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

June 2013

SUMMARY

In 1996, US Congress amended the Safe Drinking Water Act (SDWA), adding a requirement that Public Water Systems (PWS) deliver an annual Consumer Confidence Report (CCR), similar to the Annual Water Quality Report (AWQR) that California water systems began distributing in 1990. The annual CCR lists:

- All drinking water potential "contaminants" *detected* during the previous calendar year. Presence of contaminants does not necessarily indicate the water poses a health risk
- The major sources of those detected contaminants in drinking water, and
- Health effect language for contaminants of concern.
- Water quality standard violations.

All Public Water Systems (PWS) monitor for tens of other constituents in their waters that are not regulated. In 1996, California Legislature under the Calderon-Sher Safe Drinking Water Act mandated that a brief written report be prepared and a public hearing be held every three (3) years if PWS *exceeded* certain specified Public Health Goals (PHG) or Maximum Contaminant Level Goals (MCLG).

This Triennial Report:

- Compares Ventura drinking water quality (for the past three years) to the goals adopted by the California Department of Public Health Services (CDPHS) and the United States Environmental Protection Agency (USEPA)
- Category or type of risk to health that could be associated with each constituent addressed
- Best Available Treatment (BAT) technology that could be used to reduce the constituent level, and
- An estimated cost to install treatment if it is appropriate and feasible

The City's water system complies with all of the health-based drinking water *standards* required by CDPHS and USEPA. A Maximum Contaminant level (MCL) is a mandatory and an enforceable standard of water quality and acceptability, which the City's water system routinely meets. State PHGs and Federal MCLGs differ from MCLs in that they are not enforceable and represent *goals* that would be ideal if cost was not a concern and near perfection was technically possible.

Out of 83 PHGs and 12 MCLGs, only eight (8) chemicals were identified in Ventura's water that exceed the goals. 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 those 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.

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 Public Health (CDPH) uses PHGs to identify MCLs that are to be reviewed for possible revision or when setting MCLs for unregulated chemicals.

A comparison of the Ventura Water's drinking water quality data with the PHGs and MCLGs was completed and the results are presented in this report. Only chemicals that have a California primary drinking water standard and for which a PHG or MCLG has been set and was exceeded are addressed in this report. **Attachment 3** is the OEHHA list of chemicals with PHGs. If OEHHA does not set a PHG for a primary drinking water standard, the state law would require the use of the EPAs Maximum Contaminant Level Goals (MCLGs).

Provisions of the California Health and Safety Code § 116470 (b) (**Attachment 1**) requires that large water utilities (>10,000 service connections) prepare a special report every three (3) years 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 2** is a list of all regulated constituents with MCLs and PHGs or MCLGs shown.

The information required in the report includes the following for any constituent detected in the City of Ventura's (City) water supply in 2010, 2011, and 2012 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.

<u>WHAT ARE PHGs?</u>

- PHGs are set by the California Office of Environmental Health Hazard Assessment (OEHHA), which is part of California EPA.
- PHGs are concentrations of contaminants in drinking water that pose no significant health risk if consumed for a lifetime.
- 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 from 2010, 2011 and 2012 for purposes of determining compliance with drinking water standards was considered. This information was all summarized in our 2010, 2011 and 2012 Annual Consumer Confidence Reports (CCR) on water quality, which were distributed by June of each year to all of our customers.

GUIDELINES FOLLOWED IN DETERMINING BEST AVAILABLE TREATMENT TECHNOLOGY AND COST ESTIMATES

The Office of Environmental Health Hazard Assessment California Environmental Protection Agency prepared guidelines for water utilities to use in preparing the PHG reports. These guidelines were used in the preparation of our report. **Attachment 3** provides cost estimates for the best treatment technologies, which are available today.

Both the USEPA and CDPH 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 or 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 CDPH, 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 2**.

