



# 2010

# Report on Public Health Goals

## Cordova System

Report prepared by  
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### Public Health Goals - Background

Provisions of the California Health and Safety Code, Section 116470, require public water systems serving more than 10,000 service connections to prepare a report (in plain language) containing information on the “detection” of any contaminants at levels above the Public Health Goals (PHGs) adopted by the State Office of Environmental Health Hazard Assessment (OEHHA) or the additional Maximum Contaminant Level Goals (MCLGs) set by the United States Environmental Protection Agency (USEPA). The first report was required and prepared July 1, 1998 and is required to be revised every three years thereafter.

Golden State Water Company is providing information in conformance with this requirement by providing this revised and updated report at this time. If a constituent was detected in the water supply between 2007 and 2009 at a level exceeding an applicable PHG or MCLG, this report provides health and treatment cost information as required by law.

### Regulations and Drinking Water

The USEPA and the California Department of Health Services (CDPH) 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.

Drinking water goals include MCLGs and PHGs. MCLGs are levels of contaminants in drinking water below which there is no known or expected risk to public health. They are set by the USEPA and allow for a margin of safety. MCLGs are not enforceable drinking water standards. PHGs are water quality goals set by the OEHHA and are recommended target levels and are not required to be met by any public water systems.

Drinking water standards are also known as Maximum Contaminant Levels (MCLs) and Action Levels (ALs). MCLs are the highest level of a contaminant allowed in drinking water. They are set as close to MCLGs and PHGs as are economically and technologically feasible. MCLs are enforceable water quality standards that public water systems must meet. ALs are the concentrations of a contaminant which, if exceeded, triggers treatment or other requirements that the water system must follow.

PHGs and MCLGs are not water quality standards. MCLGs and PHGs are goals identifying extremely small risks. These risks are normally assessed where one person in a million would be at risk to a contaminant. Determinations of health risk at these low levels are frequently theoretical and are based on risk assessments made using assumptions and mathematical extrapolations. Many contaminants are considered to be carcinogenic. The USEPA has set these MCLGs at zero, which cannot be measured by available analytical methods.

The USEPA and CDPH have established Best Available Technologies (BAT) to remove or reduce contaminants to levels at or approaching the PHGs and MCLGs, where technologically feasible. The following information discusses the constituents found in the water served by the water system at or above the MCLGs and PHGs, the established BAT, and the cost estimate to remove the contaminant to the goal levels, where technologically feasible. Please note that accurate cost estimates are difficult, if not impossible, and are highly speculative and theoretical.

### Preparation of Report

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

# Constituents Detected that Exceed PHGs or MCLGs

## Radiological Contaminants

### Gross Alpha Particle Activity

Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Gross alpha particle activity has been detected at levels up to 3.4 picoCuries/L (pCi/L) in the ground and surface water supplied to the system. There is no PHG for gross particle activity. The MCLG is 0 pCi/L, and the MCL is 15 pCi/L. The levels detected in our system were below the MCL at all times, but were over the level identified by USEPA as the MCLG.

The CDPH and USEPA, which set drinking water standards, have determined that gross alpha particle activity is a health concern at certain levels of exposure. This radiological constituent is a naturally occurring contaminant in some groundwater and surface water supplies. The category of health risk associated with gross alpha particle activity, and the reason that a drinking water standard was adopted for it, is that some people who drink water containing alpha emitters in excess of the MCL over many years may have an increased risk of getting cancer. The numerical health risk for the MCLG of 0 pCi/L is zero. CDPH and USEPA set the drinking water standard for gross alpha particle activity at 15 pCi/L to reduce the risk of cancer or other adverse health effects.

The Best Available Technology (BAT) identified to treat gross alpha particle activity is reverse osmosis (RO). The most effective method to consistently remove gross alpha particle activity to the PHG is to install RO treatment at the select groundwater and surface water connections sites where the water exceeds the MCLG. The cost to install and operate RO removal systems to remove gross alpha particle activity to the MCLG in our Cordova system would be approximately \$20.5 million annually which includes construction and annual operational cost. This translates into a monthly cost of \$118.70 per connection (\$\$ cost /services) for the life of the treatment system.

### Radium

Radium is a naturally-occurring radioactive metal. Its most common isotopes are radium-226, radium-224, and radium-228. Radium is a radionuclide formed by the decay of uranium and thorium in the environment. It occurs at low levels in virtually all rock, soil, water, plants, and animals. The CDPH and USEPA have set MCLs for the isotopes radium-226 and radium-228 in drinking water. Combined radium (226 + 228) has been detected at levels up to 2.7 pCi/L in the ground and surface water supplied to the system. There is no PHG for combined radium-226 and radium-228. The MCLG is 0 pCi/L, and the MCL is 5 pCi/L. The levels detected in our system were below the MCL at all times, but were over the level identified by the USEPA as the MCLG.

The CDPH and USEPA, which set drinking water standards, have determined that combined radium is a health concern at certain levels of exposure. This radiological constituent is a naturally occurring contaminant in some groundwater and surface water supplies. The category of health risk associated with combined radium, and the reason that a drinking water standard was adopted for it, is that some people who drink water containing radium-226 and/or or radium-228 in excess of the MCL over many years may have an increased risk of getting cancer. The numerical health risk for the MCLG of 0 pCi/L is zero. CDPH and USEPA set the drinking water standard for combined radium at 5 pCi/L to reduce the risk of cancer or other adverse health effects.

The Best Available Technologies (BATs) identified to remove combined radium from drinking water are ion exchange, reverse osmosis (RO), and lime softening. The most effective method to consistently remove combined radium to the MCLG is to install RO treatment at the select groundwater and surface water connections sites where the water exceeds the MCLG. The cost to install and operate RO removal systems to remove both gross alpha particle activity and combined radium to the MCLG in our Cordova system would be approximately \$20.5 million annually which includes construction and annual operational cost. This translates into a monthly cost of \$118.70 per connection (\$\$ cost /services) for the life of the treatment system.

