

2022 Report on Water Quality Relative to Public Health Goals

Background

The California Health and Safety Code¹ requires water utilities with more than 10,000 service connections to prepare a triennial report comparing water quality results to the Public Health Goals (PHGs) or Maximum Contaminant Level Goals (MCLGs). PHGs are non-enforceable goals set by the California Office of Environmental Health Hazard Assessment (OEHHA), a division of the California Environmental Protection Agency (Cal-EPA). If OEHHA has not adopted a PHG for a drinking water constituent, the law requires water utilities to use MCLGs adopted by United States Environmental Protection Agency (USEPA), which are also non-enforceable goals. This report addresses constituents that have a California primary drinking water standard (a Maximum Contaminant Level, MCL) and either a PHG or MCLG.²

This triennial report for Dublin San Ramon Services District (DSRSD) covers the calendar years 2019, 2020, and 2021. If a constituent with an established MCL was detected in the DSRSD water supply between 2019 and 2021 at a level exceeding an applicable PHG or MCLG, this report provides the following information, as required by law:

- The numerical public health risk associated with the MCL and the PHG or MCLG, if possible to quantify;
- The category or type of health risk that could be associated with each constituent;
- The best treatment technology available that could be used to reduce the level of the constituent in our drinking water; and
- An estimate of the cost to install that treatment if it is appropriate and feasible.

Public Health Goals

A Public Health Goal is the concentration of a constituent in drinking water that poses no significant health risk. PHGs are based solely on public health risk. In setting PHGs, OEHHA does not consider any of the practical risk-management factors used by the USEPA and the California Division of Drinking Water (DDW) when they set enforceable drinking water standards (MCLs). These practical factors include the capability to detect and analyze constituents at very low levels, technologies available to reduce constituents to these levels, and the benefits and costs of doing so. PHGs are not enforceable, and no public water systems are required to meet them. When a PHG is absent a MCLG will be used as the concentration of comparison. MCLGs, like PHGs, are strictly health based and include a margin of safety.

Water Quality Data

The water quality compliance data collected by DSRSD or provided by Zone 7 Water Agency in calendar years 2019, 2020, and 2021 were used to create this report. This data is summarized separately in DSRSD's 2019, 2020, and 2021 Annual Water Quality Reports.³

Report Guidelines

The Association of California Water Agencies (ACWA) formed a workgroup that prepared guidelines for water utilities to use in preparing the required report.⁴ DSRSD staff used the 2022 ACWA guidelines to prepare this report.

Treatment Technologies and Estimated Costs

Both the USEPA and DDW identify what are known as Best Available Technologies (BATs). These are the best-known methods of reducing contaminant levels to the MCL. Costs can be estimated for using such technologies. However, many PHGs and all MCLGs are set much lower than the MCL. It is not always possible or feasible to determine a treatment that could reduce the level of a constituent down to the level of 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 to try and further reduce very low levels of one constituent may adversely affect other aspects of water quality.

Constituents that Exceeded a PHG or MCLG

The following constituents were detected in our drinking water distribution system at levels above the PHG or MCLG.

Escherichia coli (E. coli) Bacteria

When samples test positive for total coliform bacteria, *E. coli* analysis is conducted. *E. coli* are bacteria found in the environment, foods, and intestines of people and animals. *E. coli* are a large and diverse group of bacteria. In 2019, *E. coli* was found to be present in one sample. In 2020 and 2021, no *E. coli* were detected. Although the MCL was not exceeded, the MCLG of zero positive samples was exceeded.

Health risk category: Most *E. coli* are harmless and are an important part of a healthy human intestinal tract. However, some *E. coli* are pathogenic, meaning they can cause illness, such as diarrhea, urinary tract infections, respiratory illness and pneumonia, or other illnesses. The types of *E. coli* that can cause diarrhea can be transmitted through contaminated water or food, or through contact with animals or persons.

Best available treatment technology: Exceeding zero *E. coli* bacteria at any one time, in and of itself, does not normally constitute the need for any treatment or action. There is no action that could be taken with absolute certainty that could ensure that the system would always have zero-percent *E. coli* every single time.

