2022

Triennial Public Health Goal Report

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REPORT ON WATER QUALITY
RELATIVE TO PUBLIC HEALTH GOALS

2019 – 2021

California Health and Safety Code Section 116470(b)

Background

Provisions of the California Health and Safety Code specify that public water systems serving more than 10,000 service connections prepare a special report if any of their water quality measurements have exceeded any Public Health Goals (PHG's). PHG's are non-enforceable goals established by the California Environmental Protection Agency'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 non-enforceable Maximum Contaminant Level Goals (MCLG's) adopted by the United States Environmental Protection Agency (USEPA).

If a constituent was detected in Vista Irrigation District's (District's or District) water supply in 2019 through 2021 at a level exceeding an applicable PHG or MCLG, this report identifies the constituent and provides the information required by the law. Where available, the numerical public health risk, the category of health risk, the best treatment technology available to remove or reduce the constituent and an estimate of the cost to install the treatment are included.

Public Health Goals

PHG's are based solely on public health risk considerations. None of the practical risk-management factors that are considered by the USEPA or the California Division of Drinking Water (DDW) in setting drinking water standards (Maximum Contaminant Levels or MCL's) is considered in developing PHG's. These factors include analytical detection capability, treatment technology available, benefits and costs. ***PHG's are not enforceable and are not required to be met by any public water system. MCLG's are the federal equivalent to PHG's.***

Water Quality Data Considered

All the water quality data collected for the District's system in 2019, 2020 and 2021 for purposes of determining compliance with drinking water standards was considered. This data was summarized in the annual Consumer Confidence Reports for the same years, which the District made available to customers via its website or in hard copy upon request.

Best Available Treatment Technology and Cost Estimates

Both the USEPA and the DDW adopted what are known as Best Available Technologies (BATs). These methods are some of the most effective at reducing constituent levels to or below the MCL. Costs can be estimated for such technologies. However, since many PHG's and all MCLG's are set much lower than the MCL, it is not always possible to determine what treatment technique is needed to further reduce a constituent to or near the PHG or MCLG, many of which are set at zero. Estimating the costs to reduce a constituent to zero is difficult (if not impossible) because it is not possible to verify by analytical means that the level has been lowered to zero. In some cases, installing additional treatment processes to try and further reduce very low levels of one constituent may have adverse effects on other aspects of water quality.

2019-2021 Constinuents detected that exceeded a PHG or MCLG

Constituent	Units	MCL	PHG or MCLG	DLR	Highest Average Detected		
					2019 (Location)	2020 (Location)	2021 (Location)
Arsenic	ug/L	10	0.004	2	3.0 (a)	ND	2.1 (a)
Bromate	ug/L	10	0.1	1	3.1 (a)	2.8 (a)	2.0 (a)
Chlorite	mg/L	1	0.05	0.02	0.26 (b)	0.25 (b)	0.26 (b)
Copper	mg/L	1.3*	0.3*	0.05	NC	NC	0.56* (d)
Gross Beta	pCi/L	50	0	4	ND	ND	5.0 (a)
Uranium	pCi/L	20	0.43	1	2.0 (c)	2.0 (e)	2.6 (a)

(a) = Twin Oaks Valley Water Treatment Plant (b) Escondido-Vista Water Treatment Plant
(c) Robert A. Weese Filtration Plant (d) = Vista Irrigation District
(e) Robert A. Skinner Water Treatment Plant
* = 90th Percentile
mg/L = Milligrams per Liter or parts per million (ppm)
ug/L = Micrograms per Liter or parts per billion (ppb)
pCi/L = Picocuries per Liter (a measure of radiation)
DLR = Detection Limit for Purposes of Reporting
ND = Non Detectable
NC = Not Collected

Constituents Exceeding PHG's

The following is a discussion of constituents detected in the District's source water or distributed water at levels above the PHG, or if no PHG exists, above the MCLG.

