

2007



Report on Public Health Goals

San Dimas System

Report prepared by
Golden State Water Company
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Public Health Goals - Background

Under the Calderon-Sher Safe Drinking Water Act of 1996 public water systems in California serving greater than 10,000 connections must prepare a report containing information on 1) detection of any contaminant in drinking water at a level exceeding a Public Health Goal (PHG) 2) estimate of costs to remove detected contaminants to below the PHG using Best Available Technology (BAT), and 3) health risks for each contaminant exceeding a PHG. This report must be made available to the public every three years. The initial report was due on July 1, 1998, and subsequent reports are due every three years thereafter.

This report has been prepared to address the requirements set forth in Section 116470 of the California Health and Safety Code. It is based on water quality analyses during calendar years 2004, 2005, and 2006 or, if certain analyses were not performed during those years, the most recent data available. The report has been designed to be as informative as possible, without unnecessary duplication of information contained in the Consumer Confidence Reports, which are mailed to customers by July 1st of each year.

There are no regulations explaining requirements for the preparation of PHG reports. A workgroup of the Association of California Water Agencies (ACWA) Water Quality Committee has prepared suggested guidelines for water utilities to use in preparing PHG reports. The ACWA

Regulations and Drinking Water

California Health and Safety Code Section 116365 requires the State to develop a PHG for every contaminant with a primary drinking water standard or for any contaminant California is proposing to regulate with a primary drinking water standard. A PHG is the level which poses no significant health risk if consumed for a lifetime. The process of establishing a PHG is a risk assessment based strictly on human health considerations. PHGs are recommended targets and are not required to be met by any public water system.

The State office designated to develop PHGs is the California Environmental Protection Agency's Office of Environmental Health Hazard Assessment (OEHHA). The PHG is then forwarded to the California Department of Health Services (CDHS) Division of Drinking Water and Environmental Management for use in revising or developing a Maximum Contaminant Level (MCL) in drinking water. The MCL is the highest level of a contaminant that is allowed in drinking water. California MCLs cannot be less stringent than federal MCLs and must be as close as is technically and economically feasible to the PHGs. CDHS is required to take treatment technologies and cost of compliance into account when setting an MCL. Each MCL is reviewed at least once every five years.

Four chemical contaminants (selenium, styrene, total chromium and molinate) and two radiological contaminants (gross alpha particle and gross beta particle) have MCLs but do not yet have designated PHGs. If any of these contaminants have been detected in drinking water, the Maximum Contaminant Level Goal (MCLG), the federal U.S. Environmental Protection Agency (USEPA) equivalent of PHGs, is used in this PHG Report.

Two chemical contaminants, perchlorate and N-nitrosodimethylamine (NDMA), have PHGs but are not yet regulated in drinking water with a primary drinking water standard. CDHS has proposed a perchlorate MCL at 6 micrograms per liter ($\mu\text{g}/\text{l}$). CDHS is considering regulating NDMA in drinking water.

Identification of Contaminants

Section 116470(b)(1) of the Health and Safety Code requires public water systems serving more than 10,000 connections to identify each contaminant detected in drinking water that exceeded the applicable PHG. Section 116470(f) requires the MCLG to be used for comparison if there is no applicable PHG.

Golden State Water Company (GSWC)-San Dimas System has approximately 16,000 service connections. The following constituents were detected at one or more locations within the drinking water system at levels that exceeded the applicable PHGs or MCLGs.

- Total Coliform Bacteria - naturally occurring in the environment
- Arsenic – naturally occurring in groundwater and surface water
- Copper – corrosion of residential plumbing
- Gross Alpha Particle Activity (gross alpha) – naturally occurring in groundwater
- Gross Beta Particle Activity (gross beta) – naturally occurring in groundwater and surface water

• Uranium – naturally occurring in groundwater

guidelines for water utilities to use in preparing PHG reports. The ACWA guidelines were used in the preparation of our report. These guidelines include tables of cost estimates for BAT. The State of California provides ACWA with numerical health risks and category of health risk information for contaminants with PHGs. This health risk information is appended to the ACWA guidelines.

