Agenda Report

August 6, 2007

TO: City Council

FROM: City Manager

SUBJECT: Report on Water Quality Public Health Goals

RECOMMENDATION

It is recommended that the City Council:

1. Hold a public hearing on August 6, 2007 for the purpose of accepting and responding to public comments on the City of Pasadena's Water Quality Report Relative to Public Health Goals (PHGs);
2. Accept the City of Pasadena's Water Quality Report Relative to Public Health Goals; and
3. Declare the 2007 Water Quality Report Relative to Public Health Goals to be categorically exempt from the California Environmental Quality Act and the "Environmental Guidelines and Procedures for the City of Pasadena" pursuant to Section 15308 of the State of California Environmental Quality Act (CEQA) Guidelines (actions by regulatory agencies for protection of the environment).

BACKGROUND

The water that Pasadena Water and Power (PWP) delivers to its customers complies with all applicable drinking water standards, or Maximum Contaminant Levels (MCLs), which are enforceable regulatory standards under the Safe Drinking Water Act and must be met by all public drinking water systems. MCLs are set by the California Department of Health Services (DHS), which is the primary State agency responsible for protection of public health and the regulation of drinking water.

The California legislature has established criteria for adopting MCLs in drinking water by creating the concept of a Public Health Goal (PHG). As a result, the preparation of the PHG report is required pursuant to the enactment of Senate Bill (SB) 1307, which amended provisions of section 116470 of the Health and Safety Code and intended to provide information to the public in addition to the Annual Water Quality Report mailed to each customer annually.

Section 116470 of the Health and Safety Code requires that public water systems with more than 10,000 service connections prepare a report to inform the public when one or more PHGs are exceeded. During the period covered by the report, 2004-2006, there were instances when contaminants were detected in PWP's drinking water at levels above the PHG, or if no PHG, above the Maximum Contaminant Level Goals (MCLG). These contaminants include trichloroethylene, tetrachloroethylene, total coliform bacteria, nitrate, fluoride, lead, copper, arsenic, uranium, and gross alpha.

A PHG and MCLG is a health risk assessment measurement, not a proposed drinking water standard. It is the level of a contaminant in drinking water, which is considered not to pose a significant risk to health if consumed for a lifetime. PHGs are based solely on public health considerations. The risk-management factors that are considered by the United States Environmental Protection Agency or the California Department of Health Services in setting drinking water standards are not considered in setting the PHGs or MCLGs. 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.

PWP's PHG report provides the following information for all contaminants detected in the water supply in years 2004, 2005 and 2006 at levels exceeding the applicable PHGs or MCLGs.

1. Numerical public health risk associated with the MCL and the PHG or MCLG
2. Category of risk to public health associated with each contaminant
3. Best Available Treatment Technology that could be used to reduce the contaminant level
4. Estimate of the cost to install that treatment if it is appropriate and feasible

The PHG Report does not propose any further actions. The drinking water quality of the City of Pasadena meets all State of California, Department of Health Services and USEPA drinking water standards set to protect public health. To further reduce the levels of the contaminants identified in the report would require costly treatment processes and the effectiveness of these treatment processes to provide any significant reductions in contaminant levels is uncertain. The health protection benefits of these hypothetical reductions are not clear and not quantifiable.

The Health and Safety Code requires that a public hearing be held for the purpose of accepting and responding to public comments. The law mandates that PHG reports be completed by July 1, 2007, and every three years thereafter, and that the public hearing should be held within a reasonable time after completion of the report.

PWP staff completed the PHG Report on June 28, 2007. Copies of the report have been made available for public inspection at PWP's administrative offices located at 150 South Los Robles Avenue, Suite 200 and on the web at http://www.cityofpasadena.net/waterandpower/yourwater.asp. In addition, a notice of public hearing has been published in the Pasadena Star News on July 23, 2007.

The City's 2007 Report on Water Quality Public Health Goals is categorically exempt from the CEQA and the "Environmental Guidelines and Procedures for the City of Pasadena" as a Class 8 exemption (Section 15308 of the State CEQA Guidelines), an action by a regulatory agency for the protection of the environment.

Fiscal Impact

Acceptance of the Report will have no fiscal impact on the City.

