
# Public Health Goals
# Escondido Water System
# 2021

# CITY OF ESCONDIDO

# REPORT ON CITY'S WATER QUALITY RELATIVE TO PUBLIC HEALTH GOALS

2019 – 2021

California Health and Safety Code Section 116470(b)

## Background

Provisions of the California Health and Safety Code specify that larger water utilities (>10,000 service connections) prepare a special report if any of their water quality measurements have exceeded any Public Health Goal (PHG, see definition below). The law also requires that where a PHG for a constituent has not been established, the water suppliers are to use the Maximum Contaminant Level Goals (MCLG) adopted by the United States Environmental Protection Agency (USEPA). Only constituents which have a California primary drinking water standard and for which either a PHG or an MCLG has been set are to be addressed.

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 or MCLG has yet been adopted. These will be addressed in the future as they are adopted in either the California or the Federal standards.

If a constituent was detected in the Escondido water supply in the years of 2019 through 2021 at a level exceeding an applicable PHG or MCLG, this report provides the information required for our customers. Included is:

- The numerical public health risk associated with the Maximum Contaminant Level (MCL) and the PHG or MCLG. (MCLs are set by the USEPA or the California Department of Public Health in their enforceable drinking water standards).
- 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.
- An estimate of the cost to install that treatment if it is appropriate and feasible.

## Goals vs Standards

Public water supplies are strictly regulated for a host of contaminants. The most stringent standards are those set by the USEPA and the California Department of Public Health in their primary drinking water standards. These standards are called Maximum Contaminant Levels (MCL) and they are enforced by the California Department of Public Health. Tests for these contaminants are run on a required frequency using standard methodologies. Public drinking water systems must ensure compliance with these standards at all times.

Contrary to standards, there are also two sets of goals that may apply to various contaminants that may be found in drinking water supplies. The goals can be either state or federal goals. The goals are not enforceable, but they provide contaminant levels for which the water system operators should strive to meet.

The California Office of Environmental Health Hazard Assessment (OEHHA), a section of Cal EPA, sets Public Health Goals (PHGs). The PHGs are not enforceable and are not required to be met by any public water system. They are set as goals based solely on public health risk considerations and they include a margin of safety.

Maximum Contaminant Level Goals (MCLGs) are the federal equivalent to PHGs; however, there is a difference in how levels for carcinogens are set at the federal level. The Maximum Contaminant Level Goals for carcinogens are set at zero because the USEPA assumes there is no absolutely safe level of exposure to them. Conversely, PHGs are set at a level considered to pose no significant risk of cancer, and are usually noted as a one in a million cancer risk for a lifetime of exposure. Determinations of health risk at these low levels are frequently theoretical and have not been quantified or proven through scientific experimentation. .

## Best Available Treatment Technology

Both the USEPA and the California Department of Public Health adopt what are known as Best Available Technologies (BAT). These technologies take into account practical risk-management factors such as analytical detection capability, available treatment technology, benefits, and costs. These are the best known methods for reducing contaminant levels to the MCL. However, since many PHG's and all MCLG's are set much lower than the MCL, it is not always possible to determine what treatment is needed to further reduce contaminant concentrations to the low levels set in the PHG or MCLG. Unfortunately, the analytical tests to determine these very low levels are not always available or they do not provide reliable test results. In some cases, treatment processes that reduce one contaminant to a very low level may have adverse effects on other aspects of water quality.

## Water Quality Data Considered

Water quality data collected from the City of Escondido water system during the years 2019, 2020 and 2021, for purposes of determining compliance with drinking water standards, was considered in this report. This data is summarized in the annual Water Quality Reports for the same years; reports are made available for customer review on the City of Escondido's website and hard copies are mailed to customers upon request. The constituents discussed below were detected in Escondido's drinking water at levels above the PHG, or if no PHG, above the MCLG.

## Coliform Bacteria

Each month, approximately 140 – 200 samples are collected from the water distribution system for coliform analysis. Occasionally, a sample was found to be positive for coliform bacteria, but repeat samples were negative and follow up actions were taken. A maximum of 3.21% of these samples were positive in any month (maximum: 1.94% in 2019, 3.21% in 2020, and 1.07% in 2021).