- Uranium - naturally occurring in groundwater
- Bromodichloromethane (BDCM) – disinfection byproduct in the distribution system
- Bromoform (BF) – disinfection byproduct in the distribution system
- Dichloroacetic Acid (DCAA) – disinfection byproduct in the distribution system
- Trichloroacetic Acid (TCAA) -- disinfection byproduct in the distribution system
- N-nitrosodimethylamine – industrial contamination or disinfection byproduct in the distribution system

The accompanying chart shows the applicable PHG or MCLG and MCL or Action Level (AL) for each contaminant identified above. Copper is regulated by an AL, not an MCL, and is tested from samples collected at selected customers' indoor faucets or taps. The AL is the concentration of copper, which if exceeded in more than 10 percent of the tap samples, triggers treatment or other requirements that a water system must follow. The chart shows the 90th percentile concentration of copper observed during the most recent round of at-the-tap sampling. BDCM, BF, DCAA and TCAA are the individual disinfection byproducts that do not have MCLs. They do have federal MCLGs. NDMA does not have an MCL yet. The chart includes the maximum, minimum, and average concentrations of arsenic, radiological chemicals, and organic chemicals in drinking water supplied by GSWC-San Dimas System in calendar years 2004 to 2006.

Numerical Public Health Risks

Section 116470(b)(2) of the Health and Safety Code requires disclosure of the numerical public health risk, determined by OEHHA, associated with the MCLs, ALs, PHGs and MCLGs. Available numerical health risks developed by OEHHA for the contaminants identified above are shown on the accompanying chart. Only numerical risks associated with cancer-causing chemicals have been quantified by OEHHA

Total Coliform Bacteria – USEPA has determined that the health risk associated with the MCLG is 0.

Arsenic - OEHHA has determined that the health risk associated with the PHG is one excess case of cancer in a million people and the risk associated with the MCL is 2 excess cases of cancer in 1,000 people over a long period of time.

Gross Alpha - USEPA has determined that the health risk associated with the MCLG is 0 and the risk associated with the MCL is 1 excess case of cancer in 1,000 people over a long period of time for the most potent alpha emitter.

Gross Beta - USEPA has determined that the health risk associated with the MCLG is 0 and the risk associated with the MCL is 2 excess case of cancer in 1,000 people over a long period of time for the most potent beta emitter.

Uranium - OEHHA has determined that the health risk associated with the PHG is one excess case of cancer in a million people and the risk associated with the MCL is 5 excess cases of cancer in 100,000 people over a long period of time.

Bromodichloromethane – USEPA has not established an MCL but has set an MCLG at 0.

Bromoform – USEPA has not established an MCL but has set an MCLG at 0.

Dichloroacetic Acid – USEPA has not established an MCL but has set an MCLG at 0.

Trichloroacetic Acid – USEPA has not established an MCL but has set an MCLG at 20 µg/l.

Copper – OEHHA has not established a numerical health risk for copper because PHGs for non-carcinogenic chemicals in drinking water are set at a concentration at which no known or anticipated adverse health risks will occur, with an adequate margin of safety.

NDMA – OEHHA has determined that the health risk associated with the PHG is one excess case of cancer in a million people. An MCL for NDMA has not yet been established.

Identification of Risk Categories

Identification of Risk Categories

Section 116470(b)(3) of the Health and Safety Code requires identification of the category of risk to public health associated with exposure to the contaminant in drinking water, including a brief, plainly worded description of those terms. The risk categories and definitions for the contaminants identified above are shown on the accompanying chart.

Description of Best Available Technology

Section 116470(b)(4) of the Health and Safety Code requires a description of the best available technology (BAT), if any is available on a commercial basis, to remove or reduce the concentrations of the contaminants identified above. The BATs are shown on the accompanying chart.

