TRIENNIAL REPORT ON DRINKING WATER PUBLIC HEALTH GOALS

CITY OF PITTSBURG WATER SYSTEM

JULY 2022

Prepared in Accordance with:
California Health and Safety Code, Section 116470 (b)

CITY OF PITTSBURG
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CITY OF PITTSBURG WATER SYSTEM

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SECTION 1: BACKGROUND INFORMATION

Reporting Requirements:

The California Health and Safety Code 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. PHGs are non-enforceable goals established by the California Office of Environmental Health Hazard Assessment (OEHHA). The law also requires that where OEHHA has not adopted a PHG for a constituent, the water suppliers are to use the Maximum Contaminant Level Goal (MCLG) adopted by the United States Environmental Protection Agency (USEPA). Only constituents that have both a California primary drinking water standard and a PHG or MCLG are to be addressed in the report.

The City of Pittsburg prepared the last Triennial PHG Report in 2019. The 2022 Triennial PHG Report covers constituents detected in the City of Pittsburg's water supply during calendar years 2019 through 2021 at a level exceeding an applicable PHG or MCLG and provides the required information for each constituent. Included is the numerical public health risk associated with the Maximum Contaminant Level (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.

What are Public Health Goals (PHGs) and Maximum Contaminant Level Goals (MCLGs)?

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 USEPA or the California State Water Resources Control Board, Division of Drinking Water (DDW) in setting drinking water standards are considered in setting the PHGs. These factors include analytical detection capability, treatment technology available, 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.

Water Quality Data Considered:

All of the water quality data collected by the City of Pittsburg Water System between 2019 and 2021 for the purposes of determining compliance with drinking water standards was considered. This data was summarized in our 2019, 2020, and 2021 Annual Water Quality Reports which are made available each year, in June, to all the City's customers. The Annual Water Quality Report is also available at City Hall and on the City's website.

For each regulated contaminant, DDW establishes Detection Limits for the purpose of Reporting (DLRs). DLRs are the minimum levels at which any analytical result must be reported to DDW. Results detected below the DLR cannot be quantified with any certainty. In some cases, PHGs are set below the DLR (Exhibit A).

Guidelines Followed:

The Association of California Water Agencies (ACWA) formed a workgroup in 2004 to establish guidelines for water utilities to use in preparing these reports. The guidelines were updated in 2022 and were utilized in the preparation of this report. No formal guidance was available from state regulatory agencies.

Best Available Treatment Technology and Cost Estimates:

Both the USEPA and Division of Drinking Water (DDW) have identified best available technologies that 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, because it is not possible to verify by analytical means that the level has been lowered to zero. In some cases, installing treatment to further reduce very low levels of one constituent may have adverse effects on other aspects of water quality.

SECTION 2: CONTITUENTS DETECTED THAT EXCEED THE PHGs OR MCLGs

The following is a discussion of constituents that were detected in the City's drinking water sources at levels above a Public Health Goal (PHG), or if no PHG, above the Maximum Contaminant Level Goal (MCLG).

Arsenic

Arsenic is a naturally occurring element in the earth's crust and is very widely distributed in the environment. All humans are exposed to microgram quantities of arsenic (Inorganic and organic) largely from food (25 to 50 µg/day) and to a lesser degree from drinking water and air. Some edible seafood may contain higher concentrations of arsenic which is predominantly in less acutely toxic organic forms.

The City of Pittsburg utilizes groundwater from the Bodega, and Dover wells for a portion of its the source water. Depending on the geology of the area in which wells are drilled, arsenic can be found as a natural mineral, which can impact the quality of the water bearing aquifer. The primary MCL for arsenic was reduced from 0.05 milligrams per liter (mg/L) in January 2006 to the current limit of 0.01 mg/L. The current PHG for arsenic is 0.000004 mg/L, significantly less than the analytical capability reflected in the DLR of 0.002 mg/L.

