2018 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: Twin Oaks Valley Water Treatment Plant	Major Sources in Drinking Water
PRIMARY STANDARDS--Mandatory Health-Related Standards							
CLARITY							
Combined Filter	NTU	0.1	NA	NA	Range	0.01 - 0.02	
Effluent Turbidity	NTU	0.1	NA	NA	Average	0.01	Soil runoff
	%	95 (a)	NA	NA	%d 0.1	100.0%	
MICROBIOLOGICAL							
Total Coliform					Range	ND	
Bacteria in Distribution System	%	5.0 (b)	0	NA	Average	ND	Naturally present in the environment
Total Coliform					Range	ND	
Bacteria in Treatment Plant effluent	%	5.0 (b)	0	NA	Average	ND	Naturally present in the environment
E. coli					Range	ND	
Bacteria in Treatment Plant effluent	(c)	(c)	0	NA	Average	ND	Human and animal fecal waste
ORGANIC CHEMICALS							
Pesticides/PCBs							
					Range	ND	
Alachlor	ppb	2	4	1	Average	ND	Runoff from herbicide used on row crops
					Range	ND	Runoff from herbicide used on row crops
Atrazine	ppb	1	0.15	0.5	Average	ND	and along highways
					Range	ND	Runoff/leaching from herbicide used on rice,
Bentazon	ppb	18	200	2	Average	ND	alfalfa, and grapes
					Range	ND	Leaching of soil fumigant used on rice, alfalfa,
Carbofuran	ppb	18	1.7	5	Average	ND	and grapes
					Range	ND	
Chlordane	ppt	100	30	100	Average	ND	Residue of banned insecticide
					Range	ND	Runoff from herbicide used on row crops,
2,4-D	ppb	70	20	10	Average	ND	range land, lawns and aquatic weeds
					Range	ND	Runoff from herbicide used on rights-of-way,
Dalapon	ppb	200	790	10	Average	ND	crops, and landscapes
Dibromochloropropane					Range	ND	Banned nematocide that may still be present
(DBCP)	ppt	200	1.7	10	Average	ND	in soils
					Range	ND	Runoff from herbicide used on soybeans,
Dinoseb	ppb	7	14	2	Average	ND	vegetables, and fruits
					Range	ND	Runoff from herbicide used for terrestrial
Diquat	ppb	20	15	4	Average	ND	and aquatic weeds
					Range	ND	Runoff from herbicide used for terrestrial
Endothall	ppb	100	94	45	Average	ND	and aquatic weeds
					Range	ND	
Endrin	ppb	2	1.8	0.1	Average	ND	Residue of banned insecticide and rodenticide
Ethylene Dibromide					Range	ND	Petroleum refinery discharges; underground
(EDB)	ppt	50	10	20	Average	ND	gas tank leaks
					Range	ND	
Glyphosate	ppb	700	900	25	Average	ND	Runoff from herbicide use
					Range	ND	
Heptachlor	ppt	10	8	10	Average	ND	Residue of banned insecticide
					Range	ND	
Heptachlor Epoxide	ppt	10	6	10	Average	ND	Breakdown product of heptachlor
					Range	ND	Runoff/leaching from insecticide used on cattle,
Lindane	ppt	200	32	200	Average	ND	lumber, and gardens
					Range	ND	
Methoxychlor	ppb	30	0.09	10	Average	ND	Runoff/leaching from insecticide uses
					Range	ND	
Molinate (Ordram)	ppb	20	1	2	Average	ND	Runoff/leaching from herbicide used on rice
					Range	ND	
Oxamyl (Vydate)	ppb	50	26	20	Average	ND	Runoff/leaching from insecticide uses
					Range	ND	Discharge from wood preserving factories
Pentachlorophenol	ppb	1	0.3	0.2	Average	ND	other insecticidal and herbicidal uses
					Range	ND	
Picloram	ppb	500	166	1	Average	ND	Herbicide runoff
Polychlorinated					Range	ND	
Biphenyls (PCBs)	ppt	500	90	500	Average	ND	Runoff from landfills; discharge of waste chemicals
					Range	ND	
Simazine	ppb	4	4	1	Average	ND	Herbicide runoff
					Range	ND	
Thiobencarb (d)	ppb	70	42	1	Average	ND	Runoff leaching from rice herbicide
2,4,5-TP					Range	ND	
(Silvex)	ppb	50	3	1	Average	ND	Residue of banned herbicide
					Range	ND	Runoff/leaching from insecticide used on
Toxaphene	ppb	3	0.03	1	Average	ND	cotton and cattle
Semi-Volatile Organic Compounds							
					Range	TT	
Acrylamide	NA	TT	(0)	NA	Average	TT	Water treatment chemical impurities
					Range	ND	Leaching from water storage tank linings
Benzo(a)pyrene	ppt	200	7	100	Average	ND	and distribution lines
					Range	ND	
Di(2-ethylhexyl)adipate	ppb	400	200	5	Average	ND	Discharge from chemical factories
					Range	ND	Chemical factory discharge; inert ingredient
Di(2-ethylhexyl)phthalate	ppb	4	12	3	Average	ND	in pesticides
					Range	ND	
Epichlorohydrin	NA	TT	(0)	NA	Average	ND	Water treatment chemical impurities
