

2016 Water Quality Report to SDCWA member agencies -- San Diego County Water Authority

Parameter	Units	State or Federal MCL [MRDL]	PHG (MCLG) [MRDLG]	State DLR	Range Average	Treatment Plant Effluent		Major Sources in Drinking Water
						Twin Oaks Valley Water Treatment Plant		
PRIMARY STANDARDS--Mandatory Health-Related Standards								
CLARITY								
Combined Filter Effluent Turbidity	NTU	0.1	NA	NA	Range	0.01 - 0.02		
	NTU	0.1	NA	NA	Average	0.01		Soil runoff
	%	95 (a)	NA	NA	%≤ 0.1	100.0%		
MICROBIOLOGICAL								
Total Coliform Bacteria in Distribution System	%	5.0 (b)	0	NA	Range	ND		Naturally present in the environment
					Average	ND		
Total Coliform Bacteria in Treatment Plant effluent	%	5.0 (b)	0	NA	Range	ND		Naturally present in the environment
					Average	ND		
E. coli Bacteria in Treatment Plant effluent	(c)	(c)	0	NA	Range	ND		Human and animal fecal waste
					Average	ND		
ORGANIC CHEMICALS								
Pesticides/PCBs								
Alachlor	ppb	2	4	1	Range	ND		Runoff from herbicide used on row crops
					Average	ND		
Atrazine	ppb	1	0.15	0.5	Range	ND		Runoff from herbicide used on row crops and along highways
					Average	ND		
Bentazon	ppb	18	200	2	Range	ND		Runoff/leaching from herbicide used on rice, alfalfa, and grapes
					Average	ND		
Carbofuran	ppb	18	1.7	5	Range	ND		Leaching of soil fumigant used on rice, alfalfa, and grapes
					Average	ND		
Chlordane	ppt	100	30	100	Range	ND		Residue of banned insecticide
					Average	ND		
2,4-D	ppb	70	20	10	Range	ND		Runoff from herbicide used on row crops, range land, lawns and aquatic weeds
					Average	ND		
Dalapon	ppb	200	790	10	Range	ND		Runoff from herbicide used on rights-of-way, crops, and landscapes
					Average	ND		
Dibromochloropropane (DBCP)	ppt	200	1.7	10	Range	ND		Banned nematocide that may still be present in soils
					Average	ND		
Dinoseb	ppb	7	14	2	Range	ND		Runoff from herbicide used on soybeans, vegetables, and fruits
					Average	ND		
Diquat	ppb	20	15	4	Range	ND		Runoff from herbicide used for terrestrial and aquatic weeds
					Average	ND		
Endothal	ppb	100	94	45	Range	ND		Runoff from herbicide used for terrestrial and aquatic weeds
					Average	ND		
Endrin	ppb	2	1.8	0.1	Range	ND		Residue of banned insecticide and rodenticide
					Average	ND		
Ethylene Dibromide (EDB)	ppt	50	10	20	Range	ND		Petroleum refinery discharges; underground gas tank leaks
					Average	ND		
Glyphosate	ppb	700	900	25	Range	ND		Runoff from herbicide use
					Average	ND		
Heptachlor	ppt	10	8	10	Range	ND		Residue of banned insecticide
					Average	ND		
Heptachlor Epoxide	ppt	10	6	10	Range	ND		Breakdown product of heptachlor
					Average	ND		
Lindane	ppt	200	32	200	Range	ND		Runoff/leaching from insecticide used on cattle, lumber, and gardens
					Average	ND		
Methoxychlor	ppb	30	0.09	10	Range	ND		Runoff/leaching from insecticide uses
					Average	ND		
Molinate (Ordram)	ppb	20	1	2	Range	ND		Runoff/leaching from herbicide used on rice
					Average	ND		
Oxamyl (Vydate)	ppb	50	26	20	Range	ND		Runoff/leaching from insecticide uses
					Average	ND		
Pentachlorophenol	ppb	1	0.3	0.2	Range	ND		Discharge from wood preserving factories other insecticidal and herbicidal uses
					Average	ND		
Picloram	ppb	500	500	1	Range	ND		Herbicide runoff
					Average	ND		
Polychlorinated Biphenyls (PCBs)	ppt	500	90	500	Range	ND		Runoff from landfills; discharge of waste chemicals
					Average	ND		
Simazine	ppb	4	4	1	Range	ND		Herbicide runoff
					Average	ND		