The City of Pittsburg meets the MCL for arsenic. The City's routine is to monitor annually for arsenic in its treated water. Test results from 2019, 2020 and 2021 showed no detectable level of arsenic in treated water. The average from the triennial period result to the current date has met the PHG level.

Arsenic analytical results - mg/L

MCL = 0.01 mg/L PHG = 0.000004 mg/L Detection level = 0.002 mg/L
ND = not detected na = not analyzed

Water Source	2019	2020	2021
Treated water	ND	0.0021	ND

Average = ND (lower than Detection Limit to Report)

Chlorite

In 2018, the City of Pittsburg implemented the use of chlorine dioxide as a pre-oxidant prior to monochlorination of drinking water to destroy natural water impurities that would otherwise produce trihalomethanes, leads to the formation of the by-product chlorite. The MCL for chlorite is 1 ppm (part per million), with a PHG of 0.05 ppm.

The PHG is based on hematological effects observed in offspring at 3 mg/kg-day and higher in a two-generation rat reproductive study. There are no acceptable carcinogenicity studies on chlorite. Several of these studies (sub chronic, chronic, and developmental) reveal that oral exposure to chlorite can result in significant hematological, endocrine, reproductive, and gastrointestinal effects as well as changes in neurobehavioral development.

The USEPA Maximum Contaminant Level Goal (MCLG) for chlorite is 0.8 mg/L. This value is based on the same study utilized by OEHHA (CMA, 1996), but inferring a no observed adverse effect level (NOAEL) of 3 mg/kg-day based on the reduced response to auditory stimuli. The USEPA calculated a reference dose (RfD) of 0.03 mg/kg-day, using a combined uncertainty factor of 100 (U.S. EPA 1998a, b, 2000). Their recommended health-protective chlorite level (the MCLG) is calculated using adult water consumption values.

The City of Pittsburg collected and analyzed 108 samples for chlorite during 2019-2021, with values that ranged from ND (not detected) to 0.45 ppm, with all sample results at or below the MCL. The BAT for chlorite reduction is reverse osmosis (RO).

Radiological Standards

Radionuclides (Radium-226 and Radium-228, and Gross Alpha materials) are commonly detected in groundwater in quantities above the Public Health Goals. In the treated drinking water, the City of Pittsburg meets the MCL for Radionuclides. The City does routine annual monitoring for radionuclides in its treated water. The 2019, 2020 and 2021. Result for treated water was ND (not detected), well below the PHG level.

<u>Uranium</u>

The City of Pittsburg utilizes groundwater from the Bodega, and Dover wells for a portion of its source water. Depending on the geology of the area in which wells are drilled, Uranium can be found as a natural mineral, which can impact the quality of the water bearing aquifer. Uranium is a naturally occurring radioactive element present in geological formations and the earth's crust.

It is introduced into groundwater and surface water through erosion. DDW has set the drinking water standard for uranium at MCL for uranium is 20 pCi/L and the PHG for uranium is 0.5 pCi/L, although the DLR is set at 1 pCi/L.

The City of Pittsburg collected and analyzed 3 samples for uranium during 2019-2021, with values that ranged from ND to 1.27 pCi/L, with an average value of 1.00 pCi/L, with all samples below the MCL.
The average from the triennial period result for the current date has met the PHG level.
The major source of uranium in drinking water is from erosion of natural deposits. Some people who drink water containing uranium in excess of the MCL over many years may have kidney problems or an increased risk of cancer. The best available technology (BAT) for removal of uranium has been identified as ion exchange and reverse osmosis.

Table 1. Health Risk Categories and Cancer Risk Values for Chemicals with California Public Health Goals (PHGs) Detected During 2019 - 2021 testing.