Respectfully submitted,

Cynthia J. Kurtz
City Manager

Prepared by:

Inna Babbitt
Water Quality Manager
Water and Power Department

Approved by:

Phyllis E. Currie
General Manager
Water and Power Department

PASADENA WATER AND POWER

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

June 2007

BACKGROUND

The California legislature has established criteria for adopting drinking water standards, called Maximum Contaminant Levels (MCLs), by creating the concept of a Public Health Goal (PHG). PHGs are established by the California Environmental Protection Agency's Office of Environmental Health Hazard Assessment (OEHHA). A PHG is a health risk assessment, not a proposed drinking water standard. It is the level of a contaminant in drinking water, which is considered not to pose a significant risk to health if consumed for a lifetime. This determination is made without regard to cost or treatability. The California Department of Health Services (DHS) uses PHGs to identify MCLs that are to be reviewed for possible revision or when setting MCLs for unregulated chemicals.

Provisions of the California Health and Safety Code Section 116470(b) (Attachment A) requires that large water utilities (>10,000 service connections) prepare a special report by July 1, 2007 if their water quality measurements have exceeded any PHGs. The law also requires that where OEHHA has not adopted a PHG for a contaminant, the water suppliers are to use the Maximum Contaminant Level Goal (MCLG) adopted by the United States Environmental Protection Agency (USEPA). MCLGs are the federal equivalent to PHGs, but are not identical. 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 in this report. Attachment B is a list of all regulated constituents with MCLs and PHGs or MCLGs shown.

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 nor MCLG has yet been adopted by OEHHA or USEPA including Total Trihalomethanes (TTHMs). These will be addressed in future required reports after PHGs or MCLGs have been adopted.

This report provides the following information as specified in the Health and Safety Code (Attachment A) for any constituent detected in the City of

Pasadena's (City) water supply in 2004, 2005, and 2006 at a level exceeding an applicable PHG or MCLG:

- Numerical public health risk associated with the MCL and the PHG or MCLG.
- Category or type of risk to health that could be associated with each constituent.
- Best Available Treatment Technology that could be used to reduce the constituent level.
- Estimate of the cost to install that treatment if it is appropriate and feasible.

WHAT ARE PHGs?

- PHGs are set by the California Office of Environmental Health Hazard Assessment (OEHHA) which is part of California EPA.
- PHGs are based solely on public health risk considerations. None of the risk-management factors that are considered by the DHS in setting drinking water standards are considered in setting the PHGs. These factors include analytical detection capabilities, treatment technology available, benefits and costs.
- PHGs are not enforceable and are not required to be met by any public water system. MCLGs are federal equivalent to PHGs and are set by the USEPA.

WATER QUALITY DATA CONSIDERED

All of the water quality data collected for our water system between 2004 and 2006 for purposes of determining compliance with drinking water standards were considered. This information was all summarized in our 2004, 2005 and 2006 Annual Consumer Confidence Reports, which were mailed to all of our customers in June 2005, June 2006, and June 2007 (Attachment C).

Most of the constituents in the water delivered to our customers were reported as ND or "not detected." This generally means that the laboratory report indicated that the compound was not detected, but it could also mean that it was detected at a level less than the State's detection level for purposes of reporting (DLR).

GUIDELINES FOLLOWED

The Association of California Water Agencies (ACWA) formed a workgroup, which prepared guidelines for water utilities to use in preparing the PHG reports. These guidelines were used in the preparation of our report. No general guidelines are available from the state regulatory agencies.

ACWA's workgroup also prepared guidelines for water utilities to use in estimating the costs to reduce a constituent to the MCL. Attachment D provides cost estimates for the best treatment technologies, which are available today.

BEST AVAILABLE TREATMENT TECHNOLOGY AND COST ESTIMATES

Both the USEPA and DHS have adopted what are known as Best Available Technologies (BAT), which are the best known methods of reducing contaminant levels. Capital construction and operation and maintenance (O&M) costs can be estimated for such technologies. However, since many PHGs and 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 down to or near the PHG or MCLG. For example, USEPA sets the MCLG for potential cancer-causing chemicals 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 our drinking water sources at levels exceeding the PHG, or if no PHG, above the MCLG. The City, using multiple treatment methods approved by DHS, consistently delivers safe water at the lowest possible cost to our customers. Constituents that were detected in one or more of our drinking water sources at levels above the MCLs were reduced to acceptable levels. The health risk information for regulated constituents with MCLs, PHGs or MCLGs is provided in Attachment B.

