2016 Report

WATER QUALITY RELATIVE TO PUBLIC HEALTH GOALS

June 2016

PADRE DAM
Municipal Water District

Background
SB 1307, added to the California Health and Safety Code in 1997, specifies that water utilities with more than 10,000 service connections prepare a special report if their water quality measurements have exceeded any Public Health Goal (PHG) established by the California Environmental Protection Agency, or in the absence of a PHG, the Maximum Contaminant Level Goal (MCLG) established by the United States Environmental Protection Agency (USEPA).

The report must be completed by July 1 every three years, beginning in 1998, and must be followed by a public hearing for the purpose of accepting and responding to public comment on the report. This public hearing will be scheduled as part of Padre Dam Municipal Water District's regular Board meeting on July 20, 2016, and will be noticed as required.

Padre Dam's water supply complies with all of the health-based drinking water standards and maximum contaminant levels (MCLs) required by the California State Water Resources Control Board, Division of Drinking Water (DDW) and the USEPA.

Reporting Requirements
The California Health and Safety Code, Section 116470 (b) (SB 1307) specifies that this report must include (See Attachment 1):

- Identify any constituent in Padre Dam's water supply between 2013 and 2015 exceeding an applicable PHG or MCLG;
- Include the category or type of health risk that could be associated with each identified constituent;
- Include the numerical public health risk associated with the PHG, MCLG or Maximum Contaminant Level (MCL);
- Identify the best treatment technology available to reduce the constituent level;
- Estimate the cost to install that treatment if it is appropriate and feasible.

The report only addresses constituents which have a California Primary Drinking Water Standard for which either a PHG or MCLG has been set (See Attachment 2). There are constituents, such as Total Trihalomethanes, for which the California Environmental Protection Agency (Cal/EPA) or USEPA have not yet adopted a PHG or MCLG. The few constituents in this category are routinely detected in water systems, but usually at levels well below drinking water standards. These constituents will be addressed when a PHG is adopted.

Public Health Goals
PHGs are set by the California Office of Environmental Health Hazard Assessment (OEHHA), which is part of Cal/EPA, and are based solely on public health risk considerations. None of the practical risk-management factors – including detection capability, available treatment technology, and costs versus benefits -- that are considered by the USEPA or the DDW in setting drinking water standards (MCLs) are considered in setting the PHGs. 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 Used
Padre Dam receives its water supply from four treatment facilities: Metropolitan Water District of Southern California's (MWD) Skinner Water Treatment Plant, Helix Water District's (Helix) R. M.

Levy Treatment Plant, the San Diego County Water Authority's (SDCWA) Twin Oaks Valley Treatment Plant and the Claude "Bud" Lewis Carlsbad Desalination Plant.

This report is based on all water quality data collected by Padre Dam from our distribution system and our water suppliers from 2013 through 2015 to determine compliance with drinking water standards. This data was summarized in Padre Dam's 2013, 2014 and 2015 Water Quality Reports.

Guidelines Followed

Padre Dam used the guidelines developed by The Association of California Water Agencies (ACWA) to prepare this report.

Best Available Treatment Technologies and Cost Estimates

Both the USEPA and the DDW adopt Best Available Technologies (BATs), the best practices available to reduce contaminant levels to the MCL, the highest level of a contaminant allowed in drinking water. Data is available to estimate the cost of installing these technologies. (See Attachment 3)

It is not always possible or feasible, however, to determine what treatment and technology is needed to reduce a constituent level to the PHG or MCLG, which is set much lower than the MCL, and is often set at zero. Estimating the costs to reduce a constituent to zero is difficult, if not impossible, because analytical means to verify that the level has been lowered to zero may not be available. In some cases, installing treatment to 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 MCLG

The following constituents were detected in Padre Dam's drinking water supply at some point between 2013 and 2015 at levels above the PHG, or if no PHG, above the MCLG.

Total Coliform Bacteria

Coliform bacteria exist naturally and are not generally considered harmful. They are monitored because they are indicator organisms. If a positive sample is found, it indicates the possibility of a bacterial organism in the water and needs to be further investigated. It is not at all unusual for a water system to have an occasional positive sample. It is difficult, if not impossible, to assure that a system will never have a positive sample.

