

2007



Report on Public Health Goals

Artesia System

Regulations and Drinking Water

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

Constituents Detected

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 7.2 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 zero 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.

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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 2004 and 2006 at a level exceeding an applicable PHG or MCLG, this report provides health and treatment cost information as required by law.

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The CDHS 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 zero pCi/L is zero. CDHS 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 Artesia system would be approximately \$4.98 million annually which includes construction and annual operational costs. This translates into a monthly cost of \$38.94 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 6.4 pCi/L in the groundwater and surface water supplied to the system. There is no PHG for gross particle activity. The MCLG is zero 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 the USEPA as the MCLG.

The CDHS 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 zero pCi/L is zero. CDHS 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 to the MCLG is to install RO treatment at the select groundwater and surface water connection 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 Artesia system would be approximately \$2.27 million annually which includes construction and annual operational cost. This translates into a monthly cost of \$17.75 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 CDHS 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 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 zero 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 CDHS 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 PHG of zero pCi/L is zero. CDHS 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 connection 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 Artesia system would be approximately \$4.33 million annually which includes construction and annual operational cost. This translates into a monthly cost of \$33.90 per connection (\$\$ cost /services) for the life of the treatment system.

Uranium

Uranium has been detected at levels up to 12 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 below the MCL at all times, but were over the level identified by CDHS as the PHG.

uranium is 0.43 pCi/L, and the MCL is 20 pCi/L. The levels detected in our system were below the MCL at all times, but were over the level identified by CDHS as the PHG.

The CDHS and USEPA, which set drinking water standards, have determined that uranium 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 uranium, and the reason that a drinking water standard was adopted for it, is that some people who drink water containing uranium in excess of the MCL over many years may have kidney problems or an increased risk of getting cancer. The numerical health risk associated with the PHG of 0.43 pCi/L is one excess cancer case per million people. CDHS set the drinking water standard for uranium at 20 pCi/L to reduce the risk of cancer or other adverse health effects.

The Best Available Technologies (BATs) identified to treat 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. The cost to install and operate RO removal systems to remove uranium to the PHG in our Artesia system would be approximately \$2.27 million annually which includes construction and annual operational cost. This translates into a monthly cost of \$17.75 per connection (\$\$ cost /services) for the life of the treatment system.

Inorganic Contaminants

Arsenic

Arsenic has been detected at levels up to 23 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 connection 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 Artesia system would be approximately \$6.51 million annually which includes construction and annual operational cost. This translates into a monthly cost of \$50.91 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 6.7% of samples collected monthly from the distribution system. This percentage is the highest monthly percentage over the 36-month period from 2004 to 2006. The Golden State Water Company – 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 five of the 1,875 samples collected during the 36 months from 2004 through 2006.

The MCL for total coliform is 5% of monthly samples, and the MCLG is 0% of monthly samples. The total coliform bacteria percentage levels for water in the distribution system were over the MCL one time between 2004 and 2006 (September 2005) and were over the MCLG twice. An investigation performed after the MCL exceedance indicated that the positive coliform samples were due to contamination during sample collection rather than the presence of total coliform within the distribution system.

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.

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 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.

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, maintenance of a disinfectant residual throughout our system, an effective monitoring and surveillance program and maintaining positive pressures in our distribution system. The GSWC - Artesia system has already taken all of the steps described by CDHS as “best available technology” for coliform bacteria in Section 64447, Title 22, CCR.

Disinfection By-Products

Bromate

Bromate is a chemical that is formed when ozone is used to disinfect drinking water and reacts with naturally occurring bromide found in source water. Bromate has been detected at levels up to 5.6 mg/L surface water supplied to the system. The MCL for bromate is 10 mg/L, and the MCLG is zero mg/L. The Artesia water system is in full compliance with the federal drinking water standard for bromate, but we have detected bromate in the system above the MCLG.

The CDHS and USEPA have determined that bromate is a health concern at certain levels of exposure. The category of health risk associated with bromate, and the reason that a drinking water standard was adopted for it, is that some people who drink water containing bromate in excess of the MCL over many years may have an increased risk of getting cancer. The numerical health risk for the MCLG of zero mg/L is zero. CDHS and USEPA set the drinking water standard for bromate at 10 mg/L to reduce the risk of cancer or other adverse health effects.

The Best Available Technology (BAT) for removing bromate to below the MCLG is control of ozone treatment process to reduce production of bromate. This is typically accomplished by treating the source water in a variety of ways to reduce the natural organic matter (NOM), which will allow a reduction in the applied dose of ozone used for disinfection. However, in the Artesia water system, the source water is treated by a third party. Therefore, the bromate would need to be treated directly. The most effective treatment technique to reduce the bromate levels in the source water to levels below the MCLG is to treat the water by reverse osmosis (RO) at the select sites where the water exceeds the MCLG. The cost to install and operate an RO system to remove bromate to below the MCLG in the Artesia water system would be approximately \$2.27 million annually which includes construction and annual operational cost. This translates into a monthly cost of \$17.75 per connection for the life of the treatment system.

Summary of Findings

Overall, seven constituents were detected in our Artesia system at concentrations/levels above the PHGs or MCLGs. The system exceeded an MCL only one time during the period of 2004 to 2006, and this exceedance was attributed to non-representative samples from contaminated sample taps rather than a true problem within the distribution system. The drinking water quality of GSWC's Artesia System meets all the drinking water standards to protect public health. Therefore, no further action is required at this time.

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.aswater.com>.