

SEWRPC Planning Report No. 52

A REGIONAL WATER SUPPLY PLAN FOR SOUTHEASTERN WISCONSIN

Appendix D

**LAKE MICHIGAN WATER
TREATMENT PLANT RAW WATER AND FINISHED
WATER QUALITY CHARACTERISTICS**

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Table D-1

LAKE MICHIGAN RAW WATER CHARACTERISTICS

Characteristic	Concentration ^a			
	City of Oak Creek ^b	City of Racine ^b	City of Milwaukee	
			Linwood Plant ^c	Howard Avenue Plant ^c
Alkalinity, Total (CaCO ₃).....	102	110 ^b	108	108
Arsenic.....	<0.010	<0.010	<0.010	<0.010
Barium.....	<0.4	<0.4	<0.4	<0.4
Cadmium.....	<0.0002	<0.0002	<0.0002	<0.0002
Calcium.....	36	35 ^b	34	34
Chloride.....	13	11	8	9
Chromium.....	<0.003	<0.003	<0.003	0.004
Copper.....	<0.050	<0.050	0.023	0.035
Fluoride.....	0.13 ^b	1.0	0.15	0.15
Hardness, Total (CaCO ₃).....	135	136 ^b	128	124
Iron.....	<0.1	<0.1	0.10	0.22
Lead.....	<0.003	<0.003	<0.003	<0.003
Magnesium.....	11	12 ^b	10	10
Manganese.....	<0.040	<0.040	<0.040	<0.040
Mercury.....	<0.0002	<0.0002	<0.0002	<0.0002
NO ₃ + NO ₂	<0.5	<0.5	<0.5	<0.5
Selenium.....	<0.005	<0.005	<0.005	<0.005
Silver.....	<0.0005	<0.0005	<0.0005	<0.0005
Sodium.....	7	6	4	5
Sulfate.....	32	23	20	21
Total Residue.....	190	196 ^b	158	170
Zinc.....	<0.020	<0.020	0.050	0.050

^aConcentration in mg/l, except where noted.

^bDistribution water sample use of analysis.

Source: Oak Creek Water and Sewer Utility, Water System Study, March 2002.

Table D-2

LAKE MICHIGAN WATER TREATMENT PLANT FINISHED WATER QUALITY CHARACTERISTICS

Class and Parameter	Concentration ^a						
	Allowable Concentration Standard	Milwaukee 2005 (Median)	Racine 2005	Kenosha 2005	Port Washington 2004	Oak Creek 2005	South Milwaukee 2004
Chemical & Physical Parameters							
Alkalinity, as CaCO ₃	NR	99	105	101	107	--	--
Hardness, Calcium, as CaCO ₃	NR	94	--	--	81	--	--
Hardness, Total, as CaCO ₃	NR	134	140	134	129	--	--
pH.....	6.5-8.5 Standard Units	7.55 Standard Units	7.5 Standard Units	--	7.4 Standard Units	--	--
Total Dissolved Solids (TDS) calc.....	500	176	--	--	307	--	--
Total Organic Carbon.....	NR	1.5	1.5	--	--	--	--
Clarity							
Turbidity , NTU ' 95% of the time	<0.3 NTUs in minimum of 95 percent of monthly samples	0.06 NTU	0.06 NTU	--	0.08 NTU	0.09 NTU	--
Inorganic Chemicals							
Aluminum	0.2	0.056	<0.02	--	--	--	--
Antimony	0.006	<0.0010	<0.001	ND	0.0	--	0.0026
Arsenic	0.05	<0.0020	<0.002	0.0011	0.0	--	0.001
Barium	2	0.019	0.019	0.02	0.02	0.18	0.21
Beryllium.....	0.004	<0.0003	<0.0003	0.0011	--	--	--
Boron.....	NR	0.017	<0.2	--	--	--	--
Cadmium.....	0.005	--	<0.001	0.0011	0	--	--
Calcium	--	--	36	--	32.4	--	--
Chloride.....	250	13.4	16	--	37.3	--	--
Chlorine, Total.....	4	1.33	1	--	1.3	--	--
Chromium.....	0.1	0.002	0.0098	0.0011	0.003	--	0.001
Copper.....	NR	<0.002	<0.02	--	0.13	0.28	0.0416
Cyanide	0.2	<0.020	<0.02	ND	--	--	--
Fluoride	4.0	1.0	1.12	1.0	1.1	0.7	0.0012
Iron	0.3	<0.003	0.02	--	0.00013	--	--
Lead	NR	<0.002	<0.003	--	0.0066	0.0055	0.00711
Magnesium.....	NR	11	12	--	13.4	--	--
Manganese.....	0.05	<0.0005	0.0075	--	--	--	--
Mercury	0.002	<0.0001	<0.0002	ND	0	--	--
Nickel.....	0.1	<0.001	0.0025	0.0013	0.0038	0.0046	--
Nitrate and Nitrite, Total, as Nitrogen.....	10	0.29	0.3	0.41	0.8	--	--
Nitrate, as Nitrogen	10	0.29	0.3	--	--	0.4	--
Nitrite, as Nitrogen.....	1	<0.010	<0.01	ND	0	--	--
Ortho-phosphate	NR	1.9	0.24	--	--	--	--
Potassium.....	NR	1.3	1.42	--	--	--	--
Selenium	0.05	<0.002	<0.002	ND	0	--	0.001
Sodium	--	--	6.2	9.7	6.5	13	7.3
Sulfate	500 (proposed)	30	--	27	23	22	30
Thallium.....	0.002	<0.0004	<0.0004	ND	0	--	0.0004
Zinc.....	5	<0.005	0.086	--	0.12	--	--