The MCL for coliform is 5%, which means that a maximum of 5% of water samples per month can be positive for coliform. The MCLG is zero. The reason for the coliform drinking water standard is to minimize the possibility of the water containing pathogens -- 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 are unable to do so with coliforms.

In 2013, Padre Dam collected between 104 and 130 samples per month for coliform analysis. Occasionally, a sample was found to be positive for coliform bacteria but recheck samples were negative and follow-up actions were taken. A maximum of 0.93% of monthly samples were positive in any month. The bacterial organism, E. Coli, was not detected in any samples.

In 2014, Padre Dam collected between 104 and 139 samples per month. Occasionally, a sample was found to be positive for coliform bacteria but recheck samples were negative and follow-up actions were taken. A maximum of 0.83% of monthly samples were positive in any month. The bacterial organism, E. Coli, was not detected in any samples.

In 2015, Padre Dam collected between 104 and 139 samples per month for coliform analysis. Occasionally, a sample was found to be positive for coliform bacteria but recheck samples were negative and follow-up actions were taken. A maximum of 2.63% of monthly samples were positive in any month. The bacterial organism, E. Coli, was not detected in any samples.

Padre Dam has taken all of the steps described by DDW as Best Available Technology (BATs) for coliform bacteria in Section 64447, Title 22, CCR.

We have worked closely with our regional treated water suppliers, Metropolitan Water District of Southern California, San Diego County Water Authority and Helix Water District, to ensure potable water received through our local suppliers meets the highest water quality standards. 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.

In addition, Padre Dam has implemented an effective cross-connection control program and a comprehensive monitoring and security system to protect the integrity of Padre Dam's water distribution system and the quality of water delivered to our customers. Lastly, we work to maintain positive water pressure and adequate disinfectant residual throughout the system.

Arsenic

Arsenic is a naturally occurring element in the earth's crust and is very widely distributed in the environment. All humans are exposed to microgram quantities of arsenic (inorganic and organic) largely from food (25 to 50 µg/day) and to a lesser degree from drinking water and air. In certain geographical areas, natural mineral deposits may contain large quantities of arsenic and this may result in higher levels of arsenic in water.

The MCL for arsenic is 10 ppb, the PHG and MCLG for arsenic is 0.004 ppb. Arsenic was detected at the SDCWA Twin Oaks Valley Plant in a Single Sample in 2013 (2 ppb), 2014 (3.4 ppb) and 2015 (3 ppb). The Helix Levy Plant reported a range of Non Detect – 2.5 for Arsenic levels in 2013. Arsenic was not detected in samples from MWD, or Carlsbad water supplies.

The OEHHA has set the PHG at 4 ppt (0.004 ppb). The category of health risk for Arsenic is carcinogenicity. Carcinogenic risk means capable of producing cancer. The PHG is based on a level that will result in not more than 1 excess cancer in 1 million people who drink 2 liters daily of this water for 70 years. The actual cancer risk may be lower or zero.

Reverse osmosis (RO) is one of the most effective BATs that is used to reduce levels below the MCLG. It would be difficult to measure RO's effectiveness in meeting PHG levels because the DLR (2ppb) for arsenic is greater than the PHG limit (0.004ppb). Padre Dam does not treat our potable water and therefore would have to rely on MWD, Helix and SDCWA treatment facilities to add this process. The estimated cost for reverse osmosis for arsenic removal is $1.68 - $3.22 per 1,000 gallons of water treated. This would be approximately $4.9 - $9.4 million dollars per year for water that Padre Dam purchases or approximately $220 - $422 per Padre Dam water customer each year.

Gross Alpha
Radionuclides such as alpha in water supplies are from erosion of natural deposits. The term radionuclide refers to naturally occurring elemental radium, radon, uranium, and thorium with unstable atomic nuclei that spontaneously decay producing ionizing radiation. Gross alpha is defined as the sum total of these radionuclides.