- **Trichloroethylene (TCE)**

The PHG for trichloroethylene (TCE) is 0.0008 milligrams per liter (mg/L). The MCL or drinking water standard for TCE is 0.005 mg/L. TCE is a volatile organic compound (VOC) that has primarily been released into the environment by industries that use solvents.

In 2004 the City detected TCE in our Copelin Well during three different occasions at concentrations of 0.0015 mg/L, 0.002 mg/L, and 0.0019 mg/L. In 2006 the City detected TCE in Sunset Well at the level of 0.00157 mg/L.

The Sunset Reservoir acts as a blending facility for five wells, which includes Sunset, Copelin, Bangham, Garfield, and Villa wells. Groundwater from these wells is pumped directly into the reservoir where it is blended with imported water

purchased from the Metropolitan Water District of Southern California (MWD). Because there is no treatment of the groundwater entering the Sunset Reservoir, a small amount of VOCs - TCE and PCE - can enter the distribution system through the blended supply. At no time did the level of any individual VOC in the water distributed to customers exceed the MCL.

The category of health risk associated 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 for many years could experience an increased risk of getting cancer. DHS 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." This language is taken from the California Code of Regulations (CCR), Title 22, Section 64468.2. The numerical health risk of ingesting drinking water with TCE at the PHG is $1X10^{-6}$, or one additional theoretical cancer case in one million people drinking two liters of water a day for 70 years.

The Best Available Technology (BAT) for TCE to reduce the concentration is either Granular Activated Carbon (GAC) or Packed Tower Aeration (PTA). The estimated cost to install, lease and operate such a treatment system to treat Sunset Well, Bangham Well, and Copelin Well at the Sunset Reservoir that would reliably reduce the TCE level to 0.0008 mg/L would be approximately $1.80 per 1,000 gallons of treated water (using GAC treatment).

- **Tetrachloroethylene (PCE)**

The PHG for tetrachloroethylene (PCE) is 0.00006 mg/L and the California MCL is 0.005 mg/L. PCE is also a volatile organic compound that has been released into the environment by industries that use solvents.

PCE was detected in 2004 in Copelin Well at concentrations ranging from 0.0007 mg/L to 0.0025 mg/L. In 2005 PCE was detected in Sunset Well at a concentration of 0.00053 mg/L. All these measurements were below California MCL. DHS 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." This language is taken from the CCR, Title 22, Section 64468.2. The numerical health risk of ingesting drinking water with PCE at the PHG is $1X10^{-6}$.

As with TCE, the BAT for PCE to lower the level to the PHG is either Granular Activated Carbon (GAC) or Packed Tower Aeration (PTA). The estimated cost to install, lease and operate such a treatment system to treat Sunset Well and Copelin Well at the Sunset Reservoir that would reduce the PCE level (estimated 95% removal of PCE) would be approximately $1.80 per 1,000 gallons of treated water.

- **Total Coliform Bacteria**

Total coliform bacteria are measured at points in the City's distribution system. No more than 5% of all samples collected in a month can be positive for total coliforms. This defines the MCL. Although there is no PHG for total coliform bacteria, the MCLG is zero positive samples. The reason for the total coliform drinking water standard is to minimize the possibility of the water containing pathogens, which are organisms that cause waterborne disease. Because total coliform analysis 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 total coliforms.

During 2004-2006, the City collected between 130 and 168 samples each month for total coliform analysis. Occasionally, a sample was found to be positive for coliform bacteria, but follow-up actions were taken and repeat samples were negative. A maximum of 2% of these samples were positive in August 2004; 1% of these samples were positive in June 2005; and 2% of these samples were positive in June 2006.

Coliform bacteria are a group indicator organisms that are ubiquitous 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 with follow-up sampling. 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 water system will never have a positive sample.

