



2019 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 special report every three years if constituents in their drinking water have exceeded any Public Health Goals (PHGs). 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 the Maximum Contaminant Level Goal (MCLG) adopted by United States Environmental Protection Agency (USEPA). This report addresses only constituents that have a California primary drinking water standard (a Maximum Contaminant Level, MCL) and either a PHG or MCLG.² The current report is due by July 1, 2019.

If a constituent 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 following information 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
- An estimate of the cost to install that treatment if it is appropriate and feasible

Public Health Goals

A Public Health Goal represents a level of concentration of a constituent that poses no significant health risk if consumed over a lifetime. 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 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. MCLGs are the federal equivalent to PHGs.

Water Quality Data

DSRSD considered all of the water quality data collected for the district's water system between 2016 and 2018 for the purpose of determining compliance with drinking water standards. This data is summarized in our 2016, 2017, and 2018 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. DSRSD staff used the ACWA guidelines to prepare this report. No guidance was available from state regulatory agencies.

Treatment Technologies and Estimated Costs

Both the USEPA and California Division of Drinking Water adopt what are known as Best Available Technologies. 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.

Total Coliform Bacteria

During 2016, 2017, and 2018, the District collected 80 to 127 samples each month for coliform analysis. Coliform bacteria exceeded the MCLG of zero percent positive in 12 of the 36 months. Of these twelve, two exceeded the MCL of 5% in September 2016 with 6.1% and November 2016 with 7.4%. Results for the three years covered by this report are summarized below:

2016: Seven months with total coliform positive samples;
The highest monthly percentage of positives was 7.4%

2017: Three months with total coliform positive samples;
The highest monthly percentage of positives was 3.1%

2018: Two months with total coliform positive samples;
The highest monthly percentage of positives was 1.1%

Health risk category: Regulators created the coliform drinking water standard (MCL) to minimize the possibility of pathogens in tap water. Pathogens are organisms that cause waterborne disease. Coliform bacteria are not pathogens; rather they are surrogate indicators of the potential presence of pathogens. It is not possible to state a specific numerical health risk for coliform. While USEPA normally sets MCLGs "at a level where no known or anticipated adverse effects on persons would occur," they indicate they cannot do so with coliforms.

Coliform bacteria are ubiquitous in nature and are not generally considered harmful. Laboratories use them as indicator organisms because they are easy to monitor and analyze. If a positive sample is found, it indicates a potential problem that needs to be investigated through follow-up sampling. It is not unusual for a water system to have an occasional positive sample. It is difficult, if not impossible, to assure a system will never have a positive sample.

Best available treatment technology: DSRSD's wholesale water provider, Zone 7 Water Agency, adds chloramine at the source to assure the water is microbiologically safe. DSRSD may add supplemental chloramine to boost the chlorine residual 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 safe drinking water.

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 main dead ends, and maintaining positive pressures in our distribution system. DSRSD has already taken all of the steps described by the Division of Drinking Water as best available technology for coliform bacteria in the California Code of Regulations, Section 64447, Title 22.

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 2016 and 2018, no *E. coli* were detected. In 2017, *E. coli* was found to be present in two samples. Although the MCL was not exceeded, the MCLG of zero positive samples was exceeded.

Health risk category: Most *E. coli* are harmless and actually 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. The same measures to control the overgrowth of total coliform bacteria are used to prevent *E. coli* growth. As described above, DSRSD has implemented steps to ensure the potential for *E. coli* growth is minimized.

Fluoride

DSRSD has detected fluoride at levels up to 1.1 milligrams per liter (mg/L) in the water supplied through our distribution system. The state of California MCL is 2.0 mg/L and the PHG is 1.0 mg/L. Our water system is in full compliance with the federal and state drinking water standards for fluoride, but the fluoride level in the system at times exceeds the PHG.

Health risk category: Some people who drink water containing fluoride above the MCL over many years may experience tooth mottling or dental fluorosis. This is why regulators adopted a drinking water standard for fluoride.

Best available treatment technology: DSRSD adds fluoride to assure our water provides optimal dental health. Fluoride's effect is topical. Small amounts of fluoride maintained in the mouth in saliva and dental plaque keeps tooth enamel strong by preventing the loss of important minerals. DSRSD carefully controls fluoride levels to provide the best protection for dental health without causing undesirable health risks. In addition, the district routinely maintain the pumps that inject fluoride throughout our system and flush water mains in our distribution system.

