



Golden State
Water Company
A Subsidiary of American States Water Company

Golden State Water Company
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2019 Report on Public Health Goals

Artesia System

Report Prepared by
Golden State Water Company

Introduction

Public Health Goals - Background

Provisions of the California Health and Safety Code, Section 116470(b), specify that larger water utilities (>10,000 service connections) prepare a special report by July 1, 2019 if their water quality measurements have exceeded any Public Health Goals (PHGs). PHGs are non-enforceable goals established by the California EPA'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 Maximum Contaminant Level Goals (MCLGs) adopted by United State Environmental Protection Agency (USEPA). Only constituents which have a California primary drinking water standard and for which either a PHG or MCLG has been set are to be addressed.

Golden State Water Company (Golden State Water) is providing information in conformance with this requirement by providing this updated report. If a regulated constituent was detected in the 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 public health risk associated with the Maximum Contaminant Level (MCL) and the PHG or MCLG, the category or type of risk to health that could be associated with each constituent, the best treatment technology available that could be used to reduce the constituent level, and an estimate of the cost to install that treatment if it is appropriate and feasible.

What Are PHGs?

The USEPA and the State Water Resources Control Board's Division of Drinking Water (DDW) are responsible for establishing regulations and setting drinking water standards and goals. These agencies, along with the California Public Utilities Commission (CPUC) set rules and regulations for water systems to follow.

PHGs are set by OEHHA and are based solely on public health risk considerations. None of the practical risk-management factors that are considered by the USEPA or DDW in setting MCLs are considered in setting the PHGs. These factors include analytical detection capability, treatment technology available, benefits, and costs. The 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 of the water quality data collected by our water system between 2016 and 2018 for purposes of determining compliance with drinking water standards

was considered. This data was summarized in our 2016, 2017, and 2018 Consumer Confidence Reports on Water Quality, which were made accessible to all Golden State Water customers.

Guidelines Followed

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

Best Available Treatment Technology and Cost Estimates

Both the USEPA and DDW adopt Best Available Technologies (BATs) which are the best known methods of reducing contaminant levels to 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 or feasible to determine what treatment is needed to further reduce a constituent downward 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 treatment to try and further reduce very low levels of one constituent may have adverse effects on other aspects of water quality.

Constituents Detected that Exceed PHGs or MCLGs

Inorganic Chemical Contaminants

Arsenic

Arsenic has been detected at levels up to 9.2 micrograms per liter ($\mu\text{g/L}$) in the water supplied to the Artesia System. The MCL is 10 $\mu\text{g/L}$ and the PHG is 4 nanograms per liter (ng/L). Our water system is in full compliance with the drinking water standard for arsenic, but the arsenic level in the system at times exceeds the PHG.

The DDW and USEPA have determined that arsenic is a health concern at certain levels of exposure. The category of health risk associated with arsenic, and the reason that a drinking water standard was adopted for it, is that some people who drink water containing arsenic above the MCL over many years may experience skin damage and circulatory system problems and are at a higher risk of getting

cancer. The numerical health risk for the PHG of 4 ng/L is one excess cancer case per million people. The numerical health risk for the MCL of 10 µg/L is 2.5 excess cancer cases per thousand people.

The DDW lists the Best Available Technologies (BATs) for removing arsenic to below the MCL as activated alumina, ion exchange, lime softening, coagulation/filtration, and reverse osmosis (RO). For the purpose of cost estimation, RO was selected as the treatment method to consistently remove arsenic below the PHG in the Artesia system.

Volatile Organic Chemicals

Tetrachloroethylene

Tetrachloroethylene (PCE) has been detected at levels up to 0.65 µg/L in water supplied to the Artesia System. The MCL for PCE is 5 µg/L and the PHG is 0.06 µg/L. Our water system is in full compliance with the drinking water standard for PCE, but the PCE level in the system at times exceeds the PHG.

The DDW and USEPA have determined that PCE is a health concern at certain levels of exposure. This organic chemical has been a popular solvent, particularly for the dry cleaning industry. It generally gets into drinking water by improper waste disposal. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. The numerical health risk for the PHG of 0.06 µg/L is one excess cancer case per million people. The numerical health risk for the MCL of 5.0 µg/L is 8 excess cancer cases per hundred thousand people.