# Microbiological Contaminants

## Total Coliform Bacteria

Total coliform bacteria have been present in a maximum of 9.1% of samples collected monthly from the distribution system. This percentage is the highest monthly percentage over the 36-month period from 2007 to 2009. The Golden State Water Company – Cordova System collects between 48 and 60 routine samples every month at points throughout the water distribution system that are analyzed for total coliforms. Total coliform bacteria were present in seven of the 1,905 samples collected during the 36 months from 2007 through 2009.

The MCL for total coliform is 5% of monthly samples, and the MCLG is 0% of monthly samples. The total coliform bacteria percentage level for water in the distribution system were over the MCL once between 2007 and 2009 (November 2009) and was over the MCLG twice.

The CDHS and USEPA, which set drinking water standards, 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, generally is a result of a problem with water treatment or the pipes that distribute the water and indicates that the water may be contaminated with organisms that can cause disease. Disease symptoms may include diarrhea, cramps, nausea, and possibly jaundice, and any 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 CDHS 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 CDHS lists four operating and maintenance conditions as the Best Available Technology (BAT) for protection against microbiological contaminants. These conditions are practiced by the Cordova System, 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 add chlorine at our sources to assure that the water served is microbiologically safe. 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, an effective monitoring and surveillance program and maintaining positive pressures in our distribution system. The GSWC - Cordova system has already taken all of the steps described by CDPH as “best available technology” for coliform bacteria in Section 64447, Title 22, CCR.

## Inorganic Chemicals

### Arsenic

Arsenic has been detected at levels up to 4.2 micrograms per liter (mg/L) in the ground and surface water supplied to the system. The USEPA MCL is 10 mg/L (effective 1/23/06) and the PHG is 4 nanograms per liter (ng/L). Our water system is in full compliance with the federal drinking water standard for arsenic, but the arsenic level in the system at times exceeds the PHG.

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 associated with the PHG of 4 ng/L is one excess cancer case per million people.

The Best Available Technologies (BATs) for removing arsenic to below the MCL are activated alumina, ion exchange, lime softening, coagulation/filtration and reverse osmosis (RO). The most effective method to consistently remove arsenic to below the PHG is to install RO treatment at the select groundwater and surface water connections sites where the water exceeds the PHG. The cost to install and operate RO removal systems to remove arsenic to below the PHG in our Cordova system would be approximately \$2.4 million annually which includes construction and annual operational cost. This translates into a monthly cost of \$13.76 per connection (\$\$ cost /services) for the life of the treatment system.

## Lead

Based on the Lead and Copper Rule, GSWC conducts monitoring of lead and copper in water samples collected from customers' home taps. Home tap samples are currently collected on a triennial basis. The most recent data were collected in 2008. A total of 35 home tap samples were collected in 2008 with lead levels ranging from non-detection to 0.004 mg/L.

There is no MCL for lead. Instead the 90th percentile value of all samples from household taps in the distribution system cannot exceed an Action Level of 0.015 mg/l. The PHG for lead is 0.002 mg/l. "Action Level" means the concentrations of lead in water which is used to determine the treatment requirements that a water system needs to meet. The 90th percentile level for lead was 0.003 mg/L. This value is significantly below the Action Level per the Lead and Copper Rule, however, the value is above the PHG level.

The category of health risk for lead is damage to the kidneys or nervous system of humans. Numerical health risk data on lead has not yet been provided by OEHHA, the State agency responsible for providing that information.

Our water system is in full compliance with the Lead and Copper Rule. Based on our extensive sampling, it was determined according to State regulatory requirements that we meet the Action Levels for lead and copper. Therefore, we are deemed by CDPH to have "optimized corrosion control" for our system.

In general, optimizing corrosion control is considered to be the Best Available Technology (BAT) to deal with lead findings. We will continue to monitor our water quality parameters that relate to corrosion control, such as the pH, hardness, alkalinity and total dissolved solids, and will take action if necessary to maintain our system in an "optimized corrosion control" condition.

Since we are meeting the "optimized corrosion control" requirement, it is not prudent to initiate additional corrosion control treatment as it involves the addition of other chemicals and there could be additional water quality issues raised. Therefore, no estimate of cost has been included.

## Volatile Organic Chemicals

### Tetrachloroethylene

Tetrachloroethylene (PCE) has been detected at levels up to 2.4 ug/l in water supplied to the Cordova system. The MCL for PCE is 5 ug/l and the PHG is 0.06 ug/l. The PCE levels detected in our water sources were below the MCL, but at times were above the PHG level.

The CDPH has 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. CDPH has set the drinking water standard for PCE at 5 ug/l to reduce the risk of cancer or other adverse health effects that have been observed in laboratory animals. Drinking water that meets the CDPH standards is associated with little or no risk and is considered safe with respect to PCE.

CDHS lists the Best Available Technologies (BATs) for removing PCE as treatment with granular activated carbon (GAC) and by packed tower aeration. The most effective method to consistently remove PCE to below the PHG is to install GAC treatment at the select groundwater sites where the water exceeds the PHG. The cost to install and operate GAC removal systems to remove PCE to below the PHG in our Cordova system would be approximately \$0.3 million annually which includes construction and annual operational cost. This translates into a monthly cost of \$1.85 per connection (\$\$ cost / services) for the life of the treatment systems.

## Summary of Findings

Overall, six constituents were detected in our Cordova system at concentrations/levels above the PHGs. The system exceeded an MCL once during the period of 2007 to 2009. The drinking water quality of GSWC's Cordova System currently meets all the drinking water standards to protect 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>.