

Agenda Report

August 23, 2004

TO: City Council
THROUGH: Municipal Services Committee
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 23, 2004 for the purpose of accepting and responding to public comments on the City of Pasadena's Report on Water Quality Public Health Goals (PHGs);
2. Accept the City of Pasadena's Report on Water Quality Public Health Goals; and
3. Declare the 2004 Report on Water Quality 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 California Environmental Quality Act (CEQA) Guidelines (actions by regulatory agencies for protection of the environment).

BACKGROUND

The water that Pasadena Water and Power 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 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 was enacted in 1996 by 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.

The City of Pasadena Water and Power (PWP) is required to prepare this report because during the period covered by the report, 2001-2003, there were instances when constituents were detected in the City's drinking water at levels above the PHG, or if no PHG, above the Maximum Contaminant Level Goals (MCLG). These constituents include trichloroethylene, carbon tetrachloride, tetrachloroethylene, total coliform bacteria, nitrate, fluoride, lead, copper, uranium, gross alpha, and combined radium.

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. 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. 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.

Section 116470 of the Health and Safety Code requires that public water systems with more than 10,000 service connections that exceed one or more PHGs prepare a report to inform the public regarding the PHG exceedances that occurred, and 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, 2004, and every three years thereafter, and that the public hearing should be held within a reasonable time after completion of the report.

PWP's PHG report provides the following information for all constituents detected in the water supply in years 2001, 2002 and 2003 at levels exceeding the applicable PHGs or Clogs.

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

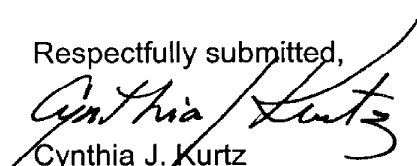
PWP's staff completed the PHG Report on June 28, 2004. Copies of the report have been made available for public inspection at PWP's administrative offices located at 150 South Los Robles Avenue, Suite 200.

The City's 2004 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

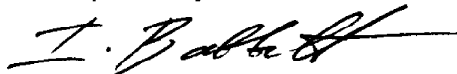
Acceptance of the Report will have no fiscal impact on the City. Acceptance of the Report is a formal legal requirement.

Respectfully submitted,



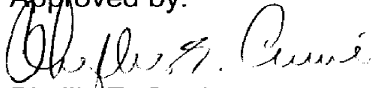
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PASADENA WATER AND POWER
REPORT ON CITY'S WATER QUALITY
RELATIVE TO
PUBLIC HEALTH GOALS

Background

The California legislature has established criteria for adopting Maximum Contaminant Levels (MCLs) in drinking water by creating the concept of a Public Health Goal (PHG). 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 (Attachment Number 1) requires that large water utilities (>10,000 service connections) prepare a special report by July 1, 2004 if their water quality measurements have exceeded any PHGs. The law also requires that where California Office of Environmental Health Hazard Assessment (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 Number 2 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.

The Health and Safety Code specifies the information that is to be provided in the report (Attachment Number 1). This report provides all of the required information except where such information is not available from the state agency that is charged with providing it to water suppliers.

This report provides the following information required by the law for any constituent detected in the City of Pasadena's (City) water supply in 2001, 2002, and 2003 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).
- PHGs are based solely on public health risk considerations. None of the risk-management factors that are considered by the USEPA or 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.

Water Quality Data Considered

All of the water quality data collected for our water system between 2001 and 2003 for purposes of determining compliance with drinking water standards was considered. This information was all summarized in our 2001, 2002 and 2003 Annual Water Quality Reports, which were mailed to all of our customers in June 2002, 2003 and 2004 (Attachment Number 4).

Most of the constituents in the water delivered to our customers are 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 Number 3 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 to the MCL. 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.

In 2001, the City provided the BAT for the removal of Volatile Organic Chemicals (VOC) via the Devil's Gate VOC Groundwater Treatment Plant (Plant). This Plant was designed to remove the trichloroethylene, tetrachloroethylene, 1,2-Dichloroethylene and carbon tetrachloride from the Arroyo Well, Ventura Well, Windsor Well and Well 52. These wells and the Plant were turned off on January 2002 due to perchlorate contamination.

