CITY OF FULLERTON

2010 REPORT ON THE CITY'S WATER QUALITY RELATIVE TO "PUBLIC HEALTH GOALS AND MAXIMUM CONTAMINANT LEVEL GOALS"

Public Health Goals - Background:

Provisions of the California Health and Safety Code Section 116470(b) specify that larger (>10,000 service connections) water utilities prepare a special report by July 1, 2010 if their water quality measurements have exceeded any Public Health Goals (PHGs). PHGs are non-enforceable goals established by the Cal-EPA's 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 Goals (MCLGs) adopted by Federal Environmental Protection Agency (USEPA). Only constituents which have a California primary drinking water standard and for which either a PHG or MCLG has been set are to be addressed.

If a constituent was detected in the City's water supply between 2007 and 2009 at a level exceeding an applicable PHG or MCLG, this report provides the information required by the law. 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 PHGs and MCLGs?

PHGs are set by the OEHHA which is part of Cal-EPA 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 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 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 our water system between 2007 and 2009 for purposes of determining compliance with drinking water standards was considered. This data was all summarized in our 2008, 2009, and 2010 Annual Water Quality Reports which were mailed to all of our customers by July 1st of each year.

Guidelines Followed:

The Association of California Water Agencies (ACWA) formed a workgroup which prepared guidelines for water utilities to use in preparing these newly required reports. The ACWA guidelines were used in the preparation of our report. No guidance was available from state regulatory agencies.

Best Available Treatment Technology and Cost Estimates:

Both the USEPA and CDPH adopt what is known as Best Available Technologies (BATs) which is the best known method 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. For example, the pH of the water may increase or decrease depending on the technology implemented.

Constituents Detected that Exceed a PHG or a MCLG:

The following is a discussion of constituents that were detected in one or more of our drinking water sources at levels above the PHG, or if no PHG exists, above the MCLG.

Trichloroethylene (TCE):

The City of Fullerton conducted monitoring of TCE in water samples collected from each of the City's eleven active wells. The MCL or drinking water standard for TCE is 5 parts per billion (ppb). Based on analytical results obtained, TCE was detected above the established PHG of 0.17 ppb in five of our wells. These five wells, which are all located at the City's main plant, are currently blended together (per CDPH approved plan) to lower the level of TCE in the water before entering the City's water system. The blended levels of TCE were well below the MCL as shown on the following table.

Maximum Contaminate Level (MCL)	Public Health Goal (PHG)	Annual Average (2007)	Annual Average (2008)	Annual Average (2009)
5 ppb	1.7 ppb	0.8 ppb	0.8 ppb	0.9 ppb

The category of health risk associated (carcinogenic) with TCE, and the reason that a drinking water standard was adopted for it, is that people who drink water containing TCE above the MCL throughout their lifetime could experience an increased risk of getting cancer. CDPH says that "Drinking water which meets this standard (the MCL) is associated with little to none of this risk and should be considered safe with respect to TCE."

The numerical health risk at the MCL of 5 ppb is $3x10^{-6}$, or three excess cancer cases per one million population. The numerical health risk at the PHG of 1.7 ppb is $1x10^{-6}$ or one excess cancer case per one million population.

The BAT to lower the level of TCE is either Granular Activated Carbon (GAC) or Packed Tower Aeration (PTA). Since the TCE levels in the City's five Main Plant wells is already below the MCL, GAC with a long empty bed contact time (EBCT) would likely be required to

attempt to lower the TCE level below the PHG of 1.7 ppb. The estimated cost to install and operate such a treatment system at our Main Plant would be approximately $7,021,780 per year, includes annualized capital and O&M costs. This would result in an assumed increased cost for each residential customer (using 15,000 gallons per month) of $126.00 year or 24% increase in water rates.

Tetrachloroethylene (PCE):

The City of Fullerton conducted monitoring of PCE in water samples collected from each of the City's eleven active wells. The MCL or drinking water standard for PCE is 5 ppb. Based on analytical results obtained, PCE was detected above the established PHG of 0.06 ppb at only one well (Kimberly 2). The range of individual sampling results obtained over the three year sampling period was non-detect to 1.6 ppb, with the average annual results shown on the following table.

Maximum Contaminate Level (MCL)	Public Health Goal (PHG)	Annual Average (2007)	Annual Average (2008)	Annual Average (2009)
5 ppb	0.06 ppb	0.9 ppb	1.1 ppb	1.0 ppb

The category of health risk associated (carcinogenic) with PCE, and the reason that a drinking water standard was adopted for it, is that people who drink water containing PCE above the MCL throughout their lifetime could experience an increased risk of getting cancer. CDPH says that "Drinking water which meets this standard (the MCL) is associated with little to none of this risk and should be considered safe with respect to PCE."