All results from Treated Water

Chemical	**Health Risk Category[1] (more specific information in parentheses)**	**Ca. PHG**	**Cancer Risk[2] at PHG**	**Ca. MCL**	**Cancer Risk at California MCL**	**DLR**	**City's 2019 Results**	**City's 2020 Results**	**City's 2021Results**
Arsenic (mg/L)	carcinogenicity (causes cancer)	0.000004 (4x10-6) mg/L[2]	$1x10^{-6}$ (One per million)	0.01 mg/L	$2.5x10^{-3}$ (2.5 per thousand)	0.002 mg/L	ND	0.0021	ND
Uranium pCi/L	carcinogenicity (causes cancer)	0.43 pCi/L	$1x10^{-6}$	20 pCi/L	$5x10^{-5}$ (5 per hundred thousand)	1 pCi/L	ND	1.27	1.74

1 Health risk category based on experimental animal testing data evaluated in the OEHHA PHG technical support document unless otherwise specified.

2 Cancer Risk = theoretical 70-year lifetime excess cancer risk at the statistical upper confidence limit. Actual cancer risk may be lower or zero. Cancer risk is stated in terms of excess cancer cases per million (or fewer) population, e.g., 1×10-6 means one excess cancer case per million people; 5×10-5 means five excess cancer cases per 100,000 people.

MCL = maximum contaminant level.

mg/L = milligrams per liter of water or parts per million (ppm) (PHGs are expressed here in milligrams per liter for consistency with the typical unit used for MCLs and MCLGs.)

ND = non-detect

pCi/L = picocuries per liter; a picocurie (pCi) is a unit of measurement for radionuclides that measures the number of disintegrations per second. For uranium: 0.001 mg (mass) = 0.72 pCi. (activity)

SECTION 3: COST ESTIMATES FOR TREATING PHG/MCLG CHEMICALS

The City uses about 490 – 650 million gallons (1,500 – 2,000-acre feet) of groundwater each year. This represents about 15% of the City's water supply. The two chemicals discussed in this PHG Report are found in the groundwater. One option would be to discontinue use of the groundwater sources. The difference in cost between using the City's wells and buying water from Contra Costa Water District is about $ 795 per acre foot. The cost of changing water sources would increase the cost of water by about $ 1,192,500 per year, for 1,500-acre feet of water.

Arsenic:
The most common technologies used for arsenic removal are coagulation/filtration and adsorption. The City of Pittsburg Water currently uses coagulation/filtration in its water treatment process.

Adsorption is a more passive process but can have higher operating costs for challenging waters when compared to coagulation/filtration. The latter entails more operator interface and routine sludge handling. Arsenic treatment for groundwater supplies uses Ion Exchange or Granular Ferric Oxidation (GFO). Treatment cost is estimated at $ 2.40 per 1,000 gallons or $1,173,064 per year. Adsorption treatment techniques produce a waste that might be classified as hazardous.
The average from the triennial period result to the current date has met the PHG level.

Radionuclides (Uranium):

Ion exchange and Reverse Osmosis have been identified by California Department of Public Health as a Best Available Technology (BAT) that can effectively lower the level of Uranium below the MCL.

While Uranium was with values that ranged from ND to 1.27 pCi/L, with an average value of 1.00 pCi/L, with all samples below the MCL for treated drinking water in 2019, 2020 or 2021, the prevalent source for the uranium comes from the groundwater supply. The estimated cost to install and operate an Ion Exchange treatment system that would effectively reduce the Uranium level below the PHG in treated water is estimated at $520,000 annually, including capital and operation costs. When MCLGs are set at zero, there may not be commercially available technology to reach a non-detectable level. Since there is little data readily available to "estimate" cost of treatment to achieve absolute zero levels, rough estimates of BAT as defined are provided. This may still not achieve the PHG or MCLGs and the costs may be significantly higher to do so. There are no current cost estimates available.

