

CITY OF ESCONDIDO

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

2007 – 2009

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 by July 1, 2010 if any of their water quality measurements have exceeded any Public Health Goal (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 2007 through 2009 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.

Public Health Goals (PHGs) are set by the California Office of Environmental Health Hazard Assessment (OEHHA) which is part of Cal-EPA. The PHG's 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 (MCLG) 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, PHG's are set at a level considered to pose no significant risk of cancer. This is usually defined 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. 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 in 2007, 2008, and 2009 for purposes of determining compliance with drinking water standards was considered in this report. This data was summarized in the annual Consumer Confidence Reports for the same years and was mailed to our customers. The Consumer Confidence Report for 2009 report will be mailed to all of our customers on or before June 27th. 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 130 to 170 samples are collected from the distribution system for coliform analysis. Occasionally, a sample is found to be positive for total coliform bacteria. In 2007, 2008 and 2009, all months had zero detectable total coliform bacteria except those listed below:

<u>2007</u>	<u>2008</u>	<u>2009</u>
Feb 0.71%	Feb 0.70%	May 1.40%
Aug 0.74%	Aug 1.99%	Jun 2.84%
Sep 1.46%	Sep 1.69%	
	Oct 0.70%	
	Dec 1.16%	

The percentage represents the percent of positive samples for the given month. Over the three year period there were 21 samples out of 5,383 (0.39%) that tested positive for total coliform. Repeat samples were tested for all positive samples. All repeat samples tested were negative except for one which tested E.Coli positive in June of 2009, triggering the acute MCL violation. The cause was found to be animal waste. A boil water order was put in place for the affected customers until the problem was eliminated and water quality testing indicated no presence of coliform bacteria.

The regulated MCL for total coliform bacteria requires that less than 5% of the total number of samples in the distribution system per month can be positive. The MCLG for total coliform is zero. Monitoring for total coliform bacteria is performed to minimize the possibility 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 unusual for a system to have an occasional positive total coliform sample. Follow up sampling indicates the presence or absence of further risk. If further testing indicates the presence of bacteria, investigation into the cause is done, the issue is addressed, and follow up testing is performed to ensure that bacteria is no longer present. Costs vary depending upon the source of the bacterial contamination.

Best practices are followed by the City to keep bacterial contamination out of the water supply. 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. Instead, it is required that 90% of the samples taken from household taps and tested for copper not exceed an Action Level or Notification Level of 1.3 mg/L for copper. The PHG for copper is 0.30 mg/L.

The Federal and State 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 sampling in 2009 indicates that 90% of the samples taken from Escondido households were lower than 0.62 mg/L. All samples were within the Action Level described above; however, approximately 67% of the 64 samples collected in 2009 for copper exceeded the 0.30 mg/L PHG.

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.

For lead samples, it is required that 90% of all samples from household taps in the distribution system not exceed an Action Level or Notification Level of 0.015 mg/L for lead. The PHG for lead is 0.0002 mg/L. All samples were within the Action Level described above; however, all of the 64 samples collected in 2009 for lead were higher than the 0.0002 mg/L PHG.

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 Lead and Copper Rule. Based on extensive sampling, it was determined 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 and lead levels to zero is not known as the majority of copper and lead contamination comes from piping in individual residences.

Radionuclides

Samples are tested for radionuclides every 3 years. The measurement made in the Escondido water system in 2008 was well below the Federal and State radionuclides regulations for maximum contaminant levels, but were generally greater than the goal levels. The maximum contaminant level goal for Gross Alpha Particles and Beta Particles is zero. The PHG for Radium 226 and 228 (combined), Strontium-90 and Uranium are 0.07, 0.35 and 0.43 pCi/L, respectively. Levels measured in the Escondido system are shown in the table below:

Constituent/Date	5-13-2008
Gross Alpha	< 3 pCi/L
Gross Beta	3.2 pCi/L
Radium 226/228	< 0.5 pCi/L
Strontium-90	0.81 pCi/L
Uranium	1.9 pCi/L

pCi/L = picocuries per liter

Radioactive contaminants come from erosion of natural deposits of certain minerals that are radioactive and may emit a form of radiation known as alpha radiation, photons and beta radiation. With Alpha, Beta and Radium there is an increased risk of cancer. The presence of uranium increases the risk of cancer and is toxic to kidney function. Uranium intake from water is about equal to the total from other dietary components.

The recommended treatment processes to lower Uranium levels include:

- Enhanced Coagulation followed by Filtration
- Lime Softening
- Ion Exchange
- Reverse Osmosis

The first technique, Enhanced Coagulation followed by Filtration, is a technology that is applicable to surface waters. Lime Softening cannot be considered in Escondido as the City's water treatment plant was not designed to facilitate softening and the plant site is too small to add these facilities. The other techniques, ion exchange and reverse osmosis, would require extensive site modification at considerable cost to the ratepayers. Given that the Escondido samples are well within the MCL, it is not feasible at this point to consider adding treatment processes that may or may not be effective in meeting the PHG.

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 and it helps to lower levels of other disinfection byproducts such as total Trihalomethane and Haloacetic Acid in drinking water. Chlorine dioxide was applied seasonally at the Escondido Water Treatment Plant while Lake Wohlford water was used as the raw water source. The current MCL is 1.0 mg/L and the PHG is 0.05 mg/L.

Chlorite levels measured in the Escondido system when chlorine dioxide was being used are shown in the table below:

	<u>2007</u>		<u>2008</u>		<u>2009</u>
May	0.62 mg/L	May	0.62 mg/L	May	0.60 mg/L
Jun	0.63 mg/L	Jun	0.56 mg/L	Jun	0.64 mg/L
Jul	0.45 mg/L	Jul	0.56 mg/L	Jul	0.70 mg/L
		Aug	0.62 mg/L	Aug	0.68 mg/L
		Sep	0.49 mg/L		
		Oct	0.53 mg/L		
		Nov	0.62 mg/L		

Several studies reveal that oral exposure to chlorite, at levels higher than the MCL, can result in significant hematological, endocrine, reproductive, and gastrointestinal effects as well as changes in neurobehavioral development. Based on testing results, it was determined that the Escondido Water System meets the MCL for chlorite, but exceeds the PHG.

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 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.