Health Risk Categories and Cancer Risk Values

Chemical	Health Risk Category	California MCL (mg/L)	California PHG (mg/L)	USEPA MCLG (mg/L)	Cancer Risk @ PHG	Cancer Risk @ MCLG
TCE	Cancer	0.005	0.0008	0	1×10^{-6}	0
PCE	Cancer	0.005	0.00006	0	8×10^{-5}	0
Carbon Tet	Cancer	0.0005	0.0001	0	5×10^{-6}	0
1,2-Dichloro-ethylene (cis)	Chronic toxicity	0.006	none	0.07	NA	NA

Trichloroethylene (TCE)

The MCL or drinking water standard for TCE is 0.005 milligram per liter (mg/L). The PHG for TCE is 0.0008 mg/L. In 2001, the City provided BAT treatment via VOC Plant for removal of TCE in Ventura Well, Windsor Well and Well 52. In 2001 the City detected TCE in 5 of our wells; at a high concentration of 0.0100 mg/L in Copelin Well. In 2002-2003 the City detected TCE in Sunset and Copelin wells at the level of 0.0005 mg/L.

The Sunset Reservoir acts as a blending facility for five other wells. Groundwater from these wells is pumped directly into the reservoir where it is blended with imported water from Metropolitan Water District of Southern California (MWD). Because there is no treatment of the groundwater entering the Sunset Reservoir, a small amount of the 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 blended water 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 DHS Blue Book of drinking water law and regulations, Section 64468.2, Title 22, California Code of Regulations. The numerical health risk of ingesting drinking water with TCE at the PHG is 1×10^{-6} , or one additional theoretical cancer case in one million people drinking two liters of water a day for 70 years.

The BAT for TCE to lower the level below the MCL is either Granular Activated Carbon (GAC) or Packed Aeration Tower (PAT). 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 \$1.05 per 1,000 gallons of treated water (using GAC treatment).

Carbon Tetrachloride (CCl₄)

There is a California MCL for CCl₄ of 0.0005 mg/L. The PHG is 0.0001mg/L. In 2001, the City detected CCl₄ in Well 52 at a high concentration of 0.0032 mg/L. The category of health risk associated with CCl₄, and the reason that a drinking water standard was adopted for it, is that people who drink water containing CCl₄ 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 CCl₄." This language is taken from the DHS Blue Book of drinking water law and regulations, Section 64468.2, Title 22, CCR. The numerical health risk of ingesting drinking water with CCl₄ at the PHG is 5×10^{-6} , or five additional theoretical cancer cases in one million people drinking two liters of water a day for 70 years.

The BAT for CCl₄, to lower the level below the MCL, is either Granular Activated Carbon (GAC) or Packed Aeration Tower (PAT). In 2001 the City already provided BAT treatment via the VOC Plant for removal of CCl₄ in Ventura Well, Windsor Well and Well 52.

Tetrachloroethylene (PCE)

There is a California MCL of 0.005 mg/L for PCE. The PHG is 0.00006 mg/L. The MCLG for PCE, set by the USEPA, is zero. PCE was detected in 2001 in Ventura Well, Windsor Well, Well 52, Copelin Well, and Sunset Well at a high concentration of 0.004 mg/L in Copelin Well. In 2003 the City detected PCE in one well, Copelin Well with the concentration of 0.0006 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 DHS Blue Book of drinking water law and regulations, Section 64468.2, Title 22, CCR. The numerical health risk for a MCLG of zero is zero. The BAT for PCE to lower the level to zero is either Granular Activated Carbon (GAC) or Packed Aeration Tower (PAT). The same treatment process to remove TCE will also remove PCE. The City already provides PAT treatment at the VOC Treatment Plant for removal of PCE in Ventura Well, Windsor Well and Well 52.

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 \$1.05 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. The MCLG is zero positive samples. No PHG exists for total coliform bacteria. 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 2001-2003, the City collected between 130 and 159 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 check samples were negative. A maximum of 0.7% of these samples were positive in any month in 2001; 2.8% of these samples were positive in any month in 2002; 1.3% of these samples were positive in any month in 2003.

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 in Section 64447, Title 22, CCR. 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

The MCL and PHG for nitrate are set at 45 milligrams per liter (mg/L). Nitrate in drinking water at levels above the MCL of 45 mg/L 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, drinking water that meets the nitrate MCL/PHG is associated with little to no risk and is considered safe for consumption.