The EPA's Maximum Contaminant Level Goal (MCLG) for gross alpha particle activity is 0 and the California MCL is 15 pCi/L(picocuries per liter of water). The charts below show results for gross alpha.

Skinner Treatment Plant (MWD)

	Units	PHG/MCLG	MCL	Range	Average
2013				ND – 3	ND
2014	pCi/L	(0)	15	ND – 5	ND
2015				ND – 5	ND

The health risk category for Gross Alpha is carcinogenicity. The MCLG for Gross Alpha is zero (0) therefore the cancer risk at the MCLG is zero.

Reverse osmosis is the BAT to lower the level of Gross Alpha in Padre Dam's drinking water supply. Because Padre Dam does not operate its own water treatment plant, the cost to implement reverse osmosis (RO) treatment is based on the installation and operation of a reverse osmosis treatment system at each of the two connections through which Padre Dam receives already treated water from the San Diego County Water Authority. It would cost approximately $1.68 - $3.22 per 1000 gallons to treat uranium using RO treatment. This would be approximately $4.9 - $9.4 million dollars per year for water that Padre Dam purchases or approximately $220 - $422 per Padre Dam water customer each year.

Gross Beta
Gross Beta Particle Activity is naturally occurring in water purchased from our water suppliers. It is found in water from the decay of natural and man-made deposits.

The USEPA has determined that the health risk associated with the Maximum Contaminant Level Goal is 0.

Gross Beta was detected at 5pCi/L which was above the MCLG of zero (0) in water purchased from MWD. However, all water samples were below the MCL of 50 pCi/L.

Reverse osmosis is the BAT to lower the level of Gross Beta in Padre Dam's drinking water supply. Because Padre Dam does not operate its own water treatment plant, the cost to implement reverse osmosis (RO) treatment is based on the installation and operation of a reverse osmosis treatment system at each of the two connections through which Padre Dam receives already treated water from the San Diego County Water Authority. It would cost approximately $1.68 -

$3.22 per 1000 gallons to treat uranium using RO treatment. This would be approximately $4.9 - $9.4 million dollars per year for water that Padre Dam purchases or approximately $220 - $422 per Padre Dam water customer each year.

Uranium
Uranium is a naturally-occurring radioactive element present in geological formations and the earth's crust. It is introduced into groundwater and surface water through erosion.

The PHG for uranium is 0.43 pCi/L. The MCL for uranium is 20 pCi/L.
The OEHHA's health risk category for uranium is carcinogenicity and chronic toxicity (kidneys). Chronic toxicity means that adverse effects may develop gradually from low levels of exposure over a long period of time. The numerical health risk for uranium based on the California PHG is 1 in a million. This means one excess cancer case per 1 million people.

MWD and SDCWA recorded low levels of uranium in 2013, 2014 and 2015:

Skinner Treatment Plant (MWD)

	Units	PHG/MCLG	MCL	Range	Average
2013	pCi/L	0.43	20	ND – 2	1
2014				ND – 2	2
2015				ND – 2	2

Twin Oaks Valley Treatment Plant (SDCWA)

	Units	PHG/MCLG	MCL	Range	Average
2013	pCi/L	0.43	20	1.7 – 2.3	2
2014				1.7 – 2.3	2
2015				1.7 – 2.3	2

Reverse osmosis is the BAT to lower the level of uranium and other radionuclides (Gross Alpha, Gross beta) in Padre Dam's drinking water supply. Because Padre Dam does not operate its own water treatment plant, the cost to implement reverse osmosis (RO) treatment is based on the installation and operation of a reverse osmosis treatment system at each of the two connections through which Padre Dam receives already treated water from the San Diego County Water Authority. It would cost approximately $1.68 - $3.22 per 1000 gallons to treat uranium using RO treatment. This would be approximately $4.9 - $9.4 million dollars per year for water that Padre Dam purchases or approximately $220 - $422 per Padre Dam water customer each year.

Bromate
Bromate is formed when naturally occurring bromide reacts with ozone during the disinfection process.

The category of health risk for bromate is carcinogenicity. Carcinogenic risk means capable of producing cancer. The numerical health risk based on the California PHG for bromate is 1 in a million. This means one excess cancer case per one million population.