Out of 83 PHGs and 12 MCLGs, only eight (8) constituents were identified that exceeded the goals as summarized below:

Chemicals (units)	**OEHHA PHG OR (EPA) (MCLG)**	**CDPH MCL or (EPA) (RAL)**	**City Level**
		(Mandates)	
Lead 90th Percentile (ppb) *Exceeded once in 2011*	.2	(15)	1
Copper 90th Percentile (ppb) *Exceeded once in 2011*	300	1300	1026

Uranium pCi/L surface water *Exceeded once in 2010, 2011,2012*	0.43	20	2.5
Uranium pCi/L groundwater *Exceeded once in 2010, 2011,2012*	0.43	20	7.34
Gross Alpha Particles pCi/L surface water *Exceeded once in 2010, 2011, 2012*	(0)	15	3.6
Gross Alpha Particles pCi/L Groundwater *Exceeded once in 2010, 2011, 2012*	(0)	15	9.89
Total Coliform *Exceeded once in 2012*	0	5%	>1%
Radium 226 pCi/L *Exceeded once in 2010, 2011, 2012*	.05 pCi/L	5	0.89

Ventura's drinking water exceeded six (6) PHGs including lead, copper, uranium, total coliform, radium 226, and two (2) MCLGs for gross alpha particles.

Lead and copper can accumulate in drinking water as a corrosion by-product that occurs as the result of the corrosion of plumbing fixtures and pipes that remain in contact with water for a prolonged period of time. Lead, a silverish metal, is often used by plumbing fixture manufacturers for bathroom and kitchen valves to extend their use for many years. Copper, a reddish-brown metal, is often used in water pipes for residential and commercial plumbing. When sampled for lead and copper, Ventura's water sources including groundwater wells, the Ventura River and Casitas Municipal Water District (CMWD), have concentrations well below the RAL for lead and copper.

Gross alpha particles and radium 226 and uranium are naturally occurring radioactive isotopes in the environment that typically occur in the drinking water by the erosion of natural deposits in all City sources. Gross alpha particles are screening tools for the presence of regulated radionuclides.

Total Coliforms are a broad class of bacteria found in our environment. Water systems use total coliforms as an indicator for the potential presence of harmful bacteria. Investigative sampling indicated that there was not a presence of harmful bacteria in our water system.

CATEGORY/TYPE OF RISK TO HEALTH ASSOCIATED WITH PHG EXCEEDANCE

Lead has health effects that are most severe for infants and children, whose exposure to high levels of lead in drinking water can result in delays in physical or mental development. For adults, it can result in kidney problems or high blood pressure. Although the main sources of exposure to lead are ingesting paint chips and inhaling dust, the EPA estimates that 10 to 20 percent of human exposure to lead may come from lead in drinking water. Infants who consume mostly mixed formula can receive 40 to 60 percent of their exposure to lead from drinking water. Carcinogenic effects from lead have not been confirmed but are likely.

Copper is an essential nutrient, required by the body in very small amounts; however, the EPA has found copper to potentially cause the following health effects when people are exposed to it at levels above the Action Level. Short periods of exposure can cause gastrointestinal disturbance, including nausea and vomiting. Use of water that exceeds the RAL over many years could cause liver or kidney damage. People with Wilson's disease may be more sensitive than others to the effect of copper contamination and should consult their health care provider. Copper is considered a non-carcinogenic chemical in drinking water.

Radioactivity (gross alpha radioactivity, gross beta radioactivity, radium 226 and uranium) - Gross alpha & beta particles and radiation from radium 226 are carcinogenic (can cause cancer). No information is available on the short-term non-cancer effects for these radiological chemicals. Oral exposure to Radium is known to cause bone, head, and nasal passage tumors in humans. Noncarcinogenic effects of uranium on the kidneys and a lesser extent on the liver have also been documented.

Total Coliforms - Most coliform bacteria do not cause illness. However, their presence in a water system is a public health concern because of the potential for disease-causing strains of bacteria, viruses, and protozoa to also be present. Waterborne disease from these organisms typically involves flu-like symptoms such as nausea, vomiting, fever, and diarrhea. There is known relation to cancer.

BEST TREATMENT TECHNOLOGIES AVAILABLE THAT COULD BE USED TO REDUCE THE PHG EXCEEDANCE

Lead & Copper Treatment

The EPA and CDPHS primary drinking water regulations require public water systems to minimize lead and copper contamination resulting from the corrosion of plumbing materials commonly found in the home. Municipal corrosion control treatment is considered to be the best available technology for reducing lead and copper in drinking water. An Overview of AWWARF Research provides current information available on the subject.