The DDW lists the BATs for removing PCE as treatment with granular activated carbon (GAC) and by packed tower aeration. For the purpose of cost estimation, GAC was selected as the treatment method to consistently remove PCE below the PHG in the Artesia system.

Microbiological Contaminants

Total Coliform Bacteria

Total coliform bacteria have been present in a maximum of 1.6% of samples collected monthly from the distribution system. This percentage is the highest monthly percentage over the 36-month period from 2016 through 2018. The Artesia System collects between 48 and 60 samples every month at points throughout the water distribution system that are analyzed for total coliforms. Total coliform bacteria were present in 1 of the 1,875 samples collected during the 36 months from 2016 through 2018.

The MCL for total coliform is 5% of monthly samples, and the MCLG is 0% of monthly samples. Our water system is in full compliance with the drinking water standard for total coliform bacteria, but the level in the system at times exceeded the MCLG.

The DDW and USEPA have determined that the presence of total coliform is a possible health concern. Total coliform bacteria are common in the environment and are generally not harmful themselves. The presence of these bacteria in drinking water, however, may indicate a problem with water treatment or the pipes that distribute the water. Their presence could also indicate that the water may be contaminated with organisms that can cause disease. Disease symptoms may include diarrhea, cramps, nausea, and possibly jaundice, and associated headaches, and fatigue. These symptoms, however, are not just associated with disease-causing organisms in drinking water, but also may be caused by a number of factors other than your drinking water.

Because coliform is only an indicator of the potential presence of pathogens, it is not possible to state a specific numerical health risk. The DDW has set an enforceable drinking water standard for total coliform to reduce the risk of adverse health effects. Under this standard, no more than 5% of the samples collected during a month can contain these bacteria. Drinking water that meets this standard is usually not associated with a health risk from disease-causing bacteria and should be considered safe.

The DDW lists four operating and maintenance conditions as the BAT for protection against microbiological contaminants. These conditions are practiced by Golden State Water, and are as follows:

- Protection of wells from coliform contamination by appropriate placement and construction;
- Maintenance of a disinfectant residual throughout the distribution system;
- Proper maintenance of the distribution system; and
- Filtration and disinfection of approved surface water, and disinfection of groundwater.

We conduct sampling of our wells to ensure they are microbiologically safe and add chlorine to the water to help protect the distribution system. The chlorine residual levels are carefully controlled to provide the best health protection without causing the water to have undesirable taste and odor or increasing the disinfection byproduct level. This careful balance of treatment processes is essential to continue supplying our customers with safe drinking water.

Other equally important measures that we have implemented include: an effective cross-connection control program, maintenance of a disinfectant residual throughout our system, an effective monitoring and surveillance program, and maintaining positive pressures in our distribution system. Golden State Water has already taken all of the steps described by the DDW as best

available technology for coliform bacteria in Section 64447, Title 22, CCR; therefore, no cost estimate for additional treatment is given.

Cost of Treatment

The cost of treatment can depend upon a number of factors. They include the type of treatment, the number of separate treatment facilities required, and if there are multiple contaminants, whether they can all be removed with one treatment technology or require multiple technologies. The table below lists the costs for the Artesia System to consistently remove the contaminants listed in the previous section to below the PHG or MCLG. Costs include construction and annual operational expenses. These costs are estimates only, and could in fact be much higher.

Best Available Technology	Number of Sites Required	Total Annual Cost	Monthly Cost / Connection
Reverse Osmosis	7	\$16,549,088	\$128.69
Granular Activated Carbon	1	\$1,147,632	\$8.92
TOTAL	8	\$15,399,245	\$119.75

Summary of Findings

Overall, three contaminants were detected in the Artesia System at concentrations above the PHGs and/or MCLGs. Golden State Water did not serve water that contained contaminants in violation of recognized and enforceable MCLs. The drinking water quality of Golden State Water's Artesia System meets all drinking water standards for protection of public health.

If you have any questions about this report, please call us at (800) 999-4033. We are available to answer your questions 24 hours a day, 7 days a week, or visit our website at <http://www.gswater.com>.