Yorba Linda Water District

2019 PUBLIC HEALTH GOALS REPORT

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Executive Summary

The 2019 Public Health Goals Report prepared by the Yorba Linda Water District (YLWD) provides information on (1) the detection of any contaminants in the District's water supply that are above Public Health Goals (PHG) or Maximum Contaminant Level Goals (MCLGs) for the years 2016, 2017 and 2018, (2) an estimate of costs to remove detected contaminants to below the PHG or MLCG using Best Available Technologies, and (3) health risks for each contaminant exceeding a PHG or MCLG. PHGs and MCLGs are not enforceable, and are intended to be guidelines for vulnerable individuals. YLWD has detected four (4) contaminants that are above PHGs or MCLGs; however, these contaminants are below Maximum Contaminant Levels (MCLs). YLWD is in full compliance with all state and federal drinking water standards and its top priority is protecting public health.

Background

Provisions of the California Health and Safety Code Section 116470 (b) specify that water utilities with more than 10,000 connections prepare a report by July 1, 2019 if their water quality measurements have exceeded any PHGs or MCLGs. PHGs are non-enforceable goals established by the California Environmental Protection Agency's (Cal-EPA) Office of Environmental Health Hazard Assessment (OEHHA). 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). Only contaminants which have a California primary drinking water standard and for which either a PHG or MCLG has been set are to be addressed in this report.

If a contaminant was detected in the District's water supply between 2016 and 2018 at a level exceeding an applicable PHG or MCLG, this report provides the information required by the law. Included is the numerical 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 contaminant, the best treatment technology available that could be used to reduce the contaminant level, and an estimate of the cost to install, operate and maintain that treatment if it is appropriate or feasible.

Public Health Goals and Drinking Water Standards

To help keep drinking water safe, the California Legislature passed the Calderon-Sher Safe Drinking Water Act of 1996. This law requires the State Water Resources Control Board Division of Drinking Water (SWRCB-DDW) to regularly test drinking water supplies and set MCL

drinking water standards. The Act also requires the OEHHA to develop PHGs for contaminants in California's publicly supplied drinking water. This report must be made available to the public every three years. Public water utilities with more than 10,000 service connections are required to prepare a Public Health Goals report every three years if any water quality measurements exceed any of the OEHHA's PHGs or USEPA's MCLGs.

The purpose of the law is to give water system customers access to information on levels of contaminants even if below the MCL, the enforceable mandatory drinking water standard. In addition, the law intends to provide an idea of the cost to totally eliminate any trace of the contaminant from drinking water regardless of how minimal the risk. This required report is unique to California.

What is a Public Health Goal?

A PHG is the level of a chemical contaminant in drinking water that does not pose a significant risk to health. PHGs are not regulatory standards; however, state law requires SWRCB-DDW to set drinking water standards for chemical contaminants as close to the corresponding PHG as is economically and technically feasible.

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. The technology to treat the chemicals may not be available, or the cost of treatment may be very high. SWRCB-DDW must consider these factors when developing a drinking water standard.

How does OEHHA Establish a Public Health Goal?

The process for 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 who have been exposed to the chemical. The scientists use data from these studies to perform a *health risk assessment*, in which they determine 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 groups of people, such as pregnant women, young children, the elderly or persons with pre-existing illnesses, who may be especially vulnerable to the chemical's adverse effects. The PHG must consider health effects on individuals in these groups.

PHGs Set at Levels That Protect Human Health

For carcinogens, OEHHA establishes the PHG at the "one-in-one-million" risk level. At that level, not more than one person in a population of one million people drinking 2 liters of water daily for 70 years would be expected to develop cancer as a result of exposure to that chemical through drinking water.

For chemicals that cause health effects other than cancer, OEHHA sets the PHG at a level that is not expected to cause any toxic effects, including birth defects and chronic illness.

- Accumulated effects of exposure to the chemical from other sources, such as food, air and soil; as well as and other forms of drinking water, such as showering.
- 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, which may further increase health risks.

When calculating a PHG, OEHHA uses all the information it has compiled to identify the level of the chemical 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 any evidence of immediate and severe health effects when setting the PHG.