California DDW Best Available Technologies – Uranium

Unit Technologies (includes)	*Limitations (see footnotes)*	*Operator Skill Level Required*	*Raw Water Quality Range and Considerations*
1. Ion exchange	(a)	Intermediate	All ground waters; competing anion concentrations may affect regeneration frequency

2. Point of use, ion exchange	(b)	Basic	All ground waters; competing anion concentrations may affect regeneration frequency
3. Reverse osmosis	(c)	Advanced	Surface waters usually require pre-filtration
4. Point of use, reverse osmosis	(b)	Basic	Surface waters usually require pre-filtration
5. Lime softening	(d)	Advanced	All waters
6. Enhanced coagulation/filtration	(e)	Advanced	Can treat a wide range of water qualities

Limitation Footnotes:

[a] The regeneration solution contains high concentrations of the contaminant ions, which could result in disposal issues.

[b] When point of use devices are used for compliance, programs for long-term operation, maintenance, and monitoring shall be provided by systems to ensure proper performance.

[c] Reject water disposal may be an issue.

[d] The combination of variable source water quality and the complexity of the water chemistry involved may make this technology too complex for small systems.

[e] This would involve modification to a coagulation/filtration process already in place.

Chlorite

Both the USEPA and DDW adopt what are known as BATs or Best Available Technologies, 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, nor 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.

The best available technology (BAT) to lower the level of chlorite below the PHG is reverse osmosis. Since the levels are already below the MCL, reverse osmosis would be required to attempt to lower the levels to below the PHG. Please note that accurate cost estimates are difficult, if not impossible, and are highly speculative and theoretical. All costs include annualized capital, construction, engineering, planning, environmental, contingency, and operations & management, but only very general assumptions can be made for most of these items. Costs for BAT implementation were estimated using the Association of California Water Agency's (ACWA) guidance report. According to the ACWA's Cost Estimates for Treatment Technology BAT, installation and operation of a RO system would cost approximately $ 0.94 per 1,000 gallons of water treated, or $459,500 per year. There would be added costs for water conditioning to ensure water treated by reverse osmosis is optimized for distribution system corrosion control.

SECTION 4: RECOMMENDATIONS

The City of Pittsburg Water System's drinking water quality meets all the drinking water standards set by the USEPA and the California State Water Resources Control Board (SWRCB) Division of Drinking Water (DDW) to protect public health.

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 not only require alternatives involving a notable increase in supply costs but would include the additional expense to alter treatment processes with what remains the uncertain ability to achieve substantial reductions in constituent levels. In addition, 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.

For additional information about this report, please contact The City of Pittsburg Water Treatment Plant at (925) 252-6916, Monday to Friday between the hours of 7:00 a.m. and 3:30 p.m.

TABLE A - California Maximum Contaminant Levels (MCLs), Public Health Goals (PHGs), and Federal Maximum Contaminant Level Goals (MCLGs)