The required Regulatory Action Levels (RAL) for lead and copper in drinking water are 15 ppb, and 1300 ppb, respectively. The RAL is determined by ranking water samples in order of values taken at 50 household taps to indicate the fifth highest level (the 90th percentile value). Residential customers that have copper pipes and have the greatest potential for corrosion to occur are asked to take the samples. The samples are drawn after the tap water has set in the customer's pipes for at least six hours. The 90th percentile levels for lead and copper in Ventura were 9 ppb and 1090 ppb, respectively. These levels are below the RAL and are in compliance with the primary drinking water standard. The City is also in compliance with the EPA requirement to have "optimized corrosion control treatment" for Ventura's water system.

Appropriate actions are currently being taken by the City to maintain optimized corrosion control conditions by adding a polyphosphate corrosion inhibitor. The City's state certified lab monitors drinking water quality parameters relative to the corrosiveness of the water supply, such as pH, hardness, alkalinity, total dissolved solids and the corrosion indices.

Radiological Chemical Treatment

Best available treatment technologies that can be used to reduce the concentration of gross alpha & beta particles radium 226, and uranium is reverse osmosis.

Coliform Bacteria Treatment

Best available treatment technologies that can be used for prevention of total coliform is a constant disinfectant residual such as Chlorine or Chloramines and proper sampling procedures.

RECOMMENDATIONS FOR FURTHER ACTION

The drinking water quality of the City of Ventura meets all State of California, Department of Public 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 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

1. Excerpt from California Health and Safety Code: Section 116470(b)
2. List of Regulated Constituents with MCLs, PHGs or MCLGs
3. Cost Estimates for Treatment Technologies
4. Acronyms

ATTACHMENT #1

CALIFORNIA HEALTH AND SAFETY CODE

Health and Safety Code
Section 116470

116470. (a) As a condition of its operating permit, every public water system shall annually prepare a consumer confidence report and mail or deliver a copy of that report to each customer, other than an occupant, as defined in Section 799.28 of the Civil Code, of a recreational vehicle park. A public water system in a recreational vehicle park with occupants as defined in Section 799.28 of the Civil Code shall prominently display on a bulletin board at the entrance to or in the office of the park, and make available upon request, a copy of the report. The report shall include all of the following information:

(1) The source of the water purveyed by the public water system.

(2) A brief and plainly worded definition of the terms "maximum contaminant level," "primary drinking water standard," and "public health goal."

(3) If any regulated contaminant is detected in public drinking water supplied by the system during the past year, the report shall include all of the following information:

(A) The level of the contaminant found in the drinking water, and the corresponding public health goal and primary drinking water standard for that contaminant.

(B) Any violations of the primary drinking water standard that have occurred as a result of the presence of the contaminant in the drinking water and a brief and plainly worded statement of health concerns that resulted in the regulation of that contaminant.

(C) The public water system's address and phone number to enable customers to obtain further information concerning contaminants and potential health effects.

(4) Information on the levels of unregulated contaminants, if any, for which monitoring is required pursuant to state or federal law or regulation.

(5) Disclosure of any variances or exemptions from primary drinking water standards granted to the system and the basis therefore.

(b) On or before July 1, 1998, and every three years thereafter, public water systems serving more than 10,000 service connections that detect one or more contaminants in drinking water that exceed the applicable public health goal, shall prepare a brief written report in plain language that does all of the following:

(1) Identifies each contaminant detected in drinking water that exceeds the applicable public health goal.

(2) Discloses the numerical public health risk, determined by the office, associated with the maximum contaminant level for each contaminant identified in paragraph (1) and the numerical public health risk determined by the office associated with the public health goal for that contaminant.

(3) Identifies the category of risk to public health, including, but not limited to, carcinogenic, mutagenic, teratogenic, and acute toxicity, associated with exposure to the contaminant in drinking water, and includes a brief plainly worded description of these terms.

(4) Describes the best available technology, if any is then available on a commercial basis, to remove the contaminant or reduce the concentration of the contaminant. The public water system may, solely at its own discretion, briefly describe actions that have been taken on its own, or by other entities, to prevent the introduction of the contaminant into drinking water supplies.

(5) Estimates the aggregate cost and the cost per customer of utilizing the technology described in paragraph (4), if any, to reduce the concentration of that contaminant in drinking water to a level at or below the public health goal.

