

# 2010

## Report on

# Public Health Goals



**Golden State  
Water Company**  
A Subsidiary of American States Water Company

## Southwest 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, 2008 or 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, but rather are goals identifying extremely small risks. These risks are normally assessed where one person in a million, if they drink two liters of water every day for 70 years, would be at risk from a contaminant. Determinations of health risks 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 (BATs) to remove or reduce contaminants to levels at or approaching the PHGs and MCLGs, where technologically feasible. BATs 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 a zero. Furthermore, while cost estimates can be used to compare the economics of various treatment processes or the costs of major project components, such estimates do not represent the actual construction and operation and maintenance costs of the project. Actual costs are site-specific and must be developed for individual circumstances. Many factors which cannot be generalized influence construction costs. These factors include plant capacity, design criteria, treatment processes, site conditions and land costs, permit costs, climate, competition among bidders and suppliers, and general local and nationwide economic conditions.

Finally, 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.

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 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 9.3 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 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 gross alpha particle activity to the MCLG in our Southwest system would be approximately \$24.5 million annually which includes construction and annual operational cost. This translates into a monthly cost of \$39.20 per connection (\$\$ cost /services) for the life of the treatment system.

#### Gross Beta Particle Activity

Certain minerals are radioactive and may emit a form of radiation known as photons and beta radiation. Gross beta particle activity has been detected at levels up to 9.7 pCi/L in the ground and surface water supplied to the system only. There is no PHG for gross particle activity. The MCLG is 0 pCi/L, and the MCL is 50 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 beta 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 beta particle activity, and the reason that a drinking water standard was adopted for it, is that some people who drink water containing beta and photon 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. The CDPH and USEPA set the drinking water standard for gross beta particle activity at 50 pCi/L to reduce the risk of cancer or other adverse health effects.

The Best Available Technologies (BATs) identified to treat gross beta particle activity are ion exchange and reverse osmosis (RO). The most effective method to consistently remove beta and photon emitters in order to meet 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 beta and photon emitters to the MCLG in our Southwest system would be approximately \$22 million annually which includes construction and annual operational cost. This translates into a monthly cost of \$35.10 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 1.4 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 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 beta and photon emitters to the MCLG in our Southwest system would be approximately \$25.3 million annually which includes construction and annual operational cost. This translates into a monthly cost of \$40.40 per connection (\$\$ cost /services) for the life of the treatment system.

## Uranium

GSWC conducted monitoring of Uranium in water samples collected from wells. Uranium has been detected at levels up to 5.3 pCi/L in the ground and surface water supplied to the system. The PHG for uranium is 0.43 pCi/L, and the MCL is 20 pCi/L. The levels detected in our system were well below the MCL at all times, but were over the PHG.

This radiological constituent is a naturally occurring contaminant in some groundwater and surface water supplies. Exposure to uranium in drinking water may result in toxic effects to the kidney. This constituent also has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed to high levels over their lifetimes. Constituents that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. OEHHA has determined the health risk associated with the PHG is one excess case of cancer in a million people, and the risk associated with the NCL is 5 excess cases of cancer in 100,000 people over a long period of time.

The Best Available Technology (BAT) identified to treat the removal of radiological constituents listed above (gross alpha and beta particles, radium, and uranium) is reverse osmosis (RO). The most effective and economical treatment system is to use RO to reduce radiologicals at groundwater and surface water sources. The estimated cost to install and operate an RO treatment system to treat groundwater and surface water supplies in the Southwest system would be approximately \$24.5 million per year. This translates into a monthly cost of \$39.20 per connection per month for the life of the treatment system.

# Microbiological Contaminants

## Total Coliform Bacteria

GSWC conducted weekly monitoring throughout the distribution system for total coliform (TC) analysis, the results of which are calculated and reported to CDPH every month. A maximum of 5.4% of these samples were positive in June 2007. This percentage is the highest monthly percentage over a 36-month period from 2007 through 2009. GSWC's Southwest system collects between 172 and 215 samples every month at locations throughout the distribution system, for a total of 6,862 TC samples. Total coliform bacteria were present in 37 samples of the 6,862 samples collected during the 36 months from 2007 through 2009.

The CDPH and USEPA, which set drinking water standards, have determined that the presence of total coliform is a possible health concern. Coliforms 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 total coliform is only an indicator of the potential presence of pathogens, it is not possible to state a specific numerical health risk. The CDPH has set an enforceable drinking water standard for total coliform to reduce the risk of these 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 CDPH lists four operating and maintenance conditions as the Best Available Technology (BAT) for protection against microbiological contaminants. These conditions are practiced by the Artesia 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.

The Southwest system adds chlorine at the sources to assure that the water served is microbiologically safe. The chlorine residuals 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. The Southwest system has already taken all of the steps described by CDPH as "best available technology" for coliform bacteria in Section 64447, Title 22, California Code of Regulations.

## Summary of Findings

Overall, six constituents were detected in our Southwest system at concentrations/levels above the PHGs or MCLGs. The system exceeded an MCL once during the period of 2007 to 2009.

To further reduce the levels of the constituents identified in this report to meet PHG or MCLG goals, additional costly treatment processes would be required. The effectiveness of the treatment processes to provide any significant reductions in constituent levels at these already low values is uncertain, and the health protection benefits of these hypothetical reductions are not clear, and may not be quantifiable. Therefore, no further action is proposed at this time.

The drinking water quality of GSWC's Southwest 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>.