Thiobencarb (d)	ppb	70	70	1	Range	ND		Runoff leaching from rice herbicide
					Average	ND		
2,4,5-TP (Silvex)	ppb	50	3	1	Range	ND		Residue of banned herbicide
					Average	ND		
Toxaphene	ppb	3	0.03	1	Range	ND		Runoff/leaching from insecticide used on cotton and cattle
					Average	ND		
Semi-Volatile Organic Compounds								
Acrylamide	NA	TT	(0)	NA	Range	TT		Water treatment chemical impurities
					Average	TT		
Benzo(a)pyrene	ppt	200	7	100	Range	ND		Leaching from water storage tank linings and distribution lines
					Average	ND		
Di(2-ethylhexyl)adipate	ppb	400	200	5	Range	ND		Discharge from chemical factories
					Average	ND		
Di(2-ethylhexyl)phthalate	ppb	4	12	3	Range	ND		Chemical factory discharge; inert ingredient in pesticides
					Average	ND		
Epichlorohydrin	NA	TT	(0)	NA	Range	ND		Water treatment chemical impurities
					Average	ND		
Hexachlorobenzene	ppb	1	0.03	0.5	Range	ND		Discharge from metal refineries & agricultural factories; wastewater chlorination reaction by-product
					Average	ND		
Hexachlorocyclopentadiene 2,3,7,8-TCDD (Dioxin)	ppq	30	0.05	5	Range	ND		Discharge from chemical factories
					Average	ND		Waste incineration emissions; chemical factory discharge
Volatile Organic Compounds								
Benzene	ppb	1	0.15	0.5	Range	ND		Plastics factory discharge; gas tanks and landfill leaching
					Average	ND		
Carbon Tetrachloride	ppt	500	100	500	Range	ND		Discharge from chemical plants and other industrial waste
					Average	ND		
1,2-Dichlorobenzene	ppb	600	600	0.5	Range	ND		Discharge from industrial chemical factories
					Average	ND		
1,4-Dichlorobenzene	ppb	5	6	0.5	Range	ND		Discharge from industrial chemical factories
					Average	ND		
1,1-Dichloroethane	ppb	5	3	0.5	Range	ND		Extraction and degreasing solvent; fumigant
					Average	ND		
1,2-Dichloroethane	ppt	500	400	500	Range	ND		Discharge from industrial chemical factories
					Average	ND		
1,1-Dichloroethylene	ppb	6	10	0.5	Range	ND		Discharge from industrial chemical factories
					Average	ND		
cis-1,2-Dichloroethylene	ppb	6	100	0.5	Range	ND		Industrial chemical factory discharge; by-product of TCE and PCE biodegradation
					Average	ND		
trans-1,2-Dichloroethylene	ppb	10	60	0.5	Range	ND		Industrial chemical factory discharge; by-product of TCE and PCE biodegradation
					Average	ND		
Dichloromethane (Methylene Chloride)	ppb	5	4	0.5	Range	ND - 0.7		Discharge from pharmaceutical and chemical factories
					Average	ND		
1,2-Dichloropropane	ppb	5	0.5	0.5	Range	ND		Industrial chemical factory discharge; primary component of some fumigants
					Average	ND		Runoff/leaching from nematocide used on croplands
1,3-Dichloropropene	ppt	500	200	500	Range	ND		Petroleum refinery discharge; industrial chemical factories
					Average	ND		
Ethylbenzene	ppb	300	300	0.5	Range	ND		Discharge from industrial, agricultural, and chemical factories, and dry cleaners
					Average	ND		
Methyl tert-butyl ether (MTBE) (d,e)	ppb	13	13	3	Range	ND		Gasoline discharge from watercraft engines
					Average	ND		
Monochlorobenzene	ppb	70	70	0.5	Range	ND		Discharge from industrial, agricultural, and chemical factories, and dry cleaners
					Average	ND		
Styrene	ppb	100	0.5	0.5	Range	ND		Rubber and plastics factories discharge; landfill leaching
					Average	ND		
1,1,2,2-Tetrachloroethane	ppb	1	0.1	0.5	Range	ND		Discharge from industrial, agricultural, and chemical factories; solvent uses
					Average	ND		