					Range	ND	Discharge from metal refineries & agrichemicals
Hexachlorobenzene	ppb	1	0.03	0.5	Average	ND	factories; wastewater chlorination reaction by-product
					Range	ND	
Hexachlorocyclopentadiene	ppb	50	2	1	Average	ND	Discharge from chemical factories
2,3,7,8-TCDD					Range	ND	Waste incineration emissions; chemical factory
(Dioxin)	ppq	30	0.05	5	Average	ND	discharge
Volatile Organic Compounds							
					Range	ND	Plastics factory discharge; gas tanks
Benzene	ppb	1	0.15	0.5	Average	ND	and landfill leaching
					Range	ND	Discharge from chemical plants and other industrial
Carbon Tetrachloride	ppt	500	100	500	Average	ND	waste
					Range	ND	
1,2-Dichlorobenzene	ppb	600	600	0.5	Average	ND	Discharge from industrial chemical factories
					Range	ND	
1,4-Dichlorobenzene	ppb	5	6	0.5	Average	ND	Discharge from industrial chemical factories
					Range	ND	
1,1-Dichloroethane	ppb	5	3	0.5	Average	ND	Extraction and degreasing solvent; fumigant
					Range	ND	
1,2-Dichloroethane	ppt	500	400	500	Average	ND	Discharge from industrial chemical factories
					Range	ND	
1,1-Dichloroethylene	ppb	6	10	0.5	Average	ND	Discharge from industrial chemical factories
					Range	ND	Industrial chemical factory discharge;
cis-1,2-Dichloroethylene	ppb	6	100	0.5	Average	ND	by-product of TCE and PCE biodegradation
					Range	ND	Industrial chemical factory discharge;
trans-1,2-Dichloroethylene	ppb	10	60	0.5	Average	ND	by-product of TCE and PCE biodegradation
Dichloromethane					Range	ND	Discharge from pharmaceutical
(Methylene Chloride)	ppb	5	4	0.5	Average	ND	and chemical factories
					Range	ND	Industrial chemical factory discharge;
1,2-Dichloropropane	ppb	5	0.5	0.5	Average	ND	primary component of some fumigants
					Range	ND	Runoff/leaching from nematocide used on
1,3-Dichloropropene	ppt	500	200	500	Average	ND	croplands
					Range	ND	Petroleum refinery discharge; industrial
Ethylbenzene	ppb	300	300	0.5	Average	ND	chemical factories
Methyl *tert*-butyl ether					Range	ND	
(MTBE) (d,e)	ppb	13	13	3	Average	ND	Gasoline discharge from watercraft engines
					Range	ND	Discharge from industrial, agricultural, and chemical
Monochlorobenzene	ppb	70	70	0.5	Average	ND	factories, and dry cleaners
					Range	ND	Rubber and plastics factories discharge;
Styrene	ppb	100	0.5	0.5	Average	ND	landfill leaching
					Range	ND	Discharge from industrial, agricultural, and chemical
1,1,2,2-Tetrachloroethane	ppb	1	0.1	0.5	Average	ND	factories; solvent uses
Tetrachloroethylene					Range	ND	Discharge from factories, dry cleaners,
(PCE)	ppb	5	0.06	0.5	Average	ND	and auto shops
					Range	ND	
Toluene	ppb	150	150	0.5	Average	ND	Discharge from petroleum and chemical refineries
					Range	ND	
1,2,4-Trichlorobenzene	ppb	5	5	0.5	Average	ND	Discharge from textile-finishing factories
					Range	ND	Metal degreasing site discharge; manufacture
1,1,1-Trichloroethane	ppb	200	1000	0.5	Average	ND	of food wrappings
					Range	ND	
1,1,2-Trichloroethane	ppb	5	0.3	0.5	Average	ND	Discharge from industrial chemical factories
					Range	ND	Cleaning and degreasing solvent,
1,2,3-Trichloropropane	ppt	5	0.7	5	Average	ND	also associated with pesticide products
Trichloroethylene					Range	ND	Discharge from metal degreasing sites and
(TCE)	ppb	5	1.7	0.5	Average	ND	other factories
Trichlorofluoromethane					Range	ND	Industrial factory discharge; degreasing solvent;
(Freon-11)	ppb	150	1300	5	Average	ND	propellant
1,1,2-Trichloro-1,2,2-					Range	ND	Discharge from metal degreasing sites and other
trifluoroethane (Freon-113)	ppm	1.2	4	0.01	Average	ND	factories; dry cleaning solvent; refrigerant
					Range	ND	Leaching from PVC piping; plastic factory
Vinyl Chloride	ppt	500	50	500	Average	ND	discharge; by-product of TCE and PCE biodegradation
					Range	ND	Discharge from petroleum and chemical refineries;
Xylenes	ppm	1.750	1.8	0.0005	Average	ND	fuel solvent
INORGANIC CHEMICALS							
					Range	ND	Natural deposits erosion;
Aluminum (d)	ppm	1000	600	50	Average	ND	Residue from water treatment process.
					Single		Petroleum refinery discharges; fire retardants;