DSRSD's wholesale water provider, Zone 7 Water Agency, adds chloramine at the source to assure the

water is safe from pathogens. DSRSD may add supplemental chloramine within its water distribution system. DSRSD carefully controls chloramine residual levels to provide the best health protection without causing undesirable taste and odor or increasing the level of disinfection byproducts. DSRSD and Zone 7 carefully balance treatment processes to continue supplying drinking water that meets and often exceeds State and Federal drinking water standards.

We use other equally important measures to prevent waterborne disease, including: implementing an effective cross-connection control program, maintaining disinfectant residual throughout our system, flushing water mains, and maintaining positive pressures in our distribution system. DSRSD has already taken all of the steps described by DDW as best available technology in the California Code of Regulations, Section 64447, Title 22.

Bromate

Bromate is a byproduct of the ozonation process; naturally occurring bromide in source water reacts with ozone to form bromate. Ozone is used at Zone 7 Water Agency's Del Valle Treatment Plant to control taste and odor causing compounds. Occasional algal blooms in source water reservoirs can impart significant taste and odor to the raw water, and ozone is used to remove these compounds. If bromide is present in the water, bromate can form during ozonation. Ozone is also a powerful disinfectant, and it can oxidize other unwanted compounds such as cyanotoxins that can form during algal blooms.

Bromate compliance is determined on a quarterly basis and is only relevant for the water treatment plant utilizing ozone (Del Valle Treatment Plant). Ozone treatment and compliance monitoring started in October of 2020. One of the five measurements between 2020 and 2021 at the Del Valle Treatment Plant exceeded the bromate PHG of 0.1 µg/L. The MCL for bromate is 10 µg/L. The state's analytical detection limit is 5 µg/L, an order of magnitude higher than the PHG. In the second quarter of 2021 there was a Running Annual Average, RAA of 8 µg/L.

Health risk category:

USEPA classifies bromate as a probable human carcinogen. For the MCL of 10 µg/L, the theoretical excess cancer risk is 100 extra cancer cases per million individuals consuming the water on a daily basis over a lifetime (70 years). For the PHG of 0.1 µg/L, the calculated theoretical excess cancer risk is one per million individuals.

Best available treatment technology:

Both USEPA and DDW adopt BATs, which are the best known methods for reducing contaminant levels to meet the MCLs. However, when PHGs or MCLGs are established at concentrations much lower than current analytical methods are capable of measuring (such as for bromate), it is not always possible or feasible to determine if the BAT can reduce a constituent down to or near the PHG or MCLG.

DDW and USEPA cite "control of ozone treatment process to reduce production of bromate" as the BAT to control bromate formation. The lack of specificity in the DDW and USEPA BAT designation for bromate control clearly indicates the need for more research in this area, as control requires balancing the water quality benefits of taste and odor control, disinfection, and toxin removal, with disinfection byproduct formation.

To date, no BAT to remove bromate has been identified. Studies and full-scale projects at other utilities have demonstrated the efficacy of various treatment techniques in controlling bromate formation to below the MCL. These techniques inhibit the reaction between ozone and bromide and include pH suppression and chloramination before ozonation. Such methods have been shown to control bromate formation to less than 10 µg/L; it is not known if the methods can control formation to the very low concentration of the PHG. The only known treatment technology that can remove bromate is reverse osmosis, but it has not been identified by the DDW or USEPA as a BAT.

At present, the evaluation of all bromate treatment technologies is limited by detection limits of the analytical methods. It is uncertain whether these treatment methods can effectively reduce bromate formation to the PHG level, which is one hundred times lower than the MCL and ten times lower than the method detection limit of 1 µg/L. In addition, the technologies previously mentioned have yet to be designated as BAT by the regulatory agencies. For these reasons, it is premature to develop treatment costs for bromate control.

Lead

The DSRSD water system is in full compliance with the federal and state *Lead and Copper Rule*.