Tetrachloroethylene (PCE)	ppb	5	0.06	0.5	Range	ND		Discharge from factories, dry cleaners, and auto shops
					Average	ND		
Toluene	ppb	150	150	0.5	Range	ND		Discharge from petroleum and chemical refineries
					Average	ND		
1,2,4-Trichlorobenzene	ppb	5	5	0.5	Range	ND		Discharge from textile-finishing factories
					Average	ND		
1,1,1-Trichloroethane	ppb	200	1000	0.5	Range	ND		Metal degreasing site discharge; manufacture of food wrappings
					Average	ND		
1,1,2-Trichloroethane	ppb	5	0.3	0.5	Range	ND		Discharge from industrial chemical factories
					Average	ND		
Trichloroethylene (TCE)	ppb	5	1.7	0.5	Range	ND		Discharge from metal degreasing sites and other factories
					Average	ND		
Trichlorofluoromethane (Freon-11)	ppb	150	1300	5	Range	ND		Industrial factory discharge; degreasing solvent; propellant
					Average	ND		
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	ppm	1.2	4	0.01	Range	ND		Discharge from metal degreasing sites and other factories; dry cleaning solvent; refrigerant
					Average	ND		
Vinyl Chloride	ppt	500	50	500	Range	ND		Leaching from PVC piping; plastic factory discharge; by-product of TCE and PCE biodegradation
					Average	ND		
Xylenes	ppm	1.750	1.8	0.0005	Range	ND		Discharge from petroleum and chemical refineries; fuel solvent
					Average	ND		

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INORGANIC CHEMICALS								
Aluminum (d)	ppb	1000	600	50	Range Average	ND ND		Natural deposits erosion; Residue from water treatment process.
Antimony	ppb	6	20	6	Single Sample	ND		Petroleum refinery discharges; fire retardants; solder; electronics
Arsenic	ppb	10	0.004	2	Single Sample	2.4		Natural deposits erosion, glass and electronics production wastes
Asbestos	MFL	7	7	0.2	Single Sample	ND		Asbestos cement pipes internal corrosion; natural deposits erosion
Barium	ppb	1000	2000	100	Single Sample	100		Natural deposits erosion; Oil and metal refineries discharge.
Beryllium	ppb	4	1	1	Single Sample	ND		Discharge from metal refineries, aerospace, and defense industries
Cadmium	ppb	5	0.04	1	Single Sample	ND		Internal corrosion of galvanized pipes; natural deposits erosion
Chromium	ppb	50	(100)	10	Single Sample	ND		Discharge from steel and pulp mills; natural deposits erosion
Chromium VI (g)	ppb	10	0.02	1	Range Average	ND - 0.09 0.06		Runoff/leaching from natural deposits; discharge from industrial waste factories
Copper (d,f)	ppm	AL=1.3	0.3	0.05	Single Sample	ND		Internal corrosion of household pipes; natural deposits erosion
Cyanide	ppb	150	150	100	Single Sample	ND		Discharge from steel/metal, plastic, and fertilizer factories
					Control Range Optimal Fluoride Level	0.6 - 1.2 0.7		Erosion of natural deposits; water additive that promotes strong teeth
Fluoride (g) Treatment-related	ppm	2.0	1	0.1	Range Average	0.5 - 0.9 0.7		
Lead (g)	ppb	AL=15	0.2	5	Single Sample	ND		House pipes internal corrosion; erosion of natural deposits
Mercury	ppb	2	1.2	1	Single Sample	ND		Erosion of natural deposits; factory discharge; landfill runoff
Nickel	ppb	100	12	10	Single Sample	ND		Erosion of natural deposits; discharge from metal factories
Nitrate (as N) (h)	ppm	10	10	0.4	Range Average	ND - 0.6 ND		Runoff and leaching from fertilizer use; septic tank and sewage; natural deposits erosion
Nitrite (as N)	ppm	1	1	0.4	Range Average	ND ND		Runoff and leaching from fertilizer use; septic tank and sewage; natural deposits erosion
Perchlorate (i)	ppb	6	1	4	Single Sample	ND		Industrial waste discharge