The BAT for bromate reduction is reverse osmosis (RO). RO treatment reduces the natural occurring bromide in source water by reducing the natural organic matter (NOM) in water. When this is reduced, the demand for ozone decreases, therefore reducing bromate formation. Because the DLR for bromate (5 ppb) is greater than the PHG (0.1ppb), it would be difficult to assess the effectiveness of RO treatment on reaching the PHG level.

Bromate in our water system comes from our treated water from MWD, SDCWA and Helix water treatment plants. It would not be feasible for Padre Dam to lower bromate levels to the PHG and MCLG levels because it meets federal and state health-based standards. According to the Association of California Water Agencies (ACWA) Cost Estimates for Treatment Technology BAT, it would cost approximately $1.68 - $3.22 per 1,000 gallons of water treated to remove bromate. This would be approximately $4.9 - $9.4 million dollars per year for water that Padre Dam purchases or approximately $220 - $422 per Padre Dam water customer each year.

Lead and Copper

There is no MCL for Lead or Copper. Instead the 90th percentile value of all samples from household taps in the distribution system cannot exceed an Action Level of 0.015 mg/l for lead and 1.3 mg/l for copper. The PHG for lead is 0.0002 mg/l. The PHG for copper is 0.3 mg/l.

The category of health risk for lead is developmental neurotoxicity (causes neurobehavioral effects in children) cardiovascular toxicity (causes high blood pressure) and carcinenicity. The category of health risk for copper is gastrointestinal irritation.

Padre Dam’s water system is in full compliance with the Federal and State Lead and Copper Rule. Based on our sampling, it was determined according to State regulatory requirements that we are below the Action Levels for Lead and Copper.

In general, optimizing corrosion control is considered to be the best available technology 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 Padre Dam is meeting the “optimized corrosion control” requirements and based on sampling results below regulatory action levels, it is not prudent to initiate additional corrosion control treatment as it involves the addition of other chemicals and there could be additional water quality issues raised. Therefore, no estimate of cost has been included.

N-Nitrosodimethylamine (NDMA)

NDMA is a drinking water contaminant that is of interest to the environmental community because of its miscibility with water, as well as its carcinogenicity and toxicity.

The category of health risk for NDMA is carcinogenicity. The OEHHA has set the PHG at .003 ug/l. The PHG is based on a level that will result in not more than 1 excess cancer in 1 million people who drink 2 liters daily of this water for 70 years. The actual cancer risk may be lower or zero.

The most common method to treat NDMA in drinking water systems is photolysis by ultraviolet (UV) radiation in the wavelength range of 225 to 250 nanometers (nm).

In 2013, NDMA was detected in the treated water from MWD and Helix water treatment plants. In 2014 and 2015, all treated water received from our water suppliers was below PHG levels.

It would not be feasible for Padre Dam to lower NDMA levels unless all three of our water suppliers treatment plants were to implement a UV process. Currently NDMA meets federal and state health-based standards. According to the Association of California Water Agencies (ACWA) Cost Estimates for UV Treatment, it would cost approximately $0.55 per 1000 gallons to NMDA using Advanced Oxidation or UV Light treatment. This would be approximately $1.6 million dollars per year for water that Padre Dam purchases or approximately $72 per Padre Dam water customer each year.

Recommendations for Further Action

Padre Dam's drinking water quality meets all 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 -- which are already below the health-based Maximum Contaminant Levels established to provide "safe drinking water" would require additional costly treatment processes. The effectiveness of the treatment processes to provide any significant reductions in constituent levels at these already low values is uncertain. Further, the health protection benefits of these further hypothetical reductions are not at all clear and may not be quantifiable. Therefore, no further action is recommended at this time.

The money that would be required for these additional treatment processes might provide greater public health protection benefits if spent on other water system operations, surveillance, and monitoring programs.