Cost of Using Best Available Technologies and Intended Actions

Section 116470(b)(5) of the Health and Safety Code requires an estimate of the aggregate cost and cost per customer of utilizing the BATs identified to reduce the concentration of a contaminant to a level at or below the PHG or MCLG. In addition, Section 116470(b)(6) requires a brief description of any actions the water purveyor intends to take to reduce the concentration of the contaminant and the basis for that decision.

Total Coliform Bacteria- The BAT for treating coliform organisms in drinking water has been determined by USEPA to be disinfection. GSWC-San Dimas System already disinfects all the water that is served to the public. Chlorine is used to treat the water because it is an effective disinfectant and residual concentrations can be maintained to guard against biological contamination in the water distribution system.

Coliform bacteria are indicator organisms that are ubiquitous in nature. They are a useful tool because of the ease in monitoring and analysis. GSWC-San Dimas System collects weekly samples for total coliforms at various locations in the distribution system and monthly samples at each well. If a positive drinking water sample is found, it indicates a potential problem that needs to be investigated and followed up with additional sampling. It is not at all unusual for a system to have an occasional positive sample. Although USEPA set the MCLG for total coliforms at zero percent positive, there is no commercially available technology that will guarantee zero percent positive every single month; therefore, the cost of achieving the PHG cannot be estimated.

GSWC-San Dimas System will continue several programs that are now in place to prevent contamination of the water supply with microorganisms. These include:

- disinfection using chlorine and maintenance of a chlorine residual at every point in the distribution system;
- monitoring of wells and throughout the distribution system to verify the absence of total coliforms and the presence of a protective chlorine residual;
- a program in which distribution pipelines are flushed with chlorinated system water to remove stagnant water and bring in fresh water with residual disinfectant; and
- a cross-connection control program that prevents the accidental entry of non-disinfected water into the drinking water system.

Arsenic -The BATs for removal of arsenic in water for large water systems are: activated alumina, coagulation/filtration, lime softening, ion exchange, and reverse osmosis. Arsenic was detected above the PHG in water purchased from Three Valleys Municipal Water District (TVMWD) and Covina Irrigating Company (CIC). The wholesalers are in compliance with the MCL for arsenic. The estimated cost to reduce arsenic levels in the purchased water to below the PHG of 0.004 µg/l using ion exchange was calculated. Because the Detection Limit for the purpose of Reporting (DLR) for arsenic is 2 µg/l, treating arsenic to below the PHG level means treating arsenic to below the DLR of 2 µg/l. There are numerous factors that may influence the actual cost of reducing arsenic levels to the PHG. Achieving the water quality goal for arsenic could range from \$1,707,000 to \$2,049,000 per year, or between \$107 and \$128 per household per year.

Copper - USEPA has determined the BAT to reduce copper in drinking water to be corrosion control optimization. This method is capable of bringing a water system into compliance with the AL of copper at 1,300 µg/l. GSWC-San Dimas System water system is already in compliance with the copper AL, meets all state and federal requirements, and is therefore deemed by CDHS to have optimized corrosion control. Further corrosion control optimization would be incapable of achieving the PHG; therefore, the cost of reducing copper to the PHG level cannot be estimated.

The principal reason for this is that the largest source of copper in tap water is the pipe and fixtures in the customer's own household plumbing. Copper has not been detected in GSWC-San Dimas System's source waters. Factors that increase the amount of copper in the water include:

household plumbing. Copper has not been detected in GSWC-San Dimas System's source waters. Factors that increase the amount of copper in the water include:

- household faucets or fittings made of brass;
- copper plumbing materials;
- homes less than five years old or constructed before 1980;
- the water supplied to the home is naturally soft or corrosive; or
- water often sits in the household plumbing for several hours.