In the years 2019 through 2021, there were 19 samples out of 5,853 (0.32%) indicating positive for total coliform (TC), with repeat samples being negative in all cases (positive TC numbers: 9 out of 2,002 in 2019, 7 out of 1,936 in 2020, and 3 out of 1,915 in 2021). The MCL for total coliform is 5% of monthly samples and the MCLG is 0% for monthly samples. The total coliform bacteria percentage levels for water in the distribution system were below the MCL at all times, but at times was over the MCLG.

Monitoring for total coliform bacteria is performed to minimize the possibility of pathogens in the water. Pathogens are organisms that may cause waterborne disease. Because coliforms are only a surrogate indicator of the potential presence of pathogens, it is not possible to state a specific numerical health risk. While USEPA normally sets MCLGs "at a level where no known or anticipated adverse effects on persons would occur," they indicate that they cannot do so with total coliform bacteria.

Total coliform bacteria are used as an indicator organism. They are found everywhere in nature and are not generally considered harmful. They are used because of the ease in monitoring and analysis. If a positive sample is found, it indicates a potential problem that needs to be investigated. It is not at all unusual for a system to have an occasional positive total coliform sample. Follow up sampling indicates the presence or absence of further risk.

The City adds chlorine as a disinfectant during the treatment process, and also chloramines prior to distribution to assure that the water is free of pathogens. The residual levels of the disinfectant are carefully controlled to provide the best health protection without undesirable taste, odor, or byproducts. This careful balance of

treatment processes is essential to supplying Escondido's customers with safe drinking water.

Other equally important measures that have been implemented include:

- An effective cross-connection control program.
- Maintenance of a disinfectant residual throughout the system.
- An effective monitoring and surveillance program.
- Maintenance of positive pressure in the distribution system.

## Copper and Lead

There is no MCL for copper and lead. Instead, it is required that 90% of the samples taken from household taps and tested for copper and lead cannot exceed an Action Level of 1.3 mg/L for copper and 0.015 mg/l for lead. The PHG for copper is 0.30 mg/L and for lead it is 0.0002 mg/l.

The Federal and State's Lead and Copper Rule requires that sampling be conducted once every three years for both lead and copper. The samples are taken by designated customers from kitchen or lavatory faucets. The sample is taken after the water sits in the plumbing over night, without running the water to rinse or flush out contaminants.

The copper sampling in year 2021 indicates that the 90% level of copper samples taken from Escondido household taps was 0.65 mg/L, which is less than the Action Level of 1.3 mg/L, but exceeds the PHG of 0.30 mg/L. The approximate 54% of the 57 samples collected in year 2021 for copper exceeded the PHG of 0.30 mg/L.

The category of health risk for copper is gastrointestinal irritation. Numerical health risk data on copper has not yet been provided by California EPA's Office of Environmental Health hazard Assessment.

Also, the lead sampling in year 2021 indicates that the 90% level of lead samples taken from household taps were less than the detection limit for reporting (DLR) of 0.005 mg/L and less than the Action Level of 0.015 mg/L, but exceeded the PHG level of 0.0002 mg/L.

The category of risk for lead is damage to kidneys or the nervous system. Numerical health risk data on lead has not yet been provided by California EPA's Office of Environmental Health hazard Assessment.

The Escondido water system is in full compliance with the Federal and State Copper and Lead Rule. Based on extensive sampling, it was determined according to State regulatory requirements that the City does meet the Action Levels or Notification Levels for copper and lead. Therefore, the Escondido water

system is deemed by the California Department of Health Services to have "optimized corrosion control" for the system. It is not prudent to initiate additional corrosion control treatment until such time as changing conditions warrant further action. The cost to reduce the copper level to zero is not known as the majority of copper and lead contamination comes from piping in individual residences.