Water Quality Data Considered

All of the water quality data collected by the District in the years 2016, 2017 and 2018 for purposes of determining compliance with drinking water standards were considered. This data was also summarized in the District's latest 2019 Annual Water Quality Report, also known as Consumer Confidence Report, available on the District's website.

Guidelines Followed

The Association of California Water Agencies (ACWA) formed a workgroup which prepared suggested guidelines for water utilities to use in preparing PHG reports. The ACWA guidelines were used in preparation of this report. No guidance was available from state regulatory agencies.

Best Available Treatment Technologies and Cost Estimates

Both the USEPA and SWRCB-DDW adopted what are known as Best Available Technologies (BATs). BATs are the best known methods of reducing contaminant levels to below MCL. Costs can be estimated for such technologies. However, since many PHGs and all MCLGs are set much lower than the MCL, it is not always possible or feasible to determine what treatment is needed to further reduce a contaminant downward to or near the PHG or MCLG, many of which are set at zero. Estimating costs to reduce a contaminant to zero is difficult, if not impossible, to verify by analytical means that the level has been lowered 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

The following is a discussion of the contaminants that were detected in the District's drinking water sources and water distributions system above the PHG, or if no PHG, above the MCLG. The attached Appendix lists contaminants detected that exceed a PHG or MCLG, and the test results for the years 2016-2018.

Arsenic

Arsenic is a naturally occurring element in the earth's crust and is very widely distributed in the environment. All humans are exposed to small quantities of arsenic (inorganic and organic) largely from food and to a lesser degree from drinking water and air. Some edible seafood may contain higher concentrations of arsenic which is predominantly in less acutely toxic organic forms.

The District's Well No. 15 slightly exceeds the 10 parts per billion (ppb) arsenic primary drinking water standard, the MCL. Currently, Well No. 15's 3-year average arsenic level is approximately 10.5 ppb. Other District wells have an average 3.1 ppb arsenic level. Whenever in operation, District staff blends Well 15 water with other District wells in compliance with the SWRCB-DDW approved blending plan. Blended well water served to our customers has an arsenic level of about 3.1 ppb, which is above the PHG of 0.004 ppb established by OEHHA. However, arsenic is well below the enforceable MCL of 10 ppb.

Category of Risk to Public Health

OEHHA has determined arsenic as 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 and the risk associated with the MCL is 2.5 excess cases of cancer per 1,000 people, over a 70-year lifetime exposure.

Best Available Technology to Remove or Reduce the Concentration of Arsenic and Approximate Treatment Cost

Activated alumina, ion exchange, reverse osmosis, lime softening, coagulation/filtration are the water treatment technologies available for reducing the concentration for arsenic below the PHG.

It would cost the District approximately $10.7 million dollars in annualized capital, and operations and maintenance costs to reduce the arsenic levels of all its well water to the PHG level of 0.004 ppb using ion exchange treatment technology.* This would result in an average monthly increase of $35.55 to customer bills.

* *based on the 2011 cost to Coachella Valley Water District to reduce Arsenic concentrations and indexed to 2018 cost.*

Copper

The District's well water and import water sources do not contain copper. Copper found 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. As required by the USEPA Lead and Copper Rule, the District tests representative residential taps for copper every three years. If more than 10 percent (90th percentile) 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 2018, the District's 90th percentile of all samples taken from inside the customers' homes is 0.5 mg/L for copper, which is 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 adverse health effects that develop after a 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 set at a concentration at which no known or anticipated adverse health risks will occur, with an adequate margin of safety.

Best Available Technology

Optimizing corrosion control is the best available technology to reduce the level of copper in drinking water. This is achieved through effectively adjusting and maintaining alkalinity, pH, and calcium hardness, and the addition of phosphate or silica-based corrosion inhibitors, or a combination of all. Optimizing corrosion control also includes an intensive process of collection and analyses of water quality data to determine the effectiveness of corrosion control.

Gross Alpha

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 defined as the sum total of these radionuclides. Exposure to ionizing radiation in concentrations exceeding the maximum contaminant level may have carcinogenic (cancer causing), mutagenic (causing mutation of cells) or teratogenic (causing abnormalities in offspring) effects.