Selenium	ppb	50	30	5	Single Sample	ND		Refineries, mines, and chemical waste discharge; runoff from livestock lots
Thallium	ppb	2	0.1	1	Single Sample	ND		Leaching from ore processing; electronics factory discharge
RADIOLOGICALS (j)								
Gross Alpha Particle Activity	pCi/L	15	(0)	3	Range Average	4 - 7 5		Erosion of natural deposits
Gross Beta Particle Activity (k)	pCi/L	50	(0)	4	Range Average	4 - 6 5		Decay of natural and man-made deposits
Radium-226	pCi/L	NA	0.05	1	Range Average	ND ND		Erosion of natural deposits
Radium-228	pCi/L	NA	0.019	1	Range Average	ND ND		Erosion of natural deposits
Combined Radium-226 + 228 (l)	pCi/L	5	(0)	NA	Range Average	ND ND		Erosion of natural deposits
Strontium-90	pCi/L	8	0.35	2	Range Average	ND - 289 72		Decay of natural and man-made deposits
Tritium	pCi/L	20000	400	1000	Range Average	2.7 - 3.1 2.9		Decay of natural and man-made deposits
Uranium	pCi/L	20	0.43	1	Range Average	ND 2.9		Erosion of natural deposits
DISINFECTION BY-PRODUCTS, DISINFECTANT RESIDUALS, AND DISINFECTION BY-PRODUCTS PRECURSORS (m)								
Total Trihalomethanes (TTHM) (n)	ppb	80	NA	1	Range Highest LRAA	14 - 45 26		By-product of drinking water chlorination
Haloacetic Acids (five) (HAA5) (o)	ppb	60	NA	1	Range Highest LRAA	ND - 7 4		By-product of drinking water chlorination
Bromate (p)	ppb	10	0.1	1	Range Average	3.0 - 8.2 5.9		By-product of drinking water ozonation
Total Chlorine Residual DBP Precursors Control as Total Organic Carbon (TOC)	ppm	[4.0]	[4.0]	NA	Range Average	1.3 - 3.8 2.9		Drinking water disinfectant added for treatment
		TT	NA	0.30	Range Average	TT TT		Various natural and man-made sources
SECONDARY STANDARDS--Aesthetic Standards								
Aluminum (d)	ppb	200	600	50	Range Average	ND ND		Residue from water treatment process; natural deposits erosion
Chloride	ppm	500	NA	NA	Single Sample	110		Runoff/leaching from natural deposits; seawater influence
Color	Color Units	15	NA	NA	Range Average	ND ND		Naturally occurring organic materials
Copper (d,f)	ppm	1.0	0.3	0.05	Single Sample	ND		Internal corrosion of household pipes; natural deposits erosion; wood preservatives leaching
Foaming Agents (MBAS)	ppb	500	NA	NA	Single Sample	ND		Municipal and industrial waste discharges
Iron	ppb	300	NA	100	Range Average	ND ND		Leaching from natural deposits; industrial wastes
Manganese	ppb	50	NL = 500	20	Range Average	ND ND		Leaching from natural deposits
MTBE (d,e)	ppb	5	13	3	Range Average	ND ND		Gasoline discharge from watercraft engines
Odor Threshold	TON	3	NA	1	Single Sample	2		Naturally-occurring organic materials
Silver	ppb	100	NA	10	Single Sample	ND		Industrial discharges
Specific Conductance	µS/cm	1600	NA	NA	Single Sample	1000		Substances that form ions in water; seawater influence
Sulfate	ppm	500	NA	0.5	Single Sample	240		Runoff/leaching from natural deposits; industrial wastes
Thiobencarb (d)	ppb	1	70	1	Range Average	ND ND		Runoff/leaching from rice herbicide
Total Dissolved Solids (TDS)	ppm	1000	NA	NA	Single Sample	650		Runoff/leaching from natural deposits; seawater influence
Turbidity (a)	NTU	5	NA	0.1	Range Average	ND ND		Soil runoff
Zinc	ppm	5.0	NA	0.05	Single Sample	ND		Runoff/leaching from natural deposits; industrial wastes
OTHER PARAMETERS								
CHEMICAL								
Acetochlor	ppb	NA	NA	2	Range Average	ND ND		Herbicide runoff
Alachlor	ppb	NA	NA	2	Range Average	ND ND		Herbicide runoff
Alkalinity (t)	ppm	NA	NA	NA	Single Sample	120		
Boron	ppb	NL = 1000	NA	100	Single Sample	130		Runoff/leaching from natural deposits; industrial wastes