Arsenic

The MCL for arsenic is 10 ug/L. OEHHA adopted a PHG of 0.004 ug/L in 2004. The level of arsenic detected in source water supplied by the Twin Oaks Valley Water Treatment Plant was 3.0 ug/L in 2019 and 2.1 ug/L in 2021. The DLR is 2.0 ug/L.

The EPA states, "Some people who drink water containing arsenic in excess of the MCL for many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer." The cancer health risk is 1×10^{-6} (one per million) at the PHG and 2.5×10^{-3} (2.5 per thousand) at the MCL.

The following treatment methods have proven effective for removing arsenic below the MCL of 10 ug/L: adsorption media, coagulation/filtration, oxidation/filtration, ion exchange and point of use or point of entry treatment using activated alumina or reverse osmosis (RO).

It is unclear whether treatment to lower arsenic below the PHG would be feasible, as BATs are designated for treatment to achieve compliance with the corresponding MCL only and not the PHG. It should be noted that cost estimates are developed for treatment to the MCL and not to the lower PHG level.

Bromate

The MCL for bromate is 10 ug/L. OEHHA adopted a PHG of 0.1 ug/L in 2009. The highest average level of bromate detected was in water supplied by the Twin Oaks Valley Water Treatment Plant; Bromate levels averaged 3.1 ug/L in 2019, 2.8 ug/L in 2020 and 2.0 ug/L in 2021. The DLR is 1.0 ug/L.

Bromate is formed when naturally occurring bromide reacts with ozone during the disinfection process. Bromate can also be a byproduct of chlorinated water when exposed to sunlight. Bromate is considered a carcinogenic health risk according to OEHHA and the California Environmental Protection Agency. The cancer health risk is 1×10^{-6} (one per million) at the PHG (0.1 ug/L).

The BAT for bromate reduction is RO treatment prior to ozone disinfection. RO treatment would reduce bromide concentrations; thus, the demand for ozone decreases, reducing bromate formation. As accepted method detection limits for bromate are near the PHG, and the DLR is well above the PHG, it would be difficult to assess the effectiveness of RO treatment in reaching the PHG level.

Chlorite

Chlorite is a disinfection byproduct produced in the treatment of drinking water with chlorine dioxide. The MCL for chlorite is 1.0 mg/L. A PHG of 0.05 mg/L for chlorite was adopted by OEHHA in 2009. Chlorite was detected in the Escondido-Vista Water

Treatment Plant effluent at an average of 0.26 mg/L in 2019, 0.25 mg/L in 2020 and 0.26 mg/L in 2021. The DLR is 0.02 mg/L.

Several studies reveal that oral exposure to chlorite can result in hematological, endocrine, reproductive, and gastrointestinal effects as well as changes in neurobehavioral development at levels higher than the MCL.

There are no acceptable carcinogenicity studies on chlorite; however, the existing lower-quality cancer studies and the limited positive genotoxicity data suggest that chlorite may be a weak carcinogen or have carcinogenic potential.

Copper

There is no MCL for copper. Instead, the 90th percentile value of all samples from household taps in the distribution system cannot exceed an Action Level of 1.3 mg/L for copper. This means that 90% of the samples must be below the Action Level. All 58 household taps the District sampled in 2021 were below the Action Level. The PHG for copper is 0.3 mg/L; of the samples collected in 2021 for copper, 20 of the 58 were higher than the 0.3 mg/L PHG. The DLR is 0.05 mg/L.

The category of health risk for copper is gastrointestinal irritation. Numerical health risk data on copper has not yet been provided by OEHHA.

The District's water system is in full compliance with Federal and State Lead and Copper rules. Based on the District's sampling, it was determined according to State regulatory requirements that the District is below the Action Level for Copper. Therefore, the District is deemed, by DDW, to have "optimized corrosion control" and is placed on a reduced monitoring schedule of once every three years.

The District's source water supplies contain no detectable copper; however, research has shown that elevated copper levels may still be observed in household water taps due to the corrosion of copper and brass fittings in household plumbing. Optimizing water quality parameters to minimize corrosion is considered the best available technology for reducing the incidence of elevated household tap copper levels. The District monitors water quality parameters related to corrosion, such as pH, hardness, alkalinity and total dissolved solids.

Since the District meets the "optimized corrosion control" requirements, it is not prudent to initiate additional treatment, which would involve the addition of other chemicals that may raise other water quality issues.

Gross Beta Particle Activity

Gross beta particle activity (gross beta) is a measure of the total amount of radioactivity in a water sample attributable to the radioactive decay of beta-emitting elements. The MCL for gross beta is 50 pCi/L, and the MCLG is zero. Gross beta was detected in water

supplied by the Twin Oaks Valley Water Treatment Plant and averaged 5.0 pCi/L in 2021. The DLR is 4.0 pCi/L.

The category health risk for beta is carcinogenicity. As gross beta does not refer to a specific chemical contaminant, but rather to a group of radioactive elements, risk-based health protective values vary for the different beta emitting isotopes. Thus, OEHHA has not developed a PHG for gross beta but concludes that some of the radioactive elements could pose a higher than one in a million cancer risk at levels of 50 pCi/L or less.

BAT's for gross beta reduction are ion exchange and RO.

Uranium

Uranium is a naturally occurring radioactive element found in the earth's crust and is present in ground and surface waters due to its natural occurrence in geological formations. The MCL for uranium is 20 pCi/L. OEHHA adopted a PHG of 0.43 pCi/L for uranium in 2001. The DLR is 1.0 pCi/L.

The highest average level of uranium in 2019 was detected in water supplied by the Robert A. Weese Filtration Plant at 2.0 pCi/L. In 2020, samples taken from the Robert A. Skinner Water Treatment Plant averaged 2.0 pCi/L. In 2021, the highest average level of uranium was detected in water produced by the Twin Oaks Valley Water Treatment Plant at 2.6 pCi/L.

The presence of uranium increases the risk of cancer and is toxic to kidney function. The cancer health risk is 1×10^{-6} (one per million) at the PHG and 5×10^{-5} (five per hundred thousand) at the MCL. Uranium intake from water is about equal to the total from other dietary components.

The BATs to lower the level of uranium below the MCL include the following:

- Enhanced coagulation followed by filtration
- Lime softening
- Ion exchange
- Reverse osmosis

The first technique, enhanced coagulation followed by filtration, is a technology that is applicable to surface waters and is utilized at treatment plants when warranted by raw water conditions.

Lime softening, ion exchange and reverse osmosis are not used at the Escondido-Vista Water Treatment Plant, as the plant was not designed to facilitate these technologies. Extensive plant redesign would be required to incorporate them, and the effort is impractical due to the space limitations of the treatment plant site.

It is unclear whether treatment to lower uranium below the PHG would be feasible, as BATs are designated for treatment to achieve compliance with the corresponding MCL only, and not the PHG. Likewise, it should be noted that cost estimates are developed for treatment to the MCL and not to the lower PHG level.

RECOMMENDATIONS FOR FURTHER ACTION:

Vista Irrigation District's water quality meets all state and federal drinking water standards set to protect public health; the levels of the constituents identified in this report are already significantly below the health-based Maximum Contaminant Levels established to provide "safe drinking water." The effectiveness of additional costly 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 unclear and may not be quantifiable; therefore, no action to incorporate new treatment technologies to reduce constituent levels to below PHG or MCLG levels is proposed.

The District continuously monitors and assesses water quality parameters to ensure compliance with all state and federal regulations for safe drinking water. The District utilizes operational controls, monitoring, testing, data collection and analysis and collaborates with its water providers and regulatory authorities to ensure that the water the District delivers meets the highest quality water standards feasible.

For more information on Public Health Goals, visit –
https://oehha.ca.gov/water/public-health-goals-phgs.