The EPA's Maximum Contaminant Level Goal (MCLG) for gross alpha particle is 0 and the California Maximum Contaminant Level (MCL) is 15 pCi/L. The District's average level of gross alpha is 2.6 pCi/L. The levels detected were below the MCL at all times.

Category of Risk to Public Health

Health risk category based on experimental animal testing data evaluated in the U.S. EPA MCLG document and California MCL has determined gross alpha particle as a carcinogen.

Numerical Health Risks

USEPA has determined that the theoretical health risk associated with the MCLG is zero (0) and the risk associated with the MCL is 1 excess case of cancer per 1,000 people, over a lifetime exposure to the most potent alpha emitter.

Best Available Technology to Remove or Reduce the Concentration of Gross Alpha Particles and Approximate Treatment Cost

Reverse osmosis, lime softening, and coagulation/filtration are the water treatment technologies available for achieving compliance with the MCLG for gross alpha. Removal and reduction could be achieved concurrently with uranium removal and reduction. Refer to the section regarding *Best Available Technology to Remove or Reduce the Concentration of Uranium and Approximate Treatment Cost*.

Uranium

Naturally occurring uranium is found in groundwater supplies as a result of 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 8.0 pCi/L. The levels detected were below the MCL at all times.

Category of Risk to Public Health

OEHHA has determined uranium as 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 and the risk associated with the MCL is 5 excess cases of cancer per 100,000 people, over a lifetime exposure.

Best Available Technology to Remove or Reduce the Concentration of Uranium and Approximate Treatment Cost

Ion exchange, reverse osmosis, lime softening, coagulation/filtration are the technologies available for achieving compliance with the MCL for uranium. Using reverse osmosis, it would cost the District about $13.1 million dollars in annualized capital, and operation and maintenance cost to achieve the PHG level.** This would result in an average monthly increase of $43.34 to customer bills.

** *based on the 2012 cost to Inland Empire Utilities Agency for Chino Basin Desalter and indexed to 2018 cost.*

Conclusion

Drinking water provided by the Yorba Linda Water District meets 100% of all enforceable State of California, SWRCB-DDW, and United States Environmental Protection Agency primary drinking water standards. 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 performance requirements are being met to keep the level of arsenic below the enforceable standard. Providing additional treatment for 100% removal to meet the PHG would be cost-prohibitive.

For copper, the District already has optimized corrosion control, and the District's water has been found to be non-corrosive. Staff does not recommend undertaking additional corrosion control efforts. It is not recommended for two reasons: 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 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.

Yorba Linda Water District meets 100% of all enforceable drinking water standards from the SWRCB-DDW and the United State Environmental Protection Agency.

For gross alpha particle and uranium, current methods of removal and disposal technologies do not provide complete reduction to meet the level of the public health goals at this time. In the future, if available removal technology can be achieved, the District will explore and conduct the necessary studies and related costs to implement.

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 levels of contaminants identified in this report that are already significantly below the health-based Maximum Contaminant Levels would require significant financial investment. The effectiveness of the treatment processes to provide any significant reduction in contaminant levels at already low values is uncertain. The health protection benefits of these hypothetical reductions are not clear and may not be quantifiable. Furthermore, the funds that would be required for the additional treatment, approximately $23.8 million in annualized cost, might provide greater

public health protection benefits to the District's customers if spent on improving other water system operation, surveillance, and monitoring programs.

APPENDIX

Appendix

2019 PHG and MCLG Report

Contaminant	Units	MCL	PHG	MCLG	Average Results
Arsenic	ppb	10	0.004	0	3.1
Copper[1]	mg/L	1.3	0.3	1.3	0.5
Gross Alpha Particle[2]	pCi/L	15	None	0	2.6
Uranium	pCi/L	20	0.43	0	8.0

Abbreviations:

- MCL – Maximum Contaminant Level
- PHG – Public Health Goal
- MCLG – Maximum Contaminant Level Goal
- ppb = parts per billion
- mg/L = milligrams per liter
- pCi/L = picoCuries per liter

Notes:

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 not an MCL.
2. Gross Alpha Particle is a radionuclide.