Lead and Copper

Currently, regulators have not established MCLs for lead or copper. 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 an Action Level. The Action Level for lead is 15 parts per billion (ppb). The PHG for lead is 0.2 ppb. The Action Level for copper is 1.3 mg/L. The PHG for copper is 0.3 mg/L. Regulators require DSRSD to test tap water samples from selected homes for lead and copper every three years. In water samples collected in 2016, the 90th percentile value for lead was 3 ppb, which is below the Action Level of 15 ppb but over the PHG of 0.2 ppb. The 90th percentile value for copper was 0.37 mg/L, which is below the Action level of 1.3 mg/L but over the PHG of 0.3 mg/L.

Health risk category: The category of health risk for lead includes chronic toxicity (adverse effects that usually develop gradually from low levels of chemical exposure over a long period of time—months to years). The cancer risk cannot be calculated at this time by OEHHA, the state agency responsible for providing that information.

The California Division of Drinking Water, which sets drinking water standards, has determined that copper is a health concern at certain exposure levels. A reddish brown metal, copper is often used to plumb residential and commercial structures that are connected to water distribution systems. Copper can contaminate drinking water as a byproduct of corrosion that occurs when copper pipes remain in contact with water for a prolonged period of time. Copper is an essential nutrient, but at high doses it has been shown to cause stomach and intestinal distress, liver and kidney damage, and anemia.

The PHGs for lead and copper are set at levels believed to cause no significant public health risk to individuals exposed to these metals over a lifetime.

Best available treatment technology: The DSRSD water system is in full compliance with the federal and state *Lead and Copper Rule*. Samples the district analyzed according to regulatory requirements have been below the Action Levels for lead and copper since 2001. The California Division of Drinking Water reviewed past residential tap results and determined that DSRSD meets “optimized corrosion control” requirements for both constituents.

In general, optimizing corrosion control is considered to be the best available technology to deal with corrosion issues and with any lead or copper findings above Action Levels. 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

The PHG for uranium is 0.43 picoCuries per liter (pCi/l) and the MCL is 20 pCi/l. Uranium is a naturally occurring metallic element which is weakly radioactive and is ubiquitous in the earth’s crust. Uranium is found in ground and surface waters due to its natural occurrence in geological formations. The average uranium concentrations in surface and ground water are not detected and 1 pCi/l respectively. The uranium intake from water is about equal to the total from other dietary components.

Uranium was below the MCL for all water sources at all times during the period covered in this report, however four of five groundwater sources in the Zone 7 production fields exceeded the PHG at least once during this period. Uranium results for the period covered by this report ranged from non-detect to a high of 4.0 pCi/l in the water supplied by the various well fields. Annual averages for the water coming from groundwater also ranged from non-detect to 4.0 pCi/l for calendar years 2016 - 2018.

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 1×10^{-6} , or one additional theoretical cancer cases in one million people drinking two liters of water a day for 70 years.

Best available treatment technology: The available treatment technologies for uranium are ion exchange, reverse osmosis (RO), lime softening, and coagulation/filtration. The most effective treatment system to consistently remove uranium to the PHG is RO treatment installed at the select groundwater and surface water connection sites where the water exceeds the PHG. Since the levels are already well below the MCL, reverse osmosis would likely be required to attempt to reduce the levels to below the PHG. Please note that accurate cost estimates are difficult, if not impossible, and are highly speculative and theoretical. All costs including annualized capital, construction, engineering, planning, environmental, contingency, and O&M are included, but only very general assumptions can be made for most of these items. Costs estimating guides from the Association of California Water Agencies (ACWA) guidance report were used in determining the estimated cost to implement the BAT.

According to the ACWA Cost Estimates for Treatment Technology BAT, to install and operate an RO system would cost approximately \$3.24 - \$7.33 per 1,000 gallons of water treated. The estimated annualized capital and operation and maintenance costs, based on the current wellfield average of 5.0 million gallons per day, to install and operate reverse osmosis systems would be between \$6 million and \$13.5 million/year for the life of the system. The cost per customer service connection could range from \$85 to \$192 per year. There would be additional costs for water conditioning to ensure water treated by reverse osmosis is optimized for distribution system corrosion control.

Recommendations for Further Action

The drinking water within the DSRSD distribution system meets all quality standards set by the California Division of Drinking Water 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 provide “safe drinking water.” 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 July 1, 2019, http://leginfo.legislature.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 March 13, 2019, https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/mclreview/mcls_dlr_phgs.xls
3. Dublin San Ramon Services District’s 2016, 2017 and 2018 Annual Water Quality Reports, accessed on July 1, 2019, <https://www.drsrd.com/about-us/library/environmental-permits-monitoring-reports>