(6) Briefly describes what action, if any, the local water purveyor intends to take to reduce the concentration of the contaminant in public drinking water supplies and the basis for that decision.

(c) Public water systems required to prepare a report pursuant to subdivision (b) shall hold a public hearing for the purpose of accepting and responding to public comment on the report. Public water systems may hold the public hearing as part of any regularly scheduled meeting.

(d) The department shall not require a public water system to take any action to reduce or eliminate any exceedance of a public health goal.

(e) Enforcement of this section does not require the department to amend a public water system's operating permit.

(f) Pending adoption of a public health goal by the Office of Environmental Health Hazard Assessment pursuant to subdivision (c) of Section 116365, and in lieu thereof, public water systems shall use the national maximum contaminant level goal adopted by the United States Environmental Protection Agency for the corresponding contaminant for purposes of complying with the notice and hearing requirements of this section.

(g) This section is intended to provide an alternative form for the federally required consumer confidence report as authorized by 42 U.S.C. Section 300g- 3(c).

ATTACHMENT #2

LIST OF REGULATED CONSTITUENTS with MCLs, PHGs or MCLGs
MCLs, DLRs and PHGs for Regulated Drinking Water Contaminants
Last Update: February 2013

The following table includes:

CDPH's detection limits for purposes of reporting (DLRs)
(All Units are in milligrams per liter (mg/L), unless otherwise noted.)

	MCL	**DLR**	**PHG or (MCLG)**	**Date of PHG**
Chemicals with MCLs in 22 CCR §64431—Inorganic Chemicals				
Aluminum	1	0.05	0.6	2001
Antimony	0.006	0.006	0.02[a]	1997
Arsenic	0.010	0.002	0.000004	2004
Asbestos (MFL = million fibers per liter; for fibers >10 microns long)	7 MFL	0.2 MFL	7 MFL	2003
Barium	1	0.1	2	2003
Beryllium	0.004	0.001	0.001	2003
Cadmium	0.005	0.001	0.00004	2006
Chromium, Total - OEHHA withdrew the 0.0025-mg/L PHG	0.05	0.01	Withdrawn Nov. 2001	1999
Chromium-6 - MCL to be established - currently regulated under the total chromium MCL	--	*0.001*	*0.00006*[b]	
Cyanide	0.15	0.1	0.15	1997
Fluoride	2	0.1	1	1997
Mercury (inorganic)	0.002	0.001	0.0012	1999 (rev2005
Nickel	0.1	0.01	0.012	2001
Nitrate (as NO3)	45	2	45	1997
Nitrite (as N)	1 as N	0.4	1 as N	1997
Nitrate + Nitrite	10 as N	--	10 as N	1997
Perchlorate	0.006	0.004	0.006	2004
Selenium	0.05	0.005	(0.05)	--
Thallium	0.002	0.001	0.0001	1999 (rev2004
Copper and Lead, 22 CCR §64672.3				
Values referred to as MCLs for lead and copper are not actually MCLs; instead, they are called "Action Levels" under the lead and copper rule				
Copper	1.3	0.05	0.3	2008
Lead	0.015	0.005	0.0002	2009
Radionuclides with MCLs in 22 CCR §64441 and §64443—Radioactivity				
[units are picocuries per liter (pCi/L), unless otherwise stated; n/a = not applicable]				
Gross alpha particle activity - OEHHA concluded in 2003 that a PHG was not practical	15	3	(zero)	n/a

MCLs, DLRs and PHGs for Regulated Drinking Water Contaminants
Last Update: February 2013