Table D-2 (continued)

Class and Parameter	Concentration ^a						
	Allowable Concentration Standard	Milwaukee 2005 (Median)	Racine 2005	Kenosha 2005	Port Washington 2004	Oak Creek 2005	South Milwaukee 2004
Microbiological Coliform, Total, Presence in 100mL.....	<5 percent positive samples	0	0	--	0	--	--
Organic Chemicals							
1,1,1,2-Tetrachloroethane.....	NR	<0.0005	<0.0001	ND	--	--	--
1,1,1-Trichloroethane.....	0.2	<0.0005	<0.0005	ND	--	--	--
1,1,2,2-Tetrachloroethane.....	NR	<0.0005	<0.0001	ND	--	--	--
1,1,2-Trichloroethane.....	0.005	<0.0005	<0.0005	ND	--	--	--
1,1-Dichloroethane.....	NR	<0.0005	<0.0001	ND	--	--	--
1,1-Dichloroethylene.....	0.007	<0.0005	<0.0002	ND	--	--	--
1,1-Dichloropropene (2003).....	NR	<0.0005	<0.0001	ND	--	--	--
1,2-Dichloroethane.....	0.005	<0.0005	<0.0005	ND	--	--	--
1,2,3-Trichloropropane.....	NR	<0.0005	<0.0002	ND	--	--	--
1,2,4-Trichlorobenzene.....	0.07	<0.0005	<0.0005	ND	--	--	--
1,2-Dibromoethane (EDB).....	NR	<0.0002	--	--	--	--	--
1,2-Dichlorobenzene.....	0.6	<0.0005	<0.0005	ND	--	--	--
1,2-Dichloroethylene, cis.....	0.07	<0.0005	<0.0005	ND	--	--	--
1,2-Dichloroethylene, trans.....	0.1	<0.0005	<0.0005	ND	--	--	--
1,2-Dichloropropane.....	0.005	<0.0005	<0.0005	ND	--	--	--
1,3-Dichlorobenzene.....	NR	<0.0005	<0.0001	ND	--	--	--
1,3-Dichloropropane.....	NR	<0.0005	<0.0001	ND	--	--	--
1,3-Dichloropropene (2003).....	NR	<0.0005	<0.0001	ND	--	--	--
1,4-Dichlorobenzene.....	0.075	<0.0005	--	ND	--	--	--
1-2 Dibromo 3 chloropropane (DBCP).....	0.00002	<0.00001	--	--	--	--	--
2,2-Dichloropropane.....	NR	<0.0005	<0.0002	ND	--	--	--
2,4,5-TP (Silvex).....	0.05	<0.0001	<0.0001	ND	--	--	--
2,4-D.....	0.07	<0.0001	<0.0001	ND	--	--	--
1, 2 -Chlorotoluene (o-).....	NR	<0.0005	<0.0002	ND	--	--	--
1, 4 -Chlorotoluene (p-).....	NR	<0.0005	<0.0002	ND	--	--	--
3-Hydroxycarbofuran.....	NR	<0.0005	--	ND	--	--	--
Adipate, di(2-ethylhexyl).....	0.4	<0.0006	<0.0006	--	--	--	--
Alachlor.....	0.002	<0.0001	<0.0001	ND	--	--	--
Aldicarb.....	0.003	<0.0005	<0.0005	ND	--	--	--
Aldicarb sulfone.....	0.002	<0.0004	<0.0007	ND	--	--	--
Aldicarb sulfoxide.....	0.004	<0.0005	<0.0005	ND	--	--	--
Aldrin.....	NR	<0.0001	<0.0001	ND	--	--	--
Atrazine.....	0.003	<0.0001	<0.0001	ND	--	--	--
Benzene.....	0.005	<0.0005	<0.0005	ND	--	--	--
Bromobenzene.....	NR	<0.0005	<0.0002	ND	--	--	--
Bromochloromethane.....	NR	<0.0005	--	0.005	0.0054	--	--
Bromodichloromethane.....	0.08	0.0018	0.0063	ND	0.00728	0.00733	0.00955
Bromoform.....	0.08	<0.005	<0.0005	0.00023	0.0005	0.00036	0.00008
Bromomethane.....	NR	<0.0005	<0.0005	ND	--	--	--
Butachlor.....	NR	<0.0001	<0.0001	ND	--	--	--