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Antimony	ppb	6	20	6	Sample	ND	solder; electronics
Arsenic	ppb	10	0.004	2	Single Sample	3	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	ppm	1000	2000	100	Single Sample	ND	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 (q)	ppb	NA	0.02	NA	Range Average	0.04 - 0.17 0.09	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	0.6 - 1.2	
					Optimal Fluoride Level	0.7	Erosion of natural deposits;
Fluoride (g) Treatment-related	ppm	2.0	1	0.1	Range Average	0.6 - 0.9 0.7	water additive that promotes strong teeth
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 0.4	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 ND	Decay of natural and man-made deposits
Tritium	pCi/L	20000	400	1000	Range Average	ND - 289 72	Decay of natural and man-made deposits
Uranium	pCi/L	20	0.43	1	Single Sample	2.2	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	22 - 35 30	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	1 - 15 5	By-product of drinking water ozonation
Total Chlorine Residual	ppm	[4.0]	[4.0]	NA	Range Average	1.3 - 3.4 3.1	Drinking watrer disinfectant added for treatment
DBP Precursors Control as Total Organic Carbon (TOC)	ppm	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	90	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	ND	Naturally-occurring organic materials
Silver	ppb	100	NA	10	Single Sample	ND	Industrial discharges
Specific Conductance	µS/cm	1600	NA	NA	Single Sample	810	Substances that form ions in water; seawater influence
Sulfate	ppm	500	NA	0.5	Single Sample	160	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	510	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	110	
Boron	ppb	NL = 1000	NA	100	Single Sample	130	Runoff/leaching from natural deposits; industrial wastes
Calcium	ppm	NA	NA	NA	Single Sample	55	
Chlorate	ppb	NL = 800	NA	20	Range Average	160 - 290 219	By-product of drinking water chlorination; industrial processes
Corrosivity (r) (as Aggressiveness Index)	AI	NA	NA	NA	Single Sample	12	Elemental balance in water; affected by temperature, other factors
Corrosivity (s) (as Saturation Index)	SI	NA	NA	NA	Single Sample	0.64	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	220	
Magnesium	ppm	NA	NA	NA	Single Sample	20	
Metolachlor	ppb	NA	NA	1	Range Average	ND ND	Herbicide runoff
pH	pH Units	NA	NA	NA	Range Average	7.1 - 8.5 8.2	
Potassium	ppm	NA	NA	NA	Single Sample	4	
Radon (j)	pCi/L	NA	NA	100	Single Sample	ND	
Sodium	ppm	NA	NA	NA	Single Sample	82	
TOC	ppm	TT	NA	0.30	Range Average	2.1 - 2.6 2.3	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	2	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					Single		By-product of drinking water chloramination;