	State MCL	DLR	PHG or (MCLG)	Date of PHG
Gross beta particle activity – OEHHA concluded in 2003 that PHG was not practical	4 mrem/yr	4	(zero)	n/a
Radium-226	--	1	0.05	2006
Radium-228	--	1	0.019	2006
Radium-226 + Radium-228 (addressed together as one MCL)	5	--	--	--
Strontium-90	8	2	0.35	2006
Tritium	20,000	1,000	400	2006
Uranium	20	1	0.43	2001
Chemicals with MCLs in 22 CCR §64444—Organic Chemicals				
(a) Volatile Organic Chemicals (VOCs)				
Benzene	0.001	0.0005	0.00015	2001
Carbon tetrachloride	0.0005	0.0005	0.0001	2000
1 ,2-Dichlorobenzene	0.6	0.0005	0.6	1997 (rev2009)
1,4-Dichlorobenzene (p-DCB)	0.005	0.0005	0.006	1997
1,1-Dichloroethane (1,1-DCA)	0.005	0.0005	0.003	2003
1,2-Dichloroethane (1,2-DCA)	0.0005	0.0005	0.0004	1999 (rev2005)
1,1-Dichloroethylene (1,1-DCE)	0.006	0.0005	0.01	1999
cis-1 ,2-Dichloroethylene	0.006	0.0005	0.1	2006
trans-1 ,2-Dichloroethylene	0.01	0.0005	0.06	2006
Dichloromethane (Methylene chloride)	0.005	0.0005	0.004	2000
1 ,2-Dichloropropane	0.005	0.0005	0.0005	1999
1 ,3-Dichloropropene	0.0005	0.0005	0.0002	1999 (rev2006)
Ethylbenzene	0.3	0.0005	0.3	1997
Methyl tertiary butyl ether (MTBE)	0.013	0.003	0.013	1999
Monochlorobenzene	0.07	0.0005	0.2	2003
Styrene	0.1	0.0005	(0.1)[c]	
1,1,2,2-Tetrachloroethane	0.001	0.0005	0.0001	2003
Tetrachloroethylene (PCE)	0.005	0.0005	0.00006	2001
Toluene	0.15	0.0005	0.15	1999
1,2,4-Trichlorobenzene	0.005	0.0005	0.005	1999
1,1,1-Trichloroethane (1,1,1-TCA)	0.2	0.0005	1	2006
1,1,2-Trichloroethane (1,1,2-TCA)	0.005	0.0005	0.0003	2006
Trichloroethylene (TCE)	0.005	0.0005	0.0017	2009
Trichlorofluoromethane (Freon 11)	0.15	0.005	0.7	1997
1 ,1,2-Trichloro-1 ,2,2-Trifluoroethane (Freon 113)	1.2	0.01	4	1997
Vinyl chloride	0.0005	0.0005	0.00005	2000
Xylenes	1.75	0.0005	1.8	1997
(b) Non-Volatile Synthetic Organic Chemicals (SOCs)				
Alachlor	0.002	0.001	0.004	1997
Atrazine	0.001	0.0005	0.00015	1999

MCLs, DLRs and PHGs for Regulated Drinking Water Contaminants
Last Update: February 2013

	State MCL	DLR	PHG or (MCLG)	Date of PHG
Bentazon	0.018	0.002	0.2	1999 (rev200
Benzo(a)pyrene	0.0002	0.0001	0.000004[d]	1997
Carbofuran	0.018	0.005	0.0017	2000
Chlordane	0.0001	0.0001	0.00003	1997 (rev200
Dalapon	0.2	0.01	0.79	1997 (rev200
1 ,2-Dibromo-3-chloropropane (DBCP)	0.0002	0.00001	1 .7E-06	1999
2,4-Dichlorophenoxyacetic acid (2,4-D)	0.07	0.01	0.02	2009
Di(2-ethylhexyl)adipate	0.4	0.005	0.2	2003
Di(2-ethylhexyl)phthalate (DEHP)	0.004	0.003	0.012	1997
Dinoseb	0.007	0.002	0.014	1997
Diquat	0.02	0.004	0.015	2000
Endrin	0.002	0.0001	0.0018	1999 (rev200
Endothal	0.1	0.045	0.58	1997
Ethylene dibromide (EDB)	0.00005	0.00002	0.00001	2003
Glyphosate	0.7	0.025	0.9	2007
Heptachlor	0.00001	0.00001	0.000008	1999
Heptachlor epoxide	0.00001	0.00001	0.000006	1999
Hexachlorobenzene	0.001	0.0005	0.00003	2003
Hexachlorocyclopentadiene	0.05	0.001	0.05	1999
Lindane	0.0002	0.0002	0.000032	1999 (rev200
Methoxychlor	0.03	0.01	0.03	1999
Molinate	0.02	0.002	0.001	2008
Oxamyl	0.05	0.02	0.026	2009
Pentachlorophenol (PCP)	0.001	0.0002	0.0003	2009
Picloram	0.5	0.001	0.5	1997
Polychlorinated biphenyls (PCBs)	0.0005	0.0005	0.00009	2007
Simazine	0.004	0.004	0.004	2001
2,4,5-TP (Silvex)	0.05	0.001	0.025	2003
2,3,7,8-TCDD (dioxin)	$3x10^{-8}$	$5x10^{-9}$	(0)[e]	
Thiobencarb	0.07	0.001	0.07	2000
Toxaphene	0.003	0.001	0.00003	2003
Chemicals with MCLs in 22 CCR §64533—Disinfectant Byproducts				
Total Trihalomethanes[f]	0.08	--	--	--
Bromodichloromethane	--	0.0005	(zero)	
Bromoform	--	0.0005	(zero)	
Chloroform	--	0.0005	(0.07)	
Dibromochloromethane	--	0.0005	(0.06)	
Total Haloacetic Acids	0.06	--	--	--
Monochloroacetic acid		0.002	(0.07)	
Dichloroacetic acid		0.001	(zero)	
Trichloroacetic acid		0.001	(0.02)	
Bromoacetic acid		0.001	--	
Dibromoacetic acid		0.001	--	