Attachments

1. Table of Regulated Constituents with MCLs, PHGs or MCLGs
2. Excerpt from California Health & Safety Code: Section 116470 (b)
3. Cost Estimates Chart

ATTACHMENT NO. 1

2016 PHG Triennial Report: Calendar Years 2013-2014-2015				
MCLs, DLRs, and PHGs for Regulated Drinking Water Contaminants **(Units are in milligrams per liter (mg/L), unless otherwise noted.)** **Last Update: December 29, 2015** (Reference last update 9/23/2015: http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/MCLsandPHGs.shtml)				
This table includes: ● DDW's maximum contaminant levels (MCLs) ● DDW's detection limits for purposes of reporting (DLRs) ● Public health goals (PHGs) from the Office of Environmental Health Hazard Assessment (OEHHA) ● PHGs for NDMA and 1,2,3-Trichloropropane (both are unregulated) are at the bottom of this table ● The federal MCLG for chemicals without a PHG, microbial contaminants, and the DLR for 1,2,3-TCP				
Constituent	**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	1997
Antimony	--	--	0.0007	2009 draft
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 1999 0.0025 mg/L PHG in Nov 2001	0.05	0.01	(0.100)	
Chromium, Hexavalent (Chromium-6)	0.01	0.001	0.00002	2011
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 N)	10 as N	0.4	45 as NO3 (=10 as N)	1997
Nitrite (as N)	1 as N	0.4	1 as N	1997
Nitrate + Nitrite (as N)	10 as N	0.4	10 as N	1997
Perchlorate	0.006	0.004	0.001	2015
Selenium	0.05	0.005	0.03	2010
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

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Constituent	MCL	DLR	PHG or (MCLG)	Date of PHG
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
Gross beta particle activity - OEHHA concluded in 2003 that a 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	5	--	(zero)	--
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	0.07	2014
Styrene	0.1	0.0005	0.0005	2010
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	1.3	2014
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	1.2	0.01	4	1997 (rev2011)
Vinyl chloride	0.0005	0.0005	0.00005	2000
Xylenes	1.75	0.0005	1.8	1997

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Constituent	MCL	DLR	PHG or (MCLG)	Date of PHG
(b) Non-Volatile Synthetic Organic Chemicals (SOCs)				
Alachlor	0.002	0.001	0.004	1997
Atrazine	0.001	0.0005	0.00015	1999
Bentazon	0.018	0.002	0.2	1999 (rev2009)
Benzo(a)pyrene	0.0002	0.0001	0.000007	2010
Carbofuran	0.018	0.005	0.0017	2000
Carbofuran	--	--	0.0007	2015 draft
Chlordane	0.0001	0.0001	0.00003	1997 (rev2006)
Dalapon	0.2	0.01	0.79	1997 (rev2009)
1,2-Dibromo-3-chloropropane (DBCP)	0.0002	0.00001	0.0000017	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 (rev2010)
Diquat	0.02	0.004	0.015	2000
Diquat	--	--	0.006	2015 draft
Endrin	0.002	0.0001	0.0018	1999 (rev2008)
Endrin	--	--	0.0003	2015 draft
Endothal	0.1	0.045	0.094	2014
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	0.002	2014
Lindane	0.0002	0.0002	0.000032	1999 (rev2005)
Methoxychlor	0.03	0.01	0.00009	2010
Molinate	0.02	0.002	0.001	2008
Oxamyl	0.05	0.02	0.026	2009
Pentachlorophenol	0.001	0.0002	0.0003	2009
Picloram	0.5	0.001	0.5	1997
Picloram	--	--	0.166	2015 draft
Polychlorinated biphenyls (PCBs)	0.0005	0.0005	0.00009	2007
Simazine	0.004	0.001	0.004	2001
2,4,5-TP (Silvex)	0.05	0.001	0.003	2014
2,3,7,8-TCDD (dioxin)	$3x10^{-8}$	$5x10^{-9}$	$5x10^{-11}$	2010
Thiobencarb	0.07	0.001	0.07	2000
Thiobencarb	--	--	0.042	2015 draft
Toxaphene	0.003	0.001	0.00003	2003