Calcium	ppm	NA	NA	NA	Single Sample	67		
Chlorate	ppb	NL = 800	NA	20	Range Average	170 - 450 283		By-product of drinking water chlorination; industrial processes
Corrosivity (r) (as Aggressiveness Index)	AI	NA	NA	NA	Single Sample	13		Elemental balance in water; affected by temperature, other factors
Corrosivity (s) (as Saturation Index)	SI	NA	NA	NA	Single Sample	0.67		Elemental balance in water; affected by temperature, other factors
Dimethoate	ppb	NA	NA	0.7	Range Average	ND ND		Runoff from insecticide used on crops and residential uses
Hardness (t)	ppm	NA	NA	NA	Single Sample	270		
Magnesium	ppm	NA	NA	NA	Single Sample	25		
Metolachlor	ppb	NA	NA	1	Range Average	ND 7.4 - 8.6		Herbicide runoff
pH	Units	NA	NA	NA	Range Average	7.4 - 8.6 8.1		
Potassium	ppm	NA	NA	NA	Single Sample	4.6		
Radon (i)	pCi/L	NA	NA	100	Single Sample	ND		
Sodium	ppm	NA	NA	NA	Single Sample	99		
TOC	ppm	TT	NA	0.30	Range Average	1.7 - 2.4 2.1		Various natural and man-made sources
Vanadium	ppb	NL = 50	NA	3	Single Sample	ND		Naturally-occurring; industrial waste discharge
N-Nitrosodiethylamine (NDEA)	ppb	NA	NA	0.005	Single Sample	ND		By-product of drinking water chloramination; industrial processes
N-Nitrosodimethylamine (NDMA)	ppt	NL = 10	3	2	Single Sample	ND		By-product of drinking water chloramination; industrial processes
N-Nitroso-di-n-butylamine (NDBA)	ppb	NA	NA	0.004	Single Sample	ND		By-product of drinking water chloramination; industrial processes
N-Nitroso-di-n-propylamine (NDPA)	ppb	NA	NA	0.007	Single Sample	ND		By-product of drinking water chloramination; industrial processes
N-Nitrosomethylethylamine (NMEA)	ppb	NA	NA	0.003	Single Sample	ND		By-product of drinking water chloramination; industrial processes
N-Nitrosopyrrolidine (NPYR)	ppb	NA	NA	0.002	Single Sample	ND		By-product of drinking water chloramination; industrial processes
Dichlorodifluoromethane (Freon 12)	ppb	NL = 1000	NA	0.5	Range Average	ND ND		Industrial waste discharge
Ethyl-tert-butylether (ETBE)	ppb	NA	NA	3	Range Average	ND ND		Used as gasoline additive
tert-Amyl-methylether (TAME)	ppb	NA	NA	3	Range Average	ND ND		Used as gasoline additive
tert-Butyl alcohol (TBA)	ppb	NL = 12	NA	2	Single Sample	ND		MTBE breakdown product; used as gasoline additive

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ABBREVIATIONS AND FOOTNOTES

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Abbreviations							
AI	Aggressiveness Index					N	Nitrogen
AL	Action Level					NA	Not Applicable
CFE	Combined Filter Effluent					NL	Notification Level
CFU	Colony-Forming Units					ND	None Detect
LRAA	Locational Running Annual Average; highest LRAA is the highest of all Locational Running Annual Averages calculated as average of all samples collected within a 12-month period					NTU	Nephelometric Turbidity Units
						pCi/L	picoCuries per Liter
						PHG	Public Health Goal
						ppb	parts per billion or micrograms per liter (µg/L)
DBP	Disinfection By-Products					ppm	parts per million or milligrams per liter (mg/L)
DLR	Detection Limits for purposes of Reporting					ppq	parts per quadrillion or picograms per liter (pg/L)
HPC	Heterotrophic Plate Count					ppt	parts per trillion or nanograms per liter (ng/L)
MBAS	Methylene Blue Active Substances					SI	Saturation Index (Langelier)
MCL	Maximum Contaminant Level					RAA	Running Annual Average
MCLG	Maximum Contaminant Level Goal					TOC	Total Organic Carbon
MFL	Million Fibers per Liter					TON	Threshold Odor Number