MCLs, DLRs and PHGs for Regulated Drinking Water Contaminants
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	State MCL	DLR	PHG or (MCLG)	Date of PHG
Bromate	0.010	0.005	0.0001	2009
Chlorite	1	0.02	0.05	2009
Microbiological Contaminants (TT = Treatment Technique)				
Coliform % positive samples	%	5		(zero)
Cryptosporidium**		TT		(zero)
Giardia Lamblia		TT		(zero)
Legionella		TT		(zero)
Viruses		TT		(zero)

ATTACHMENT #3

Reference: 2010 ACWA Cost of Treatment Table, Costs Revised for 2012

COST ESTIMATES FOR TREATMENT TECHNOLOGIES
(INCLUDES ANNUALIZED CAPITAL AND O&M COSTS)

No.	Treatment Technology	Source of Information	***Estimated 2012 * Unit Cost*** *(S/1,000 gallons treated)*
1	Granular Activated Carbon	Reference: Malcolm Pirnie estimate for California Urban Water Agencies, large surface water treatment plants treating water from the State Water Project to meet Stage 2 D/DBP and bromate regulation, 1998	0.53-1.00
2	Granular Activated Carbon	Reference: Carollo Engineers, estimate for VOC treatment (PCE), 95% removal of PCE, Oct. 1994, 1900 gpm design capacity	0.24
3	Granular Activated Carbon	Reference: Carollo Engineers, est. for a large No. Calif. surf. Water treatment plant (90 mgd capacity) treating water from the State Water Project, to reduce THM precursors, ENR construction cost index = 6262 (San Francisco area) - 1992	1.16
4	Granular Activated Carbon	Reference: CH2M Hill study on San Gabriel Basin, for 135 mgd central treatment facility for VOC and SOC removal by GAC, 1990	0.45-0.66
5	Granular Activated Carbon	Reference: Southern California Water Co. - actual data for "rented" GAC to remove VOCs (1,1-DCE), 1.5 mgd capacity facility, 1998	2.08
6	Granular Activated Carbon	Reference: Southern California Water Co. - actual data for permanent GAC to remove VOCs (TCE), 2.16 mgd plant capacity,1998	1.35
7	Reverse Osmosis	Reference: Malcolm Pirnie estimate for California Urban Water Agencies, large surface water treatment plants treating water from the State Water Project to meet Stage 2 D/DBP and bromate regulation, 1998	1.56-2.99
8	Reverse Osmosis	Reference: Boyle Engineering, RO cost to reduce 1000 ppm TDS in brackish groundwater in SO. Calif., 1.0 mgd plant operated at 40% of design flow, high brine line cost, May 1991	3.69
9	Reverse Osmosis	Reference: Boyle Engineering, RO cost to reduce 1000 ppm TDS in brackish groundwater in So. Calif., 1.0 mgd plant operated at 100% of design flow, high brine line cost, May 1991	2.27
10	Reverse Osmosis	Reference: Boyle Engineering, RO cost to reduce 1000 ppm TDS in brackish groundwater in So. Calif., 10.0 mgd plant operated at 40% of design flow, high brine line cost, May 1991	2.46