The City is working closely with our regional water supplier, MWD, and has instituted new disinfection procedures to provide for a slightly higher disinfectant residual. MWD's disinfectant is chloramine, a combination of chlorine and ammonia. The City adds chlorine at our wells to ensure that the water served is microbiologically safe. The careful balance of treatment processes used is essential to continue supplying our customers with safe drinking water.

We have taken all of the steps described by DHS as "Best Available Technology" for coliform bacteria as described in the CCR, Title 22, Section 64447. These include: an effective cross-connection control program, to protect our wells and the distribution system from coliform contamination, maintenance of a disinfectant residual throughout our system, an effective monitoring and surveillance program, and maintaining positive pressures in our distribution system.

- **Nitrate**

Both the PHG and MCL for nitrate are set at 45 mg/L. Nitrate in drinking water at levels above the MCL is a health risk for infants of less than six months of age. High nitrate levels in drinking water can interfere with the capacity of an infant's blood to carry oxygen, resulting in a serious illness. Symptoms include shortness of breath and blueness of the skin. However, there is no health risk associated with drinking water that meets the nitrate MCL/PHG and it is considered safe for consumption. Nitrate contamination of the groundwater is a result of agricultural and residential use of fertilizers and septic systems.

In 2004-2006 the City detected nitrate in Villa Well once at 50.6 mg/L. The City operates Sunset Reservoir under a nitrate blending plan. This plan includes blending water from Bangham, Copelin, Sunset, Garfield, and Villa wells with MWD water which contains very low nitrates. This operation reduces the average concentration of nitrates in the City's distribution system.

BATs for nitrate removal are ion exchange and/or reverse osmosis. Of the two, ion exchange is the most cost effective. The estimated costs to install and operate a treatment system that lowers nitrate levels is $3.25 to $4.20 per 1,000 gallons of treated water.

- **Fluoride**

The PHG for fluoride is 1.0 mg/L and the MCL is 2.0 mg/L. The City has detected fluoride at a concentration of 1.0 mg/L or higher in eight wells. The levels detected were below the MCL at all times. Fluoride is naturally occurring in the Pasadena groundwater basin.

During the period 2004 to 2006, water from these wells was blended with MWD water, which has lower fluoride content at approximately 0.3 mg/L, before it is delivered to the customer. The health risk associated with excess fluoride is tooth mottling.

Starting October 2007, MWD will start fluoridating their water to 0.8 mg/L. The City anticipates providing water to its residents in the 0.8 mg/L to 1.2 mg/L range, thereby maintaining a level under the MCL.

BATs for fluoride removal are ion exchange, reverse osmosis, and/or electrodialysis. Of the three, ion exchange is the most cost effective. The costs to install and operate a treatment system that lowers fluoride levels below the PHG is estimated as a one time cost of $1,750 and an annual cost of $35.00 per customer.

- **Lead and Copper**

There are no MCLs for lead or copper. Instead, the 90th percentile value of all samples collected by the City from household taps cannot exceed an Action Level of 0.015 mg/L for lead and 1.3 mg/L for copper. The PHG for lead is 0.002 mg/L and for copper is 0.170 mg/L. Lead and copper can leach into drinking water through the City's and resident's plumbing systems.

The category of health risk associated with lead is damage to the kidneys or nervous system of humans. The category of health risk for copper is gastrointestinal irritation. The numerical health risk of ingesting drinking water with lead at the PHG is $3X10^{-7}$, or three additional theoretical cancer cases in ten million people drinking two liters of water a day for 70 years. For copper, the numerical cancer risk is "not applicable" (see Attachment B) because the risk is acute, not carcinogenic.

Based on extensive sampling of customers' homes identified as high risk (new plumbing installed with lead solder) for plumbing materials leaching into tap water, the City's 90th percentile value for lead measured in 2005 was 0.002 mg/L and 0.273 mg/L for copper.

All of the City's source water samples for lead and copper in 2005 were not detected below the detection level for purposes of reporting (DLR). Based on extensive sampling, the City's water system and water sources are in full compliance with the Federal and State Lead and Copper Rule. Therefore, we are deemed by DHS to have "optimized corrosion control" for our system. As a system, which is "optimized," we are required to start the next monitoring cycle for lead by May 2008.

