City of Ceres

2022 Public Health Goals Report

Prepared by Water Quality Staff

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Background

The California Health and Safety Code Title 22 Section 116470 (b) specifies that water utilities serving more than 10,000 connections prepare a brief written report every three years that documents detections of any constituents that exceed a Public Health Goal (PHG) in the preceding three years. This report documents the drinking water contaminants in our water supply found to be above a PHGs, or if no PHG, above the Maximum Contaminant Level Goal (MCLG) during calendar years 2019 through 2021.

State law requires the following information to be disclosed in this report:

- Numerical public health risk
- Category or type of health risk
- Best Available Treatment (BAT) technology
- Estimated treatment costs

What are Public Health Goals?

PHGs and MCLGs are non-enforceable goals set by the OEHHA and the USEPA. PHGs are set based solely on public health risk considerations. PHGs are often not practically achievable from an economic and technological point of view. None of the practical risk-management factors that are considered by the USEPA or the California Division of Drinking Water (DDW) in setting drinking water standards for Maximum Contaminant Level's (MCLs) are considered in setting the PHGs. These factors include analytical detection capability, treatment technology availability and costs. However, both the PHGs and MCLGs are useful tools for regulators when determining enforceable standards such as MCLs, that water suppliers are required to meet.

Water Quality Data Considered

All of the water quality data collected by the City between 2019 and 2021 for the purpose of determining compliance with drinking water standards was reviewed for the 2022 Public Health Goal report. This data was summarized in the 2019, 2020 and 2021 Annual Consumer Confidence Reports which is accessible by visiting the City's website at http://www.ci.ceres.ca.us/169/City-of-Ceres-Water-System-Historical-In or by calling the Public Works Office at (209) 538-5732 and requesting a copy.

Guidelines Followed

The Association of California Water Agencies (ACWA) formed a workgroup which prepared guidelines for water utilities to use in preparing these reports set by the OEHHA. The ACWA guidelines were updated in 2022 and were utilized in the preparation of this report.

Best Available Treatment Technology and Cost Estimates

Both the USEPA and DDW adopt what are known as Best Available Technologies (BATs), which 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 at zero. Estimating the costs to reduce a constituent to zero is difficult, if not impossible because it is not possible to verify by analytical means that the level has been lowered to zero. 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.

Constituents Detected that Exceed a PHG or a MCLG

The following is a discussion of constituents that were detected in one or more of the calendar years from the City's drinking water source at levels above the PHG, or the MCLG. Many contaminants are considered to be carcinogenic and the USEPA's policy is to set the applicable MCLGs at zero because they consider no amount of these contaminants to be without risk. It is understood by all that zero is an unattainable goal and cannot be measured by the practically available analytical methods. Note that by regulation, OEHHA cannot set a PHG at zero and must calculate a numerical level to address risk, even though it may be unattainable or impossible to measure.

Chemical	Units	MCL	PHG	Result	Sample Date
Arsenic	mg/L(1)	0.01	0.000004	0.001	2020
Gross Alpha	pCi/L	15	0	22.2	2019
Radium 226	pCi/L(2)	5	0.05	0.803	2020
Radium 228	pCi/L(2)	5	0.019	0.717	2020
TCP	mg/L	0.000005	0.0000007	.000065	2021
Uranium	pCi/L(2)	20	0.43	22.2	2020

(1) Milligrams per liter (mg/L).
(2) Picocuries per liter (pCi/L).

Arsenic

Arsenic is a naturally occurring element in the earth’s crust and is very widely distributed in the environment. High levels of arsenic tend to be found more in groundwater sources than in surface water sources. The demand on groundwater from municipal systems and private drinking water wells may cause water levels to drop and release arsenic from rock formations. Other sources of contaminant in the drinking water include erosion of natural deposits, runoff from orchards, and runoff from glass and electronics production waste. All humans are exposed to microgram quantities of arsenic (inorganic and organic) largely from food and to a lesser degree from drinking water and air.

The MCL for arsenic is 0.010 mg/L (milligrams per liter), with a PHG of 0.000004 (mg/L). The City has detected arsenic in exceedance of the PHG at (12) twelve wells. The OEHHA has determined that arsenic is a health concern at certain levels of exposure and listed the health risk category as carcinogenicity. The numerical health risk for arsenic above the PHG is $1x10^{-6}$ which means one excess cancer case per million people exposed.

Both the USEPA and the DDW list the BATs for removing arsenic to below the MCL as activated alumina, ion exchange, lime softening, coagulation/filtration, electrodialysis, oxidation/filtration and reverse osmosis (RO). The most effective method to consistently remove arsenic to below the MCL is to install RO. Currently the City is treating one well at the point of entry to the distribution system to reduce arsenic levels.

Gross Alpha

The major source of gross alpha particles in drinking water is from the erosion of natural deposits. Certain minerals are radioactive. As radioactive elements decay, gross alpha radiation continues to be released into groundwater as positive ions called cations (for example, radium 226 and 228), negative ions called anions (for example, uranium), or as radiation with no charge.