11	Reverse Osmosis	Reference: Boyle Engineering, RO cost to reduce 1000 ppm TDS in brackish groundwater in So. Calif., 10.0 mgd plant operated at 100% of design flow, high brine line cost, May 1991	1.9
12	Reverse Osmosis	Reference: Arsenic Removal Study, City of Scottsdale, AZ - CH2M Hill, for a 1.0 mgd plant operated at 40% of design capacity, Oct.1991	6.17
13	Reverse Osmosis	Reference: Arsenic Removal Study, City of Scottsdale, AZ - CH2M Hill, for a 1.0 mgd plant operated at 100% of design capacity, Oct. 1991	3.64
14	Reverse Osmosis	Reference: Arsenic Removal Study, City of Scottsdale, AZ - CH2M Hill, for a 10.0 mgd plant operated at 40% of design capacity, Oct.1991	2.73
15	Reverse Osmosis	Reference: Arsenic Removal Study, City of Scottsdale, AZ - CH2M Hill, for a 10.0 mgd plant operated at 100% of design capacity, Oct.1991	1.69
16	Reverse Osmosis	Reference: CH2M Hill study on San Gabriel Basin, for 135 mgd central treatment facility with RO to remove nitrate, 1990	1.70-2.99
17	Packed Tower Aeration	Reference: Analysis of Costs for Radon Removal…(AWWARF publication), Kennedy/Jenks, for a 1.4 mgd facility operating at 40% of design capacity, Oct. 1991	0.98
18	Packed Tower Aeration	Reference: Analysis of Costs for Radon Removal…(AWWARF publication), Kennedy/Jenks, for a 14.0 mgd facility operating at 40% of design capacity, Oct. 1991	0.52
19	Packed Tower Aeration	Reference: Carollo Engineers, estimate for VOC treatment (PCE) by packed tower aeration, without off-gas treatment, O&M costs based on operation during 329 days/year at 10% downtime, 16 hr/day air stripping operation, 1900 gpm design capacity, Oct. 1994	0.26
20	Packed Tower Aeration	Reference: Carollo Engineers, for PCE treatment by Ecolo-Flo Enviro-Tower air stripping, without off-gas treatment, O&M costs based on operation during 329 days/year at 10% downtime, 16 hr/day air stripping operation, 1900 gpm design capacity, Oct. 1994	0.27
21	Packed Tower Aeration	Reference: CH2M Hill study on San Gabriel Basin, for 135 mgd central treatment facility - packed tower aeration for VOC and radon removal, 1990	0.42-0.69
22	Advanced Oxidation Processes	Reference: Carollo Engineers, estimate for VOC treatment (PCE) by UV Light, Ozone, Hydrogen Peroxice, O&M costs based on operation during 329 days/year at 10% downtime, 24 hr/day AOP operation,1900 gpm capacity, Oct. 1994	0.51
23	Ozonation	Reference: Malcolm Pirnie estimate for CUWA, large surface water treatment plants using ozone to treat water from the State Water Project to meet Stage 2 D/DBP and bromate regulation,*Cryptosporidum* inactivation requirements, 1998	0.12-0.24

24	Ion Exchange	Reference: CH2M Hill study on San Gabriel Basin, for 135 mgd central treatment facility - ion exchange to remove nitrate, 1990	0.57-0.74

Note:
Costs were adjusted from date of original estimates to present, where appropriate, using Engineering News Record (ENR) building costs index (20-city average) from Dec 2012.

ATTACHMENT #4

ACRONYMS

Public Health Goal Report Acronyms

ACWA	Association of California Water Agencies
BAT	Best Available Technology
CCR	California Code of Regulations
CDPH	California Department of Public Health
DLR	Detection Level for Purposes of Reporting
GAC	Granular Activated Carbon
PHG	Public Health Goal
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
mg/L	Milligrams per liter
MWD	Metropolitan Water District of Southern California
OEHHA	California EPA Office of Environmental Health Hazard Assessment
O&M	Operation and Maintenance
PCE	Tetrachloroethylene
pCi/L	picoCuries per liter
PTA	Packed Tower Aeration
RO	Reverse Osmosis
TCE	Trichloroethylene
TTHM	Total Trihalomethanes
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound