2025

Triennial Public Health Goal Report

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REPORT ON WATER QUALITY
RELATIVE TO PUBLIC HEALTH GOALS

2022 - 2024

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 (PHGs). PHGs 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 (MCLGs) 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 2022 through 2024 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

PHGs 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 MCLs) are considered in setting the PHGs. These factors include analytical detection capability, treatment technology available, benefits and costs. ***PHGs are not enforceable and are not required to be met by any public water system. MCLGs are the federal equivalent to PHGs.***

Water Quality Data Considered

All the water quality data collected for the District system in 2022, 2023, and 2024 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 PHGs and all MCLGs 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 cost 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 treatment processes to try and further reduce very low levels of one constituent may have adverse effects on other aspects of water quality.

2022-2024 Constituents detected that exceed a PHG or MCLG

Constituent	Units	MCL	PHG or (MCLG)	DLR	Highest Average Detected		
					2022 (Location)	2023 (Location)	2024 (Location)
Arsenic	ug/L	10	0.004	2	2.3 (a)	2.1 (a)	ND
Bromate	ug/L	10	0.1	1	3.0 (a)	ND	1.7 (a)
Chlorite	mg/L	1	0.05	0.02	0.27 (b)	0.39 (b)	0.47 (b)
Hexavalent Chromium	ug/L	10	0.02	0.1	0.11 (a)	ND	ND
Copper	mg/L	1.3*	0.3*	0.05	NC	NC	0.54 (d)
Gross Alpha	pCi/L	15	0 (MCLG)	3	ND	ND	3.3 (b)
Gross Beta	pCi/L	50	0 (MCLG)	4	7.0 (e)	ND	13.6 (b)
Uranium	pCi/L	20	0.43	1	2.0 (e)	2.5 (c)	2.5 (c)
Total Coliform	Presence	>5% per month	0% per month	NA	ND (d)	0.81% (d)	1.6% (d)

(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
NC = Not Collected
ND = Not Detected

Constituents Exceeding PHGs

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

Arsenic

The MCL for arsenic is 10 ug/L. A PHG of 0.004 ug/L was adopted by OEHHA in 2004. The level of arsenic detected in source water supplied by the Twin Oaks Water Treatment Plant was 2.3 ug/L in 2022, 2.1 ug/L in 2023. 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 to below the MCL of 10 ug/L: adsorption media, ion exchange, coagulation/filtration, oxidation/filtration, 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. A PHG of 0.1 ug/L was adopted by OEHHA in 2009. The RAA (Running Annual Average) level of bromate detected in source water supplied by the Twin Oaks Water Treatment Plant was 3.0 ug/L in 2022 and 1.7 ug/L in 2024. The Robert A. Skinner Water Treatment Plant reported RAA levels at 1.2 ug/L in 2022 and 1.5 ug/L in 2024. 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 x 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 at the effluent of the Escondido-Vista Water Treatment Plant at an average of 0.27 mg/L in 2022, 0.39 mg/L in 2023 and 0.47 mg/L in 2024. 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, existing lower-quality cancer studies and limited positive genotoxicity data suggest that chlorite may be a weak carcinogen or have carcinogenic potential.

The best available technology for chlorite removal is RO**,** which achieves over 90% effectiveness and is designated by the EPA as a BAT. It provides high removal efficiency for chlorite and other inorganics and treats a broad range of contaminants. However, RO systems are energy-intensive, costly to install and operate, require pretreatment, and produce brine waste. Ion exchange**,** particularly with strong base anion resins, offers moderate chlorite removal depending on resin type and water chemistry. It is more cost-effective and scalable but less efficient than RO and poses challenges such as frequent regeneration, brine disposal and competition with other anions. Chemical reduction methods using agents like sulfite or ferrous iron have been studied to convert chlorite to chloride but are not widely implemented due to the need for precise dosing, risk of byproduct formation and limited field validation.

Hexavalent Chromium

OEHHA established the nation's first PHG for hexavalent chromium (Cr VI) in drinking water at 0.02 ug/L in 2011. This PHG represents a Cr VI concentration posing minimal health risks over a lifetime of exposure. In April 2024, the State Water Resources Control Board (SWRCB) approved a new MCL for Cr VI at 10 ug/L in an attempt to reduce cancer and kidney disease cases from long-term exposure. Cr VI was detected at Twin Oaks Valley Water Treatment Plant at 0.11 ug/L in 2022. The DLR is 0.1 ug/L

Cr VI is a toxic form of chromium known to cause serious health effects. Long-term ingestion through drinking water has been linked to an increased risk of stomach and intestinal cancers, as well as liver and kidney damage. Inhalation of Cr VI, common in industrial settings, can lead to lung cancer, nasal irritation and respiratory issues. Skin contact may cause allergic reactions, rashes, and ulcers. Due to its carcinogenic and toxic properties, Cr VI is considered a significant public health concern, especially for vulnerable populations and workers in industries where exposure is common.

The best available technology for removing Cr VI is ion exchange using strong base anion resins**,** which is EPA-designated and achieves over 90% removal efficiency. It is cost-effective

and suitable for both small and large systems, though it competes with other anions and requires regeneration and brine disposal. RO is another effective method, also removing over 90% of Cr VI, and offers broad contaminant removal but comes with high capital and operating costs, energy demands, and brine waste**.** Reduction-coagulation-filtration (RCF) is an alternative approach where Cr VI is reduced to Chromium III and then removed via coagulation and filtration. While effective and potentially lower in cost, RCF requires careful chemical dosing and pH control, and generates sludge that must be managed.