MRDL	Maximum Residual Disinfectant Level					TT	Treatment Technique
MRDLG	Maximum Residual Disinfectant Level Goal					µS/cm	microSiemen per centimeter; or micromho per centimeter (µmho/cm)
Footnotes							
(a)	The turbidity level from the CFE of the membranes shall be less than or equal to 0.1 NTU in 95% of the measurements taken each month and shall not exceed 1.0 NTU at any time. Turbidity is a measure of the cloudiness of the water and is an indicator of treatment performance.					(m)	TOVWTP met all provisions of the Stage 2 Disinfectants/Disinfection By-Products (D/DBP) Rule. Compliance was based on the LRAA. Average and range for the treatment plant effluent were taken from daily and monthly samples for TTHM and HAA5.
(b)	Total coliform MCLs: No more than 5.0% of the monthly samples may be total coliform-positive. In 2016, 310 samples were analyzed and all samples were negative for total coliforms. The MCL was not violated.					(n)	DLR = 0.5 ppb for each TTHM (bromoform, chloroform, dibromochloromethane, bromodichloromethane).
(c)	<i>E. coli</i> MCLs: The occurrence of two (2) consecutive total coliform-positive samples, one of which contains <i>E. coli</i> , constitutes an acute MCL violation. The MCL was not violated.					(o)	DLR = 1.0 ppb for each HAA5 analyte (dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid) except for monochloroacetic acid which has a DLR = 2.0 ppb.
(d)	Aluminum, copper, MTBE, and thiobencarb have both primary and secondary standards.					(p)	Running annual average was calculated from quarterly results of monthly and daily samples. Bromate reporting level is 3 ppb.
(e)	MTBE reporting level is 0.5 ppb.					(q)	Chromium VI reporting level is 0.03 ppb.
(f)	Lead and copper are regulated as a Treatment Technique under the Lead and Copper Rule. It requires systems to take water samples at the consumers' tap. The action levels, which trigger water systems into taking treatment steps if exceeded in more than 10% of the tap water samples, are 1.3 ppm for copper and 15 ppb for lead.					(r)	AI is a calculated value that measures the aggressiveness of water transported through pipes. Water with AI <10.0 is highly aggressive and would be very corrosive to almost all materials found in a typical water system. AI > 12.0 indicates non-aggressive water. AI between 10.0 and 11.9 indicates moderately aggressive water.
(g)	TOVWTP was in compliance with all provisions of the State's Fluoridation System Requirements.					(s)	SI measures the tendency for a water to precipitate or dissolve calcium carbonate (a natural mineral in water). Positive indices indicate the tendency to precipitate and/or deposit scale on pipes and are assumed to be non-corrosive. Negative indices indicate the tendency to dissolve calcium carbonate and are assumed to be corrosive.
(h)	State MCL is 45 mg/L as nitrate, which equals 10 mg/L as N.					(t)	Alkalinity and hardness was based on CaCO ₃
(i)	TOVWTP's perchlorate reporting level is 2 ppb, which is below the state DLR of 4 ppb.						
(j)	Data collected (annually) from four consecutive quarters of monitoring in 2013. TOVWTP's required triennial monitoring (2016-2019) was performed in 2016.						
(k)	The gross beta particle activity MCL is 4 millirem/year annual dose equivalent to the total body or any internal organ. The screening level is 50 pCi/L.						
(l)	State MCL is 5 pCi/L for combined Radium-226 and -228.						