SOQUEL CREEK WATER DISTRICT
REPORT ON DISTRICT'S WATER QUALITY
RELATIVE TO PUBLIC HEALTH GOALS
2010 - 2012

Introduction

In accordance with California Health and Safety Code §116470(b), Soquel Creek Water District (SqCWD) has prepared this Public Health Goal (PHG) report. The Association of California Water Agencies (ACWA) formed a workgroup which produced guidelines for water utilities to use in preparing PHG reports. SqCWD used these ACWA guidelines, updated in 2013, in the preparation of our report. No guidance was available from state regulatory agencies.

The regulation, as interpreted by ACWA, specifies that every 3 years, larger water utilities (>10,000 service connections) prepare a report if their water quality measurements have detected and exceeded any PHG for constituents that also have an established California primary Maximum Contaminant Level (MCL) or action level. PHGs are non-enforceable goals established by the California Environmental Protection Agency's (EPA's) Office of Environmental Health Hazard Assessment (OEHHA). The law also requires that where OEHHA has not adopted a PHG for a particular constituent, the water suppliers are to use the Maximum Contaminant Level Goals (MCLGs) adopted by US EPA.

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 US EPA or the California Department of Public Health (CDPH) in setting drinking water standards (MCLs) are considered in setting the PHGs. These factors include analytical detection capability, treatment technology availability, 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.

PHG reports are unique to California. They are required in addition to the extensive public reporting of water quality information that California water utilities have been doing for many years and in addition to the federally and state-mandated annual Consumer Confidence Reports/Water Quality Reports. Hence, it should be kept in mind that in addition to this report, the SqCWD will continue to be reporting annually in greater depth on water quality in the system.

The purpose of the legislative requirement is to give water system customers access to information on levels of contaminants even below the enforceable mandatory MCLs. Included is the numerical public health risk associated with the 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.

There are a few constituents that are routinely detected in water systems at levels usually well below the drinking water standards for which no PHG nor MCLG has yet been adopted by OEHHA or US EPA, including total trihalomethanes. These will be addressed in a future required report after these PHGs have been adopted.

Detected Compounds

All of the water quality data collected by SqCWD's water system in the years 2010 through 2012 were considered. This data were summarized in our 2010, 2011 and 2012 Annual Water Quality Reports which were mailed to all of our customers during May/June of those years.

The following section is a discussion of constituents with primary MCLs that were detected at or above the applicable California detection limit for purposes of reporting (DLR) in one or more of our drinking water sources and/or in our distribution system, at levels above the PHG, or if no PHG exists, above the MCLG. The table on the next page summarizes these constituents.

Compound	Health Risk Category	PHG (MCLG)	Cancer Risk at PHG	MCL	Cancer Risk at MCL	SqCWD Maximum Level	SqCWD Average Level	Best Available Technology (BAT)	Potential Treatment Cost
Arsenic	Carcinogenic	0.004 µg/L (ppb)	One per million	10 µg/L (ppb)	2.5 per thousand	3.1 µg/L (ppb)	Not detected at or above 2.0 µg/L (ppb)	Activated alumina; coagulation/filtration; ion exchange; lime softening; reverse osmosis; electrodialysis; and oxidation/ filtration	Already implementing coagulation and filtration; $21 to $36/year per service connection for RO
Copper	Digestive system toxicity (causes nausea, vomiting, diarrhea)	0.3 mg/L (ppm)	N/A	1.3 mg/L (action level)	N/A	0.41 mg/L (ppm) ***(90th percentile, see discussion)***	0.24 mg/L (ppm)	Optimized corrosion control	N/A - Already meeting requirement

Note: UCL is Upper Confidence Limit

Arsenic

The PHG for arsenic is 0.004 µg/L (parts per billion or ppb). The MCL for arsenic is 10 µg/L. With the arsenic PHG set at 0.004 µg/L, the CDPH may enact a lower MCL for California in the future. The maximum reported arsenic concentration in SqCWD supplied water from 2010 through 2012 was 3.1 µg/L, with the average concentration below the DLR of 2.0 µg/L.

Arsenic is a naturally occurring element in the earth's crust and is widely distributed in the environment. Humans are exposed to arsenic mostly through food, and to a lesser degree from drinking water and air (OEHHA, 2004).

The categories of health risks associated with arsenic is that long-term exposure to arsenic in drinking water can increase the risk of skin, lung, bladder and kidney cancer, as well hyperkeratosis and pigmentation skin changes (World Health Organization, 2011). Other serious health effects stemming from long-term ingestion of arsenic in drinking water include heart attacks, stroke, diabetes and hypertension (OEHHA, 2004). The numerical health risk for the PHG of 0.004 µg/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 (ACWA, 2013).