Lead does not have an established MCL. Instead, regulations require that the 90th percentile value of all samples collected from a predetermined number of household taps in the distribution system not exceed the Action Level. The Action Level for lead is 15 µg/L. The PHG for lead is 0.2 µg/L, which is below the 5 µg/L detection limit for reporting purposes (DLR). Regulators require DSRSD to test tap water samples from selected homes for lead every three years. In water samples collected in 2019, the 90th percentile value for lead was 10 µg/L, which is below the Action Level of 15 µg/L but over the PHG of 0.2 µg/L.

Health risk category: Exposure to lead has been associated with a variety of human toxicological effects. The 0.2 ppb PHG was established as a public health-protective concentration for the most sensitive non-carcinogenic chronic health endpoint, intelligence deficit in children. This PHG corresponds with a maximum daily lead intake of 2.86 micrograms per day through the consumption of drinking water.

Best available treatment technology: DDW reviewed past residential tap results and determined that DSRSD meets “optimized corrosion control” requirements. In general, optimizing corrosion control is considered to be the best available technology to address corrosion issues and lead findings above the Action Level. Zone 7 continues to monitor water quality parameters related to corrosivity, which include pH, hardness, alkalinity and total dissolved solids. DSRSD, in cooperation with Zone 7, maintains system conditions for “optimized corrosion control.”

Since the District, in cooperation with Zone 7, is meeting requirements for “optimized corrosion control,” it is not prudent to initiate additional corrosion control treatment at this time to lower the lead level. These treatments would involve adding other chemicals, which could raise additional water quality issues. Therefore, we have not included a cost estimate for additional treatment.

Uranium

Uranium is a naturally occurring metallic element which is weakly radioactive and ubiquitous in the

earth's crust. Uranium is found in ground and surface waters due to its natural occurrence in geological formations. The uranium intake from water is about equal to the total from other dietary components.

The DSRSD water system is in full compliance with the federal and state regulations for uranium. The PHG for uranium is 0.43 picoCuries per liter (pCi/l) and the MCL is 20 pCi/l. All water supply samples were below the MCL and ranged from non-detect to 4.1 pCi/l. Annual averages for the water coming from the groundwater supply ranged from 1.0 to 1.3 pCi/l for calendar years 2019 - 2021. There were no detections in the surface water supply.

Health risk category: The category for health risk associated with uranium is that people who drink water containing uranium above the MCL for many years could experience an increased cancer risk. OEHHA has determined that the numerical cancer risk for uranium at the PHG level is a *de minimis* 1×10^{-6} lifetime cancer risk for exposure through drinking water.

Best available treatment technology: The best available treatment technologies for uranium are ion exchange, reverse osmosis (RO), lime softening, and coagulation/filtration. The PHG is below the DLR and there is uncertainty surrounding the ability to treat down the PHG.

At present, the evaluation of all uranium treatment technologies is limited by detection limits of the analytical methods. It is uncertain whether these treatment methods can effectively reduce uranium to the PHG level. For this reason, it is premature to develop treatment costs for uranium control.

Recommendations for Further Action

DSRSD drinking water meets all quality standards set by DDW and USEPA to protect public health. It would require additional costly treatment processes to further reduce the levels of the constituents identified in this report, which are already significantly below the health-based Maximum Contaminant Levels established to meet PHGs / MCLGs. It is uncertain if additional treatment processes could effectively reduce constituent levels, which are already low. The health protection benefits of these further hypothetical reductions are not at all clear and may not be quantifiable. Therefore, no action is proposed.

References

1. California Health & Safety Code, Section 116470 (b), accessed June 20, 2022, https://leginfo.ca.gov/faces/codes_displaySection.xhtml?sectionNum=116470&lawCode=HSC
2. "MCLs, DLRs, and PHGs for Regulated Drinking Water Contaminants," California State Water Resources Control Board Division of Drinking Water, last updated September 14, 2021, https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/mclreview/mcls_dlrs_phgs.pdf
3. Dublin San Ramon Services District's 2019, 2020 and 2021 Annual Water Quality Reports, accessed on June 20, 2022, <https://www.drsrd.com/about-us/library/environmental-permits-monitoring-reports>
4. "Suggested Guidelines for Preparation of Required Reports on PUBLIC HEALTH GOALS (PHGs) to satisfy requirements of California Health and Safety Code Section 116470(b)," Association of California Water Agencies (ACWA), April 2022