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Constituent	MCL	DLR	PHG or (MCLG)	Date of PHG
Chemicals with MCLs in 22 CCR §64533 —Disinfection Byproducts				
Total Trihalomethanes	0.080	--		
Total Trihalomethanes	--	--	0.0008	2010 draft
Bromodichloromethane	--	0.0010	(zero)	--
Bromoform	--	0.0010	(zero)	--
Chloroform	--	0.0010	(0.07)	--
Dibromochloromethane	--	0.0010	(0.06)	--
Haloacetic Acids (five) (HAA5)	0.060	--	--	--
Monochloroacetic Acid	--	0.0020	(0.07)	--
Dichloroacetic Adic	--	0.0010	(zero)	--
Trichloroacetic Acid	--	0.0010	(0.02)	--
Monobromoacetic Acid	--	0.0010	--	--
Dibromoacetic Acid	--	0.0010	--	--
Bromate	0.010	0.0050 or 0.0010[a]	0.0001	2009
Chlorite	1.0	0.020	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)	
Chemicals with PHGs established in response to DDW requests. These are not currently regulated drinking water contaminants.				
N-Nitrosodimethylamine (NDMA)	--	--	0.000003	2006
1,2,3-Trichloropropane	--	0.000005	0.0000007	2009

Notes:

[a] DDW will maintain a 0.0050 mg/L DLR for bromate to accommodate laboratories that are using EPA Method 300.1. However, laboratories using EPA Methods 317.0 Revision 2.0, 321.8, or 326.0 must meet a 0.0010 mg/L MRL for bromate and should report results with a DLR of 0.0010 mg/L per Federal requirements.

*OEHHA's review of this chemical during the year indicated (rev20XX) resulted in no change in the PHG

** Surface water treatment = TT

NOTE: This publication is meant to be an aid to the staff of the CDHS Drinking Water Program and cannot be relied upon by the regulated community as the State of California's representation of the law. The published codes are the only official representation of the law. Refer to the published codes whenever specific citations are required.

Health and Safety Code §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 therefor.

(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 NO. 3

Table 3

Reference: Updated 2012 ACWA Cost of Treatment Table

COST ESTIMATES FOR TREATMENT TECHNOLOGIES

(INCLUDES ANNUALIZED CAPITAL AND O&M COSTS)

No.	Treatment Technology	Source of Information	Estimated 2012 Unit Cost Indexed to 2015* ($/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	0.57-1.08
2	Granular Activated Carbon	Reference: Carollo Engineers, estimate for VOC treatment (PCE), 95% removal of PCE, Oct. 1994,1900 gpm design capacity	0.26
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	1.25
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	0.49-0.71
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	2.24
6	Granular Activated Carbon	Reference: Southern California Water Co. - actual data for permanent GAC to remove VOCs (TCE), 2.16 mgd plant capacity, 1998	1.46
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	1.68-3.22
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	3.98
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	2.45
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	2.65
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	2.05
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	6.65

COST ESTIMATES FOR TREATMENT TECHNOLOGIES

(INCLUDES ANNUALIZED CAPITAL AND O&M COSTS)

No.	Treatment Technology	Source of Information	**Estimated 2012 Unit Cost Indexed to 2015*** ($/1,000 gallons treated)
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	3.92
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	2.94
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	1.82
16	Reverse Osmosis	Reference: CH2M Hill study on San Gabriel Basin, for 135 mgd central treatment facility with RO to remove nitrate, 1990	1.83-3.22
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	1.06
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	0.56
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	0.28
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	0.29
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	0.45-0.74
22	Advanced Oxidation Processes	Reference: Carollo Engineers, estimate for VOC treatment (PCE) by UV Light, Ozone, Hydrogen Peroxide, O&M costs based on operation during 329 days/year at 10% downtime, 24 hr/day AOP operation, 1900 gpm capacity, Oct. 1994	0.55
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, *Cryptosporidium* inactivation requirements,1998	0.13-0.26
24	Ion Exchange	Reference: CH2M Hill study on San Gabriel Basin, for 135 mgd central treatment facility - ion exchange to remove nitrate, 1990	0.61-0.80

*Costs were adjusted from date of original estimates to present, where appropriate, using the Engineering News Record (ENR) annual average building costs of 2015 and 2012. The adjustment factor was derived from the ratio of 2015 Index/2012 Index.