The numerical health risk at the MCL of 5 ppb is $8x10^{-5}$, or eight excess cancer cases per 100,000 population. The numerical health risk at the PHG of 0.06 ppb is $1x10^{-6}$ or one excess cancer case per one million population.

The BAT to lower the level of PCE is GAC, PTA, or Advanced Oxidation Processes (AOP). Since the PCE level is already below the MCL at our Kimberly 2 Well, GAC with a long EBCT would be required to try to lower the PCE level below the PHG of 0.06 ppb. The estimated cost to install and operate such a treatment system for our Kimberly 2 Well would be approximately $785,480 per year, includes annualized capital and O&M costs. This would result in an assumed increased cost for each residential customer (using 15,000 gallons per month) of $14.04 year or 3% increase in water rates.

Coliform Bacteria:

During 2007, 2008, and 2009, the City collected 4,843 samples from our distribution system for coliform analysis. In October and December 2008, one sample was found to be positive for coliform bacteria but confirmation samples were negative for coliform.

The MCL for coliform is 5% positive samples of all samples per month and the MCLG is zero. The reason for the coliform drinking water standard is to minimize the possibility of the water

containing pathogens which are organisms that cause waterborne disease. Because coliform is 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 coliforms.

Coliform bacteria are an indicator organism that are 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 and follow up sampling done. It is not at all unusual for a system to have an occasional positive sample. It is difficult, if not impossible, to assure that a system will never get a positive sample.

The City adds chlorine at our groundwater sources to assure that the water served is microbiologically safe. The chlorine residual levels are carefully controlled to provide the best health protection without causing the water to have undesirable taste and odor or increasing the disinfection byproduct level. This careful balance of treatment processes is essential to continue supplying our customers with safe drinking water.

Other equally important measures that we have implemented include: an effective cross-connection control program, maintenance of a disinfectant residual throughout our system, an effective monitoring and surveillance program and maintaining positive pressures in our distribution system. Our system has already taken all of the steps described by CDPH as “best available technology” for coliform bacteria in Section 64447, Title 22, CCR.

Uranium:

The City of Fullerton conducted monitoring of Uranium in water samples collected from our wells. We have detected Uranium in each of our eleven wells at levels between 4.0 and 9.5 Pico Curies per Liter (pCi/L). The levels detected were below the MCLs at all times. See the following table below.

Maximum Contaminate Level (MCL)	Public Health Goal (PHG)	Annual Average
20 pCi/L	0.43 pCi/L	6.7 pCi/L

Uranium is considered a naturally occurring contaminant in some groundwater and surface water supplies. Uranium occurs as a trace element in many types of rocks. Because its abundance on geological formations varies from place to place, uranium is a highly variable source of contamination in drinking water.

The category of health risk (carcinogenic) associated with Uranium and the reason that a drinking water standard was adopted for it is that people who drink water containing Uranium above the MCL throughout their lifetime could experience an increased risk of getting cancer and kidney toxicity. CDPH says that “Drinking water which meets this standard (the MCL) is

associated with little to none of this risk and should be considered safe with respect to Uranium."

The numerical health risk at the MCL of 20 pCi/L is $5x10^{-5}$, or five excess cancer cases per 100,000 population. The numerical health risk at the PHG of 0.43 pCi/L is $1x10^{-6}$ or one excess cancer case per one million population.

The BAT to lower the level of Uranium is Ion Exchange/Water Softening treatment. Since the level of Uranium in each of the City wells is already below the MCL, the Ion Exchanged/Lime Softening treatment method would be used to attempt to lower the Uranium level below the PHG of 0.43 pCi/L. The estimated cost to install and operate such a treatment system that would attempt to reduce the level of Uranium below the PHG would be approximately $27,554,580 per year, includes annualized capital and O&M costs. This would result in an assumed increased cost for each residential customer (using 15,000 gallons per month) of $419.40 year or 81% increase in water rates.

Gross Alpha:

Gross Alpha is the measurement of radioactive particle activity for a group of radionuclide's which include: Uranium, Combined Radium, and Radon. The City has detected Gross Alpha in all of our wells at levels between 4.4 and 9.6 pCli/L. There is no PHG for Gross Alpha, but the USEPA has established an MCLG of zero. However, since the levels of Gross Alpha detected can be attributed primarily to Uranium, which was previously discussed in this report, no additional information regarding health risks or treatment cost estimates are required.

Recommendations For Further Action:

The drinking water quality of the City's water system meets all CDPH and USEPA 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 Maximum Contaminant Levels 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.