In 2001-2003 the City detected nitrate at a concentration 45 mg/L or higher in Sunset Well and Venura Vell (concentration of 56 mg/L was measured in Ventura Vell in 2001). To reduce nitrate concentration, Pasadena has increased the number of water sources with low or no nitrate levels that flow directly into Sunset Reservoir. The nitrate blending plan includes blending of water from Bangham, Copelin, Sunset, Garfield, and Villa wells with MWD water which contains very low nitrates. The construction of a new 16-inch pipeline, which collects water from Villa Well and Garfield Well and delivers that water to Sunset Reservoir; and installation of a low-head booster pump to pump up to 10 cubic feet per second of MWD water directly into Sunset Reservoir now allows reduction of the average concentration of nitrates in the City's distribution system. In year 2001 nitrate concentration in the distribution system was lowered to 22 mg/L, and to 11 mg/L in 2003.

BAT for nitrate removal are ion exchange 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 \$2.99-\$3.86 per 1,000 gallons of treated water.

Fluoride

The fluoride MCL set by the DHS is 2.0 mg/L. The PHG is 1.0 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. Water from these wells is blended with MWD water, which has lower fluoride content, before it is delivered to the customer. The category of health risk associated with fluoride is tooth mottling.

BAT for fluoride removal are ion exchange, reverse osmosis, and/or electro dialysis. Of the three, ion exchange is the most cost effective. The costs to install and operate a treatment system that lowers fluoride levels below PHG is estimated as one time cost of \$1,600.00 and an annual cost of \$32.00 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. The PHG for copper is 0.170 mg/L.

The category of health risk for lead is damage to the kidneys or nervous system of humans. The category of health risk for copper is gastrointestinal irritation. Numerical health risk data on lead and copper have been provided by OEHHA, the State agency responsible for providing that information. OEHHA determined that the numerical cancer risk was "not applicable" (see Attachment Number 3) 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 2002, was <0.005 mg/L and 0.14 mg/L for copper.

All of the City's source water samples for lead and copper in 2002 were less than the PHG. 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 2005.

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.

Uranium

PWP conducted monitoring of uranium in water samples collected from its wells. Uranium has been detected at a high level of 17.2 picoCuries per liter (pCi/L) in Copelin Well in Year 2003. The DHS MCL is 20 pCi/L and the PHG is 0.5 pCi/L. The levels detected in our system were below the MCL at all times, but were over the levels identified by USEPA as MCLGs.

The DHS, which sets drinking water standards, has determined that uranium is a health concern at certain levels of exposure. The USEPA revised their current regulation in December 2000 and proposed as MCLG of zero for uranium. 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 picoCuries per Liter (pCi/L) to reduce the risk of cancer or other adverse health affects that have been observed in laboratory animals.

Gross Alpha

PWP conducted monitoring of gross alpha particles in water samples collected from its wells. Gross alpha has been detected at high level of 3.1 pCi/L in Monte Vista Well. The MCL is 15 pCi/L and the MCLG is 0 pCi/L. The levels detected in our system were below the MCL at all times, but were over the levels identified by USEPA as MCLGs.

The DHS has determined that gross alpha is a health concern at certain levels of exposure. The USEPA revised their current regulation in December 2000 and proposed an MCLG of zero for gross alpha. This radiological constituent is a naturally occurring contaminant in some groundwater and surface water supplies. This constituent 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 picoCuries per Liter (pCi/L) to reduce the risk of cancer or other adverse health affects that have been observed in laboratory animals.

Combined Radium

Combined Radium has been detected at a high level of 0.8 pCi/L in Sunset and Copelin wells. MCL for combined radium is 5 pCi/L and the MCLG is 0 pCi/L. The levels detected in our system were below the MCL at all times, but were over the levels identified by USEPA as MCLGs.

The DHS has determined that combined radium is a health concern at certain levels of exposure. The USEPA revised their current regulation in December 2000 and proposed an MCLG of zero for total radium. This radiological constituent is a naturally occurring contaminant in some groundwater and surface water supplies. This constituent has 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 not set a drinking water standard for total radium.

The BAT identified to treat these radiological contaminants is Reverse Osmosis (RO) treatment. The most effective and economical treatment system is to use RO treatment at select plant and surface water connection sites. We have determined 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 \$27 million annually which include construction and annual operational cost. This translates into an annual cost of \$710 per customer.

Recommendations for Further Action

The drinking water quality of the City of Pasadena meets all State of California 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 MCL's 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.

ATTACHMENTS:

- Number 1 Excerpt from California Health and Safety Code: Section 116470(b)
- Number 2 List of Regulated Constituents with MCLs, PHGs or MCLGs
- Number 3 Cost Estimates for Treatment Technologies
- Number 4 City of Pasadena Water and Power Annual Water Quality Report
- Number 5 Acronyms

IB/hs