## Arsenic

Arsenic is a naturally occurring element in the earth's crust and is very widely distributed in the environment. In certain geographical areas, natural mineral deposits may contain large quantities of arsenic and this may result in higher levels of arsenic in water. The amounts of arsenic required to cause adverse health effects depend on the chemical and physical form of the arsenic that is ingested. Inorganic forms are generally more acutely toxic than organic forms and more water-soluble forms tend to be more toxic than those that dissolve poorly in water. Also, the oxidation state of arsenic affects its toxicity, with As (III) being more toxic than As (V).

In most municipal water supplies, particularly surface reservoirs, the chief form of arsenic is As (V) due to aeration and chlorination. In chlorinated drinking water supplies, all arsenic forms have been found to be pentavalent as a result of oxidation by free chlorine.

Total arsenic was detected and ranged from ND to DNQ (detected, not quantified) of 0.0008 mg/L, and DLR (detection limits for purposes of reporting) of 0.002 mg/L, but exceeded the PHG level of 0.000004 mg/L during 2019 to 2021. (Range: ND – DNQ [0.0006 mg/L] in 2019, ND – DNQ [0.0006 mg/L] in 2020, and ND – DNQ [0.0008 mg/L] in 2021).

## DBCP (1, 2-Dibromo-3-chloropropane)

DBCP was used as a soil fumigant and nematocide, and its use was restricted and its registration was cancelled in 1985. DBCP was identified as both a carcinogen and a male reproductive toxicant in 1987. The best available technologies (BAT) to treat for DBCP are granular activated carbon (GAC) or by packed tower aeration.

The state of California PHG for DBCP is 0.000003 mg/L.

DBCP was detected, and ranged as DNQ (0.000004 mg/L – 0.000005 mg/L) on 2021, but exceeded the PHG of 0.000003 mg/L.

## Chlorite

Chlorite is a disinfection byproduct produced in the treatment of drinking water with chlorine dioxide. Chlorine dioxide has been used for control of taste and odor associated with algae and decaying vegetation in the raw water supply, as well as

lower disinfectant-by-products levels such as Total Trihalomethanes (TTHMs) and Haloacetic Acid (five) (HAA5) in drinking water. Chlorine dioxide was applied seasonally at the Escondido Water Treatment Plant to reduce an odor when the raw water sources had observed a detectable odor. The current chlorite MCL is 1.0 mg/L and the PHG is 0.05 mg/L.

The chlorite levels measured at Escondido distribution system when chlorine dioxide was being used during 2019 to 2021, ranged from 0.02 mg/L to 0.56 mg/L chlorite, but exceeded the PHG of 0.05 mg/L. (Range: 0.02 – 0.42 mg/L in 2019, 0.05 – 0.40 mg/L in 2020, and 0.09 – 0.56 mg/L in 2021)

Several studies reveal that oral exposure to chlorite can result in significant hematological, endocrine, reproductive, and gastrointestinal effects, as well as changes in neurobehavioral development at levels higher than the MCL.

Based on our sampling, it was determined that the Escondido Water System meets the MCL for Chlorite, but exceeds the PHG.

## TTHM (Total Trihalomethanes)

An important and predominant group of chlorinated drinking water byproducts, trihalomethanes can occur as a result of the reaction between natural organic matter in the water and chlorine added as a disinfectant. The term 'Total Trihalomethanes' (TTHM) describes four disinfection by-products: Bromoform, Bromodichloromethane, Chloroform, and Dibromochloromethane.

The PHG for Bromoform is 0.0005 mg/L, for Bromodichloromethane is 0.00006 mg/L, for Chloroform is 0.0004 mg/L, and for Dibromochloromethane is 0.0001 mg/L.

Bromoform was detected, and ranged from 0.0013 mg/L to 0.0056 mg/L during 2019 to 2021, exceeded the PHG of 0.0005 mg/L.

Bromodichloromethane was detected, and ranged from 0.0055 mg/L to 0.026 mg/L, exceeded the PHG of 0.00006 mg/L.

Chloroform was detected, and ranged from 0.0047 mg/L to 0.025 mg/L, exceeded the PHG of 0.0004 mg/L.

Dibromochloromethane was detected, and ranged from 0.0053 mg/L to 0.020 mg/L, exceeded the PHG of 0.0001mg/L.