Copper

There is no MCL for copper. Instead, the 90th percentile value of all samples from household taps in the District's 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 51 samples (100%) collected by the District in 2024 were below the Action Level. The PHG for copper is 0.3 mg/L. Of the 51 copper samples collected in 2024, 11 were equal to or greater 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 the 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 are 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 which relate 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 Alpha

USEPA has established the MCLG for gross alpha particle activity in drinking water, set at zero picocuries per liter (pCi/L)**.** This PHG represents a health-protective level of exposure, indicating that any detectable level of gross alpha radiation in drinking water may pose some health risk over a lifetime of consumption.

Ingesting water containing alpha-emitting radionuclides can increase the risk of various cancers, particularly of the bone, liver, and lungs. The risk is cumulative, meaning long-

term exposure to even low levels of alpha radiation can contribute to an increased cancer risk over time.

The MCL, MCLG and DLR for gross alpha activity are 15 pCi/L, zero pCi/L and 3 pCi/L, respectively. Gross alpha was detected at the effluent of the Escondido-Vista Water Treatment Plant at 3.3 pCi/L in 2024. Robert A. Weese Water Filtration Plant detected a 3.1 pCi/L in 2024.

Gross Beta

Gross beta radiation in drinking water refers to the total beta particle activity from radioactive substances, both naturally occurring and man-made. Beta particles are a form of ionizing radiation that can pose health risks if ingested, especially over long periods. The MCL for gross beta particle activity is 4 millirems over an entire year (mrem/yr); however, 50 pCi/L is used as a screening trigger by both the EPA and SWRCB. If the measured gross beta activity, excluding naturally occurring potassium-40, is less than or equal to 50 pCi/L, it is in compliance with the state's MCL dose limit of 4 mrem/yr for radionuclides in drinking water and does not require further testing (22 CCR §64443). The MCLG for gross beta particle activity is zero pCi/L. The Robert A. Skinner Water Treatment Plant detected 7 pCi/L in 2022. The Escondido-Vista Water Treatment Plant detected 13.6 pCi/L in 2024. The DLR is 4.0 pCi/L. The unit pCi/L measures the concentration of radioactivity in water, while mrem/yr reflects the effective radiation dose to humans.

Long-term ingestion of gross beta radiation in drinking water may increase cancer risk (e.g., bone, thyroid, blood cancers) due to exposure to radionuclides like strontium-90 and iodine-131. These radionuclides can accumulate in organs, where they emit ionizing radiation that damages DNA and tissues. Vulnerable groups, such as children, pregnant women and the immunocompromised are especially at risk, making long-term exposure a significant public health concern.

The best available technology for removing both gross alpha and gross beta radiation includes ion exchange, which is EPA-designated and effective for removing alpha-emitting radionuclides like uranium and radium. Ion exchange is widely used but requires regular regeneration and brine disposal. RO is also highly effective, removing over 90% of alpha particles, though it involves higher costs, energy use, and brine management. Lime softening is another option, particularly effective for radium and uranium removal in large municipal systems, but it generates significant sludge and requires careful chemical handling.

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. A PHG of 0.43 pCi/L for uranium was adopted by OEHHA in 2001.

The level of uranium detected in source water supplied by the Twin Oaks Water Treatment Plant averaged 2.3 pCi/L in 2024. Water analyzed from the Weese Treatment Plant averaged 1.1 pCi/L in 2022 and 2.5 pCi/L in 2023 and 2024. The Robert A. Skinner Water Treatment Plant reported 2.0 pCi/L of uranium in 2022, 2023 and 2024.

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 roughly equal to the intake 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.

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 PHGs. Likewise, it should be noted that cost estimates are developed for treatment to the MCL and not to the lower PHG level.

Total Coliform

Each month, District employees collect 120 to 150 samples from the distribution system for coliform analysis. Occasionally, a sample was found to be positive for coliform bacteria, but repeat samples were negative in all cases. In any given month, a maximum of 1.6% of the samples, or two samples, were total coliform-positive. Total coliform has no MCL, but exceeding 5% for total coliform-positive samples in a single month for the District requires a Level 1 Assessment per the SWRCB. A Level 1 Assessment requires water systems to identify a possible cause to the total coliform-positive samples and take corrective action(s).

The MCLG for coliform bacteria is zero. Coliforms are indicator organisms that are not generally considered harmful but may indicate the presence of potential pathogens. Pathogens are organisms that may cause waterborne disease. The reason for the coliform standard is to minimize the possibility of water containing pathogens. Coliform is only a surrogate indicator of the potential presence of pathogens, so it is not possible to state a specific numerical health risk.

The District takes many steps to minimize the potential for coliform bacteria. They are:

- Maintain and monitor the disinfectant residual throughout the distribution system.
- Utilize clean, self-contained distribution sample test points.
- Maintain positive pressures in the distribution system.
- Maintain an effective cross-connection control program.

Recommendations For Further Action:

The 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 MCLs 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, date collection and analysis and collaborates with water providers and regulatory authorities to ensure that the water the District delivers meets the highest water quality standards feasible.

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