PARAMETERS/ CONSTITUENTS	UNITS	STATE MCL	DLR	PHG OR (MCLG)	PHG/ MCLG EXCEEDED 2019 - 2021
INORGANICS					
ALUMINUM	mg/L	1	0.05	0.6	No
ANTIMONY	mg/L	0.006	0.006	0.001	No
ARSENIC	mg/L	0.010	0.002	0.000004	**Yes**
ASBESTOS	Fibers/L	7 million	0.2 million	(7 million)	No
BARIUM	mg/L	1	0.1	2	No
BERYLLIUM	mg/L	0.004	0.001	0.0001	No
CADMIUM	mg/L	0.005	0.001	0.00004**	No
CHROMIUM	mg/L	0.05	0.01	withdrawn***	No
CHROMIUM 6	mg/L				
COPPER (at-the-tap; 90th percentile)	mg/L	AL=1.3	0.05	0.3	No
CYANIDE	mg/L	0.15	0.1	0.15	No
FLUORIDE	mg/L	1.4-2.4	0.1	1	No
LEAD (at-the-tap; 90th percentile)	mg/L	AL=0.015	0.005	0.0002	No
MERCURY	mg/L	0.002	0.001	0.0012	No
NICKEL	mg/L	0.1	0.01	0.012	No
NITRATE (as N)	mg/L	10	0.4	10	No
NITRATE (as N03)	mg/L	45	2	45	No
NITRITE (as N)	mg/L	1	0.4	1	No
SELENIUM	mg/L	0.05	0.005	(0.05)	No
THALLIUM	mg/L	0.002	0.001	0.0001	No
ORGANICS					
ACRYAMIDE	TT	TT		(0)	No
ALACHLOR	mg/L	0.002	0.001	0.004	No
ATRAZINE	mg/L	0.001	0.001	0.00015	No
BENTAZON	mg/L	0.018	0.002	0.2	No
BENZENE	mg/L	0.001	0.0005	0.00015	No
BENZO (a) PYRENE	mg/L	0.0002	0.0001	0.000004	No
BROMATE	mg/L	0.01	0.0050	(0)	N/A
CARBOFURAN	mg/L	0.018	0.005	0.0007	No
CARBON TETRACHLORIDE	mg/L	0.0005	0.0005	0.0001	No
CHLORDANE	mg/L	0.0001	0.0001	0.00003	No
CHLORITE	mg/L	1	0.02	0.05	Yes
CHLOROETHENE (VINYL CHLORIDE)	mg/L	0.0005	0.0005	0.00005	No
CIS-1,2 DICHLOROETHYLENE	mg/L	0.006	0.0005	0.013	No
2,4-D	mg/L	0.07	0.01	0.02	No
DALAPON	mg/L	0.2	0.01	0.79	No
DIBROMOCHLOROPROPANE (DBCP)	mg/L	0.0002	0.00001	0.0000017	No
1,2-DICHLOROBENZENE (ORTHO)	mg/L	0.6	0.0005	0.6	No
1,4-DICHLOROBENZENE (PARA)	mg/L	0.005	0.0005	0.006	No
1,1-DICHLOROTHANE (1,1-DCA)	mg/L	0.005	0.0005	0.003	No
1,2-DICHLOROTHANE (1,2-DCA)	mg/L	0.0005	0.0005	0.0004	No
1,1-DICHLOROETHENE (1,1-DCE)	mg/L	0.006	0.0005	0.01	No
DICHLOROMETHANE	mg/L	0.005	0.0005	0.004	No
1,2-DICHLOROPROPANE	mg/L	0.005	0.0005	0.0005	No
1,3-DICHLOROPROPANE	mg/L	0.0005	0.0005	0.0002	No
DI (2-ETHYLHEXYL) ADIPATE	mg/L	0.4	0.005	0.2	No
DI (2-ETHYLHEXYL) PHTHALATE	mg/L	0.004	0.003	0.012	No
DINOSEB	mg/L	0.007	0.002	0.014	No
DIOXIN (2,3,7,8-TCDD)	mg/L	$3x10^{-8}$	$5x10^{-9}$	(0)	No
DIQUAT	mg/L	0.02	0.004	0.006	No
ENDOTHALL	mg/L	0.1	0.045	0.58	No