## HAA5 (Haloacetic Acids): Dichloroacetic Acid

HAAs can be formed by chlorination, ozonation or chloramination of water with formation promoted by slightly acidic water, high organic matter content and elevated temperature. Chlorine from the water disinfection process can react with

organic matter and small amounts of bromide present in water to produce various HAAs.

HAA5 describes five disinfection by products: monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid.

US EPA has concluded that dichloracetic acid causes male reproductive and development toxicity and established the MCLG of zero.

Dichloroacetic acid was detected and ranged from 0.0014 mg/L to 0.013 mg/L during 2019 to 2021, exceeding the MCLG of zero.

## Uranium

Uranium is a naturally occurring radioactive element present in the earth's crust that is found in some rocks and soil and is weakly radioactive. Uranium is also found in ground and surface waters due to natural occurrence in geological formations. The average uranium concentration in surface, ground, and domestic water are 1, 3, and 2 pCi/L (picocuries per liter), respectively. Uranium can also enter the environment in the production and use of phosphate fertilizers, or from mining and industrial processing activities.

The current uranium MCL is 20 pCi/L and the PHG is 0.43 pCi/L.

Uranium was detected at 2.1 pCi/L (picocuries per liter) in year 2021, well below the MCL but exceeded the PHG of 0.43 pCi/L.

## Gross Alpha Particle Activity

Gross alpha particle activity is a measure of the total amount of radioactivity in a water sample attributable to the radioactive decay of alpha-emitting elements. Alpha particles are highly ionizing, but the particles travel short distances in air (less than 2 inches) before being absorbed. Alpha particles have little ability to penetrate objects; thus, they can be stopped by a sheet of paper or the outer layer of skin. The external hazard from alpha particles is minimal, but the internal hazard when they are inhaled or ingested may be significant.

The U.S. EPA's MCLG for gross alpha particle is zero, and the state of California MCL is 15 pCi/L.

Gross Alpha particle was detected, and ranged from ND to 3.3 pCi/L in year 2021. The detection limit for reporting (DLR) of gross beta particle is 3 pCi/L.

These detections do not constitute a violation of drinking water regulations or indicate the water was unsafe to drink. The results could be considered typical for a California water agency.

## Gross Beta Particle Activity

Gross beta particle activity is a measure of the total amount of radioactivity in a water sample attributable to the radioactive decay of beta-emitting elements. Beta particles usually travel greater distances in air than alpha particles (about 6 feet) before being absorbed.

A low level of gross beta activity is relatively prevalent in the State's water supply, probably due to the ubiquitous nature of naturally occurring beta particle-emitting radionuclides.

The U.S. EPA's MCLG for gross beta particle is zero, and the state of California MCL is 50 pCi/L and Federal MCL is 4 mrem/yr (milliroentgen equivalent man).

Gross beta particle was detected, and ranged from ND to 4.6 pCi/L on year 2021. The detection limit for reporting (DLR) of gross beta particle is 4 pCi/L.

These detections do not constitute a violation of drinking water regulations or indicate the water was unsafe to drink.

## RECOMMENDATIONS FOR FURTHER ACTION:

The City of Escondido drinking water system meets all State of California and USEPA drinking water standards set to protect public health, but it does exceed some of the public health goals. Costly treatment processes would be required to further reduce the levels of the constituents identified in this report to meet PHG or MCLG that are significantly below the health-based MCL that have been established to provide "safe drinking water." The effectiveness of additional treatment processes to provide significant reductions in constituent levels at these already low values is uncertain. In addition, the health protection benefits of further reductions are not clear and may not be quantifiable. Therefore, no action is proposed.

## Summary of Findings:

Overall, total coliform, copper, lead, arsenic, DBCP, chlorite, TTHM, HAA5, uranium, gross alpha particle, and gross beta particle constituents were detected in our City's water system at concentrations above the PHGs or MCLGs. Also, there are several inorganic and organic compounds which are reported as ND (not detected) due to their being below the MDL (method detection limit), and due to the PHG level being much lower than the MDL. At no time did the Escondido water system ever serve water containing contaminants above recognized and enforceable MCLs. The drinking water quality of the Escondido water system meets all drinking water standards to protect public health.