of-entry water

treatment devices, and electro-chemical-induced pipe corrosion could change the water chemistry in customers' taps, thus increasing water copper content.

Current methods of removal and disposal technologies do not provide complete reduction to meet the level of the public health goals for bromate, gross alpha particle, gross beta particle, and uranium. In addition, the cost of constructing multiple reverse osmosis facilities would be infeasible and cost-prohibitive. The District continuously studies new technologies and related expenses as they emerge and would implement one if cost-effective.

In summary, the drinking water served by the Yorba Linda Water District meets all Federal and State drinking water standards set to protect public health. To further reduce the contaminants identified in this report that are already significantly below the health-based MCLs would be cost-prohibitive. The effectiveness of the treatment processes in providing any significant reduction in contaminant levels at already low values is also uncertain. Therefore, these hypothetical reductions' health protection benefits are unclear and may not be quantifiable.

ⁱ California Health and Safety Code Section 116470 (b)

ⁱⁱ This report was prepared utilizing the April 2022 Suggested Guidelines for Preparation of Required Reports on PUBLIC HEALTH GOALS (PHGs) to satisfy requirements of California Health and Safety Code Section 116470(b) and Health Risk Information for Public Health Goal Exceedance Reports prepared by Office of Environmental Health Hazard Assessment California Environmental Protection Agency.

ⁱⁱⁱ Contaminants detected in the District's water supply in 2019, 2020, and 2021 at a level exceeding an applicable PHG or MCLG are included in this report as required by the Act.

^{iv} Based on the 2012 cost to Inland Empire Utilities Agency for Chino Basin Desalter and indexed to 2021 cost.

APPENDIX

2022 Public Health Goals Report Data

Groundwater

Contaminant	Units	MCL or (AL) ¹	PHG OR (MCLG) ²	Average Results
Arsenic	ppb	10	0.004	4.9
Copper	mg/L	(1.3)	0.3	0.5
Gross Alpha Particle ³	pCi/L	15	(0)	0.77
Uranium	pCi/L	20	0.43	7.0

Imported Surface Water

Contaminant	Units	MCL	PHG OR (MCLG) ²	Average Results
Bromate	ppb	10	0.1	1.3
Gross Beta Particle ³	pCi/L	50	(0)	1.7
Uranium	pCi/L	20	0.43	1.3

Abbreviations:

MCL – Maximum Contaminant Level

AL – Action Level

PHG – Public Health Goal

MCLG – Maximum Contaminant Level Goal

ppb = parts per billion

mg/L = milligrams per liter

pCi/L = picoCuries per liter

¹ The copper level at the 90th percentile of all samples collected and arranged in an increasing order in accordance with the guidelines established by the Lead and Copper Rule. These samples were collected inside homes at residential taps. The 1.3 mg/l is an Action Level (AL) and is shown in parentheses. It is not an MCL.

² MCLGs are shown in parentheses. MCLGs are provided only when no applicable PHG exists.

³ Gross Alpha Particle and Gross Beta Particle are radionuclides, naturally occurring elemental radium, radon, uranium, and thorium with unstable atomic nuclei that spontaneously decay, producing ionizing radiation.