ENDRIN	mg/L	0.002	0.0001	0.0003	No
EPICHLOROHYDRIN	TT			(0)	No
ETHYLBENZENE	mg/L	0.3	0.0005	0.3	No
ETHYLENE DIBROMIDE (EDB)	mg/L	0.00005	0.00002	0.00001	No
GLYPHOSATE	mg/L	0.7	0.025	0.9	No
HEPTACHLOR	mg/L	0.00001	0.00001	0.000008	No
HEPTACHLOR EPOXIDE	mg/L	0.00001	0.00001	0.000006	No
HEXACHLOROBENZENE	mg/L	0.001	0.0005	0.00003	No
HEXACHLOROCYCLOPENTADIENE	mg/L	0.05	0.001	0.05	No
LINDANE	mg/L	0.0002	0.0002	0.000032	No
METHOXYCHLOR	mg/L	0.03	0.01	0.03	No
METHYL TERTIARY BUTYL ETHER (MTBE)	mg/L	0.013	0.003	0.013	No
MOLINATE	mg/L	0.02	0.002	0.001	No
MONOCHLOROBENZENE	mg/L	0.07	0.0005	0.2	No
OXAMYL	mg/L	0.05	0.02	0.026	No
PENTACHLOROPHENOL	mg/L	0.001	0.0002	0.0003	No
PICLORAM	mg/L	0.5	0.001	0.166	No
POLYCHLORINATED BIPHENYLS (PCBs)	mg/L	0.0005	0.0005	0.00009	No
SILVEX (2,4,5-TP)	mg/L	0.05	0.001	0.025	No
SIMAZINE	mg/L	0.004	0.001	0.004	No
STYRENE	mg/L	0.1	0.0005	(0.1)	No
1,1,2,2-TETRACHLOROETHANE	mg/L	0.001	0.0005	0.0001	No
TETRACHLOROETHYLENE (PCE)	mg/L	0.005	0.0005	0.00006	No
THIOBENCARB	mg/L	0.07	0.001	0.042	No
TOLUENE	mg/L	0.15	0.0005	0.15	No
TOXAPHENE	mg/L	0.003	0.001	0.00003	No
TRANS-1,2-DICHLOROETHYLENE	mg/L	0.01	0.0005	0.05	No
1,2,4-TRICHLOROBENZENE	mg/L	0.005	0.0005	0.005	No
1,1,1-TRICHLOROETHANE (1,1,1-TCA)	mg/L	0.2	0.0005	1.0**	No
1,1,2-TRICHLOROETHANE (1,1,2-TCA)	mg/L	0.005	0.0005	0.0003**	No
TRICHLOROETHYLENE (TCE)	mg/L	0.005	0.0005	0.0017	No
TRICHLOROFLUOROMETHANE (FREON 11)	mg/L	0.15	0.005	0.70	No
TRICHLOROTRIFUOROETHANE (FREON 113)	mg/L	1.2	0.01	4.0	No
TRIHALOMETHANES, TOTAL (TTHMs)	mg/L	0.080			No
XYLENES (SUM OF ISOMERS)	mg/L	1.750	0.0005	1.8	No
MICROBIOLOGICAL					
COLIFORM % POSITIVE SAMPLES	%	5		(zero)	No
CRYPTOSPORIDIUM*		TT		(zero)	No
GIARDIA LAMBIA		TT		(zero)	No
LEGIONELLA		TT		(zero)	No
VIRUSES		TT		(zero)	No
RADIOLOGICAL					
ALPHA ACTIVITY, GROSS	pCi/L	15	3	(zero)	No
BETA ACTIVITY, GROSS	pCi/L	4 mrem/yr.	4	(zero)	No
RADIUM 226	pCi/L	5	1	0.05**	N/A
RADIUM 228	pCi/L	5	1	0.019**	N/A
STRONTIUM 90	pCi/L	8	2	0.35**	No
TRITUM	pCi/L	20000	1000	400**	No
URANIUM	pCi/L	20	1	0.43	**yes**

MCL = Maximum Contaminant Level
PHG = Public Health Goal
MCLG = Maximum Contaminant Level Goal
DLR = Detection Level for Reporting Purposes; set by CDPH
* Surface Water Systems Only
TT = Treatment Technique
mg/L = milligrams per liter (equal to parts per million)
ug/L = micrograms per liter (equal to parts per billion)
pCi/L = picocurries per liter
mrem/yr. =
**PHG revised, MCL to be reviewed and may also be revised.
***Total Chromium PHG withdrawn – awaiting revised PHG for Chromium 6.
a – USEPA adopted an arsenic level of 0.010 mg/L that became effective in California on Jan. 23, 2006.