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(NMEA)	ppb	NA	NA	0.003	Sample	ND	industrial processes
N-Nitrosopyrrolidine					Single		By-product of drinking water chloramination;
(NPYR)	ppb	NA	NA	0.002	Sample	ND	industrial processes
Dichlorodifluoromethane					Range	ND	
(Freon 12)	ppb	NL = 1000	NA	0.5	Average	ND	Industrial waste discharge
Ethyl-*tert*-butylether					Range	ND	
(ETBE)	ppb	NA	NA	3	Average	ND	Used as gasoline additive
tert-Amyl-methylether					Range	ND	
(TAME)	ppb	NA	NA	3	Average	ND	Used as gasoline additive
tert-Butyl alcohol					Single		MTBE breakdown product; used as gasoline
(TBA)	ppb	NL = 12	NA	2	Sample	ND	additive

ABBREVIATIONS AND FOOTNOTES

Abbreviations

AI	Aggressiveness Index
AL	Action Level
CFE	Combined Filter Effluent
CFU	Colony-Forming Units
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
DBP	Disinfection By-Products
DLR	Detection Limits for purposes of Reporting
HPC	Heterotrophic Plate Count
MBAS	Methylene Blue Active Substances
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MFL	Million Fibers per Liter
MRDL	Maximum Residual Disinfectant Level
MRDLG	Maximum Residual Disinfectant Level Goal
N	Nitrogen
NA	Not Applicable
NL	Notification Level
ND	None Detect
NTU	Nephelometric Turbidity Units
pCi/L	picoCuries per Liter
PHG	Public Health Goal
ppb	parts per billion or micrograms per liter (µg/L)
ppm	parts per million or milligrams per liter (mg/L)
ppq	parts per quadrillion or picograms per liter (pg/L)
ppt	parts per trillion or nanograms per liter (ng/L)
SI	Saturation Index (Langelier)
RAA	Running Annual Average
TOC	Total Organic Carbon
TON	Threshold Odor Number
TT	Treatment Technique
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.

(b) Total coliform MCLs: No more than 5.0% of the monthly samples may be total coliform-positive. In 2018, 287 samples were analyzed and all samples were negative for total coliforms. The MCL was not violated.

(c) *E.coli* MCLs: The occurrence of two (2) consecutive total coliform-positive samples, one of which contains *E. coli*, constitutes an acute MCL violation. The MCL was not violated.

(d) Aluminum, copper, MTBE, and thiobencarb have both primary and secondary standards.

(e) MTBE reporting level is 0.5 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.

(g) TOVWTP was in compliance with all provisions of the State's Fluoridation System Requirements.

(h) State MCL is 45 mg/L as nitrate, which equals 10 mg/L as N.

(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.

(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.

(n) DLR = 0.5 ppb for each TTHM (bromoform, chloroform, dibromochloromethane, bromodichloromethane).

(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.

(p) Running annual average was calculated from quarterly results of monthly and daily samples. Bromate reporting level is 3 ppb.

(q) Chromium VI reporting level is 0.03 ppb.

(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.

(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.

(t) Alkalinity and hardness was based on $CaCO_3$