

**ADDITIONAL PHYSICAL, MINERAL, AND METAL CHARACTERISTICS – YEAR 2002 BY WATER TREATMENT PLANT**

	ALVARADO PLANT			MIRAMAR PLANT			OTAY PLANT			UNITS
	LOW	HIGH	AVG	LOW	HIGH	AVG	LOW	HIGH	AVG	
*Hardness (Total) as CaCO <sub>3</sub>	216	251	235	222	263	249	208	251	235	mg/L
Calcium (Ca)	52.4	66.8	59.8	58.4	75.2	65.3	49.2	67.2	60.9	mg/L
Magnesium (Mg)	15.1	24	20.5	13.2	26.4	20.5	14.8	26.6	19.8	mg/L
Sodium (Na)	78.5	87.7	82.2	73.7	89.9	79.5	75.9	86.7	81.2	mg/L
Potassium (K)	3.8	4.72	4.16	3.69	4.58	4.00	3.72	4.81	4.05	mg/L

Alkalinity, (Total) as CaCO <sub>3</sub>	126	143	132	105	133	124	116	147	128	mg/L
Carbonate (CO <sub>3</sub> )	0	6.7	0.56	0	0	0	0	0	0	mg/L
Bicarbonate (HCO <sub>3</sub> )	148	174	159	128	162	151	141	179	155	mg/L
Sulfate (SO <sub>4</sub> )	137	210	175	145	244	188	141	225	171	mg/L
Chloride (Cl)	71	118	87.4	66.5	104	82	66.4	100	84	mg/L
Nitrate (as NO <sub>3</sub> )	0.496	1.58	1.02	0.631	1.67	1.04	< 0.2	1.71	0.988	mg/L
Fluoride (F) Temp Dependent	0.26	0.30	0.28	0.26	0.31	0.28	0.27	0.34	0.30	mg/L

pH, Laboratory	7.64	8.51	8.24	7.64	8.34	8.15	7.42	8.35	8.13	
Specific Conductance (E.C.)	843	921	871	859	936	883	828	930	865	uS/cm
Total Filterable Residue at 180 C (TDS)	483	571	517	504	577	527	477	570	510	mg/L
Color, Apparent (Unfiltered)	< 1	7	3	< 1	4	1.6	< 1	11	2.5	COLOR
Odor Threshold at 60 C	< 1	1	< 1	< 1	< 1	< 1	1	1.4	1.1	TON
Turbidity, Laboratory	0.07	0.19	0.12	0.1	0.24	0.13	0.07	0.51	0.15	NTU

Aluminum (Al)	< 2.0	43.4	6.29	< 2.0	25.6	3.28	< 2.0	13.6	3.13	ug/L
Antimony (Sb)	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	ug/L
Arsenic (As)	< 1.0	1.52	< 1.0	< 1.0	1.36	1.08	< 1.0	1.52	< 1.0	ug/L
Barium (Ba)	69.5	82.6	76.5	71.6	92.3	79.8	67.6	76.4	72.8	ug/L
Beryllium (Be)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	ug/L
Cadmium (Cd)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	ug/L
Chromium (Total Cr)	< 1.0	1.2	< 1.0	< 1.0	1.05	< 1.0	< 1.0	< 1.0	< 1.0	ug/L
Copper (Cu)	2.19	18.4	5.17	5.74	13.3	8.92	2.09	4.9	3.12	ug/L
Iron (Fe)	< 50	< 50	< 50	< 50	58.7	< 50	< 50	< 50	< 50	ug/L
Lead (Pb)	< 0.5	< 2.0	< 2.0	< 0.5	< 2.0	< 2.0	< 0.5	< 2.0	< 2.0	ug/L
Manganese (Mn)	< 0.5	2.97	< 2.0	< 0.5	2.86	< 2.0	< 0.5	< 2.0	< 2.0	ug/L
Mercury (Hg)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	ug/L
Nickel (Ni)	2.38	2.79	2.56	2.38	2.97	2.67	< 2.0	2.66	2.18	ug/L
Selenium (Se)	< 3.0	3.9	< 3.0	< 3.0	3.32	< 3.0	< 3.0	3.45	< 3.0	ug/L
Silver (Ag)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	ug/L
Thallium	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	ug/L
Zinc (Zn)	< 2.0	14.6	< 8.0	< 2.0	10.1	< 8.0	< 2.0	17.3	< 8.0	ug/L
Vanadium	< 0.2	0.323	< 0.2	< 0.2	0.43	< 0.2	< 0.2	< 0.2	< 0.2	ug/L

Langelier Index	0.11	0.97	0.69	0.01	0.83	0.61	-0.16	0.89	0.57	
Aggressiveness Index	11.9	12.8	12.5	11.9	12.8	12.4	11.6	12.7	12.4	
Silica	8.3	12.4	10	7.86	9.81	8.81	8.07	11.6	9.55	mg/L
Phosphate	< 0.02	0.375	< 0.05	< 0.02	0.032	< 0.02	< 0.02	0.312	< 0.04	mg/L
Boron	42.7	141	91	40.3	150	87	43.6	135	93.7	ug/L
Nitrite as Nitrogen (N)	< 0.002	0.01	< 0.003	< 0.003	0.009	< 0.003	< 0.002	0.011	< 0.003	ug/L
Cyanide	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	mg/L
Bromide	< 0.1	0.125	< 0.1	< 0.1	0.104	< 0.1	< 0.1	0.480	< 0.1	mg/L
Perchlorate	< 4.0	< 4.0	< 4.0	< 4.0	4.39	< 4.0	< 4.0	< 4.0	< 4.0	ug/L

\* These figures can be converted to grains per gallon (gpg) by dividing the number by a factor of 17.12.

For example, Alvarado's average hardness of 235 mg/L can also be expressed as 13.73 gpg (235 divided by 17.12 =13.73)

### Abbreviations

**mg/L:** Milligrams per liter or parts per million (ppm)

**µg/L:** Micrograms per liter or parts per billion (ppb)

**ng/L:** Nanograms per liter or parts per trillion (ppt)

**uS:** Micro siemens per centimeter (a measure of conductivity)

**COLOR:** Natural color Units

**TON:** Threshold Odor Number

**NTU:** Nephelometric Turbidity Units