The MCL for Gross Alpha particles is 15 pCi/L (picocuries per liter), with a PHG of 0 (pCi/L). The City has detected Gross Alpha in exceedance of the PHG only in (1) one well. The OEHHA has determined that Gross Alpha particles is a health concern at certain levels of exposure and listed the health risk category as carcinogenicity. The numerical health risk for Radium 226 above the PHG is 1x10^{-3} which means one excess cancer case per million people.

The treatment method for Gross Alpha is similar to the treatments stated above for uranium and radium. Since the City is meeting the MCL requirements, it is not recommended to initiate treatment.

Radium 226 and 228

Radium is a natural occurring radioactive element that is present in rocks and soil in the earth's crust. Small amount of radium can be found in the groundwater supply. When Radium decays, they form isotopes. The most common isotopes found in the groundwater are Radium 226 and Radium 228. Deep bedrock aquifers used for drinking water sometimes contain levels of radium.

The MCL for Radium 226 is 5 pCi/L (picocuries per liter), with a PHG of 0.05 (pCi/L) and Radium 228 is 5 pCi/L (picocuries per liter), with a PHG of 0.019 (pCi/L). The City has detected Radium 226 in exceedance of both the PHG and MCL at (1) one well. The OEHHA has determined that Radium 226 is a health concern at certain levels of exposure and listed the health risk category as carcinogenicity. The numerical health risk for Radium 226 above the PHG is $1\text{x}10^{-6}$ which means one excess cancer case per million people.

The most inexpensive treatment method is synthetic zeolite ion exchange similar to home water softeners, which removes roughly 90% of the radium. Other possible treatment methods include lime-soda ash softening and reverse osmosis. Comparatively high start-up and operating costs may make these options impractical for most affected systems. Technologies being tested include an adsorptive media where water is passed through columns for treatment, and oxidation coagulation flocculation-filtration method. Since the City is meeting the MCL requirements, it is not recommended to initiate treatment.

1,2,3- Trichloropropane (TCP)

1,2,3-Trichloropropane (TCP) is not found in nature, it is a man-made chemical that was an impurity in soil fumigants used to control nematodes and sold under the brand names D-D, Telone and Telone II. TCP is a chlorinated hydrocarbon with high chemical stability.

The MCL for TCP is 0.000005 (mg/L), with a PHG of 0.0000007 (mg/L). The City has detected TCP in exceedance of both the PHG and MCL at (3) three wells. The OEHHA has determined that TCP is a health concern at certain levels of exposure and listed the health risk category as carcinogenicity. The numerical health risk for TCP above the PHG is $1\text{x}10^{-6}$ which means one excess cancer case per million people.

DDW lists GAC as the only BAT available for removing TCP contamination from groundwater. The City has installed GAC treatment for TCP removal to non-detectable levels at several wells and has plans to install GAC treatment at all wells where TCP has been detected, subject to available resources, with the goal of eliminating all TCP exposure in the City's water system. It is estimated that the cost to install GAC at all (3) three sites will cost in excess of 21 million dollars.

Uranium

Uranium is a naturally occurring radioactive element that is ubiquitous in the earth's crust. Uranium is found in ground and surface waters due to its natural occurrence in geological formations. Due to its abundance in geological formations, uranium varies from place to place and is a highly variable source of contamination in drinking water. Since uranium occurs as a trace element it is found in many types of rocks. Other sources of contaminant in the drinking water include phosphate deposits and mine tailings, as well as from run-off of phosphate fertilizers from agricultural land.

The MCL for uranium is 20 pCi/L (picocuries per liter), with a PHG of 0.43 (pCi/L). The City has detected uranium in exceedance of the PHG at (2) two wells. The OEHHA has determined that uranium is a health concern at certain levels of exposure and listed the health risk category as carcinogenicity. The numerical health risk for uranium above the PHG is $1x10^{-6}$ which means one excess cancer case per million people.

Both the USEPA and the DDW lists the BATs for removing uranium as ion exchange, reverse osmosis (RO), lime softening, or coagulation/filtration. The most effective method to consistently remove uranium to below the MCL is to install RO treatment at the select sources. Since the City is meeting the MCL requirements, it is not recommended to initiate additional treatment methods, which involves the addition of other chemicals that could raise other water quality issues.

Cost of Treatment

The cost of treatment can depend upon a number of constraints and factors. They include the type of treatment, the number of separate treatment facilities required, if there are multiple contaminants, and whether they can all be removed with one treatment technology or require multiple technologies. In some circumstances and with some contaminants, the money that would be required for these additional treatment processes might provide greater public health protection benefits if spent on other water system operation, surveillance, new well construction, and monitoring programs. With respect to TCP, which is the most significant water quality problem affecting the City's groundwater supply, the City has installed or is in the process of installing GAC treatment to eliminate detectable concentrations of this contaminant from its system.

Recommendations for Further Action

The levels of constituents identified in this report are already significantly below the health based MCLs established to provide safe drinking water. Further reductions in these levels would require additional costly treatment processes. The ability of these processes to provide significant additional reductions in levels is uncertain. The health protection benefits of these possible reductions are not at all clear and may not be quantifiable. Therefore, no action is proposed at this time.