GSWC-San Dimas System collected extensive lead and copper tap samples in 2002 and 2005. The copper levels in over 90 percent of the most recent samples were below the AL. GSWC-San Dimas System will continue to monitor the water quality parameters that relate to corrosivity, such as pH, hardness, alkalinity and total dissolved solids, and will take action if necessary to maintain the water system in an optimized corrosion control condition.

Gross Alpha, Gross Beta, and Uranium -The only BAT for the removal of gross alpha in water for large water systems is reverse osmosis, which can also remove gross beta and uranium, if detected. Gross alpha was detected above the MCLG at several groundwater wells and in the surface water purchased from TVMWD. Gross beta was also detected above the MCLG in water from TVMWD. Uranium was detected above the PHG at several groundwater wells and in the surface water purchased from TVMWD. The cost of providing a treatment using reverse osmosis to reduce gross alpha levels in groundwater and in TVMWD water to the MCLG of 0 (and consequently gross beta and uranium below the MCLG and PHG, respectively) was calculated. Because the DLR for gross alpha is 3 picoCuries per liter (pCi/l), treating gross alpha to 0 means treating it to below the DLR of 3 pCi/l. Achieving the water quality goal for gross alpha could range from \$6,646,000 to \$21,580,000 per year, or between \$415 and \$1,349 per household per year.

BDCM, BF, DCAA and TCAA -BDCM, BF, DCAA and TCAA are all disinfection byproducts (DBPs) formed as a result of drinking water disinfection with chlorine. BDCM and BF are two of the Total Trihalomethanes (TTHM); DCAA and TCAA are two of the Haloacetic Acids (HAA5). The MCLs for TTHM and HAA5 are 80 µg/l and 60 µg/l, respectively. GSWC-San Dimas System complies with the MCLs for TTHM and HAA5. There is no PHG or MCLG for TTHM or HAA5 as a group; however, there is an MCLG of 0 for BDCM, BF and DCAA; and 20 µg/l for TCAA. The BAT for removing DBPs is using granular activated carbon (GAC) to remove DBPs in surface water supplied by TVMWD and CIC or the DBP precursors in groundwater. The cost of providing GAC treatment for the entire well production and water purchased from TVMWD and CIC was calculated. It should be pointed out that these are theoretical calculations and rough cost estimates. Achieving the water quality goals for DBPs could range from \$971,000 to \$5,448,000 per year, or between \$61 and \$341 per household per year.

NDMA -The BAT for removal of NDMA in water is Ultraviolet (UV) radiation. NDMA was detected above the PHG in the surface water supplied by TVMWD. Currently there is no MCL for NDMA but a notification level (NL) of 10 nanograms per liter (ng/l) was established for NDMA by CDHS. A NL is an advisory level, which if exceeded, requires the drinking water system to notify the governing body of the local agency in which users of the drinking water reside (i.e. city council, county board of supervisors). The maximum concentration of NDMA in water purchased from MWD was 5.5 ng/l, which is below the NL but above the PHG of 3 ng/l. The estimated cost to reduce NDMA level in water from TVMWD using UV radiation was calculated. There are numerous factors that may influence the actual cost of reducing NDMA level to the PHG. Achieving the water quality goal for NDMA costs approximately \$1,227,000 per year, or \$77 per household per year.

All Contaminants - In addition, a cost estimate to treat all water produced or purchased by GSWC-San Dimas System using reverse osmosis to remove all the contaminants detected above the PHGs or MCLGs was calculated. Most of contaminants listed in the attached table may be removed to non-detect levels by reverse osmosis, except NDMA, total coliform and copper. NDMA can only be partially removed by reverse osmosis. Total coliform bacteria and copper can be introduced and detected anywhere in the distribution system. As shown on the attached table, achieving the water quality goals for all contaminant, except for NDMA, total coliform and copper, using reverse osmosis could range from \$7,678,000 to \$24,930,000 per year, or between \$480 and \$1,558 per household per year.

For Additional Information:

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