SqCWD's water meets all federal and state water quality standards for the presence of arsenic. Two of SqCWD's 16 active wells have had arsenic detected above the DLR of 2.0 µg/L, and above the PHG. Although not required by the CDPH, SqCWD voluntarily operates an arsenic removal plant for these two wells. (SqCWD also operates a second plant for a well with arsenic levels below the DLR). The arsenic is removed by coagulation and filtration. The treatment over the past 3 years removed an average of 46% of the arsenic, reducing the average arsenic concentration in water supplied by these wells to below the DLR.

Both the US EPA and CDPH adopt what are known as BATs or Best Available Technologies, which are the best known methods of reducing constituent levels to the MCL. Costs can be estimated for such technologies. However, since many PHGs (and MCLGs) are set much lower than the MCL, such as for arsenic, it is not always possible nor feasible to determine what treatment is needed to further reduce a constituent downward to or near the PHG. Estimating the costs to reduce a constituent to such a low level is difficult, if not impossible, because it is not possible to verify by analytical means that the level has been decreased to that low level. For example, the arsenic PHG is 0.004 µg/L, and the California DLR is 2.0 µg/L, 500 times higher than the PHG. The PHG level cannot be measured by the practically available analytical methods (Grosser, 2010).

There may not be commercially available technology to reduce arsenic concentrations to the PHG. However, reverse osmosis (RO) would likely reduce the arsenic concentrations in SqCWD water lower than that of our existing coagulation/filtration treatment plant.

Accurate cost estimates are difficult, if not impossible, to calculate and are highly speculative and theoretical. All costs including annualized capital, construction, engineering, planning, environmental, contingency and operations and maintenance costs are included but very general assumptions can be made for most of these items.

Cost estimating guides from ACWA (2013) were used in determining the estimated cost to implement RO. The SqCWD's total treatment capacity at the one location (for the two wells with arsenic above the DLR) where arsenic would be treated is approximately 1.0 million gallons per day. The estimated cost to install and operate an RO treatment system at this site would cost from approximately $330,000 to $560,000 per year for the life of the system. SqCWD has approximately 15,600 service connections. The cost per service connection would range from $21 to $36 per year. There would be additional costs for corrosion control because water treated by RO is corrosive and could cause the water to exceed lead and copper regulations (see below).

Copper

There is no MCL for copper. Instead, the 90th percentile value of all samples from household taps in the distribution system cannot exceed a California Action Level of 1.3 mg/l for copper. The PHG for copper is 0.30 mg/l.

Copper is a naturally occurring element and is an essential nutrient in humans. The category of health risk for copper is digestive system toxicity (OEHHA, 2013). Copper is not classified by the US EPA as a human carcinogen (ATSDR, 2004). However, children may be especially susceptible to the effects of excess copper.

Copper was not detected in any of our source water samples collected from 2010 through 2012 above the DLR. Based on sampling of our distribution system in 2010, our 90th percentile value for copper was 0.41 mg/l (parts per million or ppm), above the PHG of 0.30 mg/L. The average copper concentration was 0.24 mg/L, below the PHG. However, our water system is in full compliance with the federal and state Lead and Copper Rule. 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 to deal with corrosion issues and with any copper findings. We continue to monitor our water quality parameters that relate to corrosivity, such as 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" requirements, 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.

Recommendations For Further Action

The drinking water quality of the SqCWD meets all CDPH and US EPA drinking water standards set to protect public health. To further reduce the levels of the constituents identified in this report that are already significantly below the health-based MCLs established to provide "safe drinking water" 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. The health protection benefits of these further hypothetical reductions are not at all clear and may not be quantifiable. Therefore, no action is proposed.

List of Acronyms

ACWA	Association of California Water Agencies
ATSDR	Agency for Toxic Substances and Disease Registry
BAT	Best Available Technologies
CDPH	California Department of Public Health
DLR	California Detection Limit for Purposes of Reporting
EPA	Environmental Protection Agency
MCL	California Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
mg/L	milligrams per liter, or parts per million
OEHHA	California EPA Office of Environmental Health Hazard Assessment
PHG	California Public Health Goal
RO	Reverse Osmosis
SqCWD	Soquel Creek Water District
µg/L	micrograms per liter, or parts per billion

References

Agency for Toxic Substances and Disease Registry, September 2004, Public Health Statement for Copper.

ACWA, February 2013, Suggested Guidelines for Preparation of Required Reports on Public Health Goals (PHGs) to Satisfy Requirements of California Health and Safety Code Section 116470(b).

Grosser, Zoe, October 13, 2010, The Challenge: Measure Arsenic in Drinking Water, Water Technology.

OEHHA, April 2004, Public Health Goals for Arsenic in Drinking Water.
OEHHA, February 2013, Health Risk Information for Public Health Goal Exceedance Reports.

World Health Organization, 2011, Guidelines for Drinking-Water Quality, fourth edition.