In general, optimizing corrosion control is considered to be the BAT to deal with corrosion issues and with any lead or copper findings. We continue to monitor our water quality parameters that relate to corrosivity, such as the pH, hardness, alkalinity, total dissolved solids, and will take action if necessary to maintain our system in an "optimized corrosion control" condition.

Since we are meeting the "optimized corrosion control" requirements, it is not necessary or prudent to initiate additional corrosion control treatment as it involves the addition of other chemicals and additional water quality issues could be raised. Therefore, no estimate of cost has been included.

- **Arsenic**

The PHG for arsenic is 0.000004 mg/L. The California MCL for arsenic is 0.05 mg/L and the federal MCL is 0.01 mg/L. Arsenic is a metallic element and it is

both naturally occurring and released into the environment because of its use in agricultural pesticides and in chemicals for timber preservation.

Arsenic was detected once in August 2004 in the City's Villa Well at a concentration of 0.003 mg/L. This value is below both the State and federal MCLs but exceeded the PHG. Villa Well is blended with Bangham Well, Copelin Well, Sunset Well, Garfield Well, and MWD water in the Sunset Reservoir. This operation reduced the concentration of arsenic in the City's distribution system.

The category of health risk associated with arsenic is that people who drink water containing arsenic above the MCL for many years could experience an increased risk of getting cancer. The numerical health risk of ingesting drinking water with arsenic at the PHG is $4X10^{-6}$, or four additional theoretical cancer cases in one million people drinking two liters of water a day for 70 years.

The BATs for arsenic removal is either ion exchange and/or reverse osmosis. Ion exchange is the most cost effective of these two technologies. The estimated cost to install, lease and operate an ion exchange system that reduces arsenic levels is estimated at $1.10 million initial investment and $0.84 per 1,000 gallon of treated water.

- **Uranium**

The PHG for uranium is 0.43 picoCuries per liter (pCi/L) and the MCL is 20 pCi/L. Uranium is a metallic element which is weakly radioactive and naturally occurring in the environment.

PWP conducted monitoring of uranium in water samples collected from its wells. Uranium has been detected at a high level of 12 pCi/L in Chapman Well in 2004 and in Monte Vista Well at 4.7 pCi/L in both 2005 and 2006. The levels detected in our system were below the MCL at all times, but were over the PHGs.

OEHHA determined that the numerical cancer risk for uranium at the PHG level is $1x10^{-6}$. The DHS, which sets the drinking water standards, has determined that uranium is a health concern at certain levels of exposure. This radiological constituent is a naturally occurring contaminant in some groundwater and surface water supplies. Exposure to uranium in drinking water may result in toxic effects to the kidney. This constituent has also been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Constituents that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. DHS has set the drinking water standard for uranium at 20 pCi/L to reduce the risk of cancer or other adverse health affects that have been observed in laboratory animals.

The BAT identified to treat radiological contaminants is reverse osmosis (RO). The most effective and economical treatment system is to use RO treatment at select plant and surface water connection sites. We have determined to that the cost to install and operate an RO removal system to treat the wells and surface water connection in our system in order to meet the PHG levels would be approximately $30 million annually which includes construction and annual operational cost. This translates into an annual cost of $790 per customer.

- **Gross Alpha**

Although there is no PHG for gross alpha, the MCLG is 0 pCi/L and the MCL is 15 pCi/L. Gross alpha is a radiological compound that is naturally occurring in the environment.

PWP conducted monitoring of gross alpha particles in water samples collected from its wells. Gross alpha has been detected in Chapman Well at 6.8 pCi/L in March 2004 and at 5.8 pCi/L in August 2004. The levels detected in our system were below the MCL, but were over the zero level identified by USEPA as the MCLG.

Gross alpha has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed to high levels over their lifetimes. Constituents that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. DHS has set the drinking water standard for gross alpha at 15 pCi/L to reduce the risk of cancer or other adverse health affects that have been observed in laboratory animals.

As described above with uranium, the BAT for gross alpha is RO and is estimated at an annual cost of $790 per customer.

RECOMMENDATIONS FOR FURTHER ACTION

The drinking water quality of the City of Pasadena meets all State of California, Department of Health Services 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 established health-based Maximum Contaminant Levels 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.