Table D-2 (continued)

Class and Parameter	Concentration ^a						
	Allowable Concentration Standard	Milwaukee 2005 (Median)	Racine 2005	Kenosha 2005	Port Washington 2004	Oak Creek 2005	South Milwaukee 2004
Organic Chemicals (continued)							
Carbaryl.....	NR	<0.0005	<0.001	ND	--	--	--
Carbofuran.....	0.04	<0.0009	<0.0009	ND	--	--	--
Carbon Tetrachloride.....	0.005	<0.0005	<0.0005	ND	--	--	--
Chlordane.....	0.002	<0.0002	<0.0001	ND	--	--	--
Chlordane, alpha.....	0.002	<0.0001	<0.0001	--	--	--	--
Chlordane, gamma.....	0.002	<0.0001	<0.0001	--	--	--	--
Chlorobenzene.....	0.1	<0.0005	<0.0005	ND	--	--	--
Chloroethane.....	NR	<0.0005	<0.0005	ND	--	--	--
Chloroform.....	0.08	<0.0015	0.0084	0.0038	0.0073	0.01168	0.01565
Chloromethane.....	NR	<0.0005	0.0005	ND	--	--	--
Dalapon.....	0.2	<0.001	<0.0001	ND	--	--	--
Di (2-ethylhexyl) adipate.....	0.4	<0.0006	<0.0006	ND	--	--	--
Di (2-ethylhexyl) phthalate.....	0.006	<0.0006	<0.0006	ND	--	--	--
Dibromoacetic acid.....	NR	<0.001	<0.001	--	--	--	--
Dibromochloromethane.....	0.08	0.0012	--	0.0031	--	0.00393	0.00367
Dibromochloropropane.....	--	--	<0.0001	--	--	--	--
Dibromomethane.....	NR	<0.0005	<0.0001	ND	0.0023	--	--
Dicamba.....	NR	<0.0001	0.0001	ND	--	--	--
Dichloroacetic Acid.....	NR	0.0013	0.0056	--	--	--	--
Dichloromethane (methylene chloride).....	0.005	<0.0005	<0.0005	ND	--	--	--
Dieldrin.....	--	--	<0.0001	ND	--	--	--
Dinoseb.....	0.007	<0.0001	<0.0001	ND	--	--	--
Dioxin (2,3,7,8-TCDD).....	0.00000003	<0.000000005	<0.000000005	ND	--	--	--
Diquat.....	0.02	<0.0004	<0.0004	ND	--	--	--
Endothall.....	0.1	<0.009	<0.009	ND	--	--	--
Endrin.....	0.002	<0.00001	<0.00001	ND	--	--	--
Ethylbenzene.....	0.7	<0.0005	<0.0005	ND	--	--	--
Ethylene dibromide (EDB).....	0.00005	<0.00001	<0.00001	--	--	--	--
gamma-Benzene hexachloride (Lindane).....	0.0002	<0.00002	<0.00002	ND	--	--	--
Glyphosate (Round-up).....	0.7	<0.006	<0.006	ND	--	--	--
Heptachlor.....	0.0004	<0.00004	<0.00004	ND	--	--	--
Heptachlor epoxide.....	0.0002	<0.00002	<0.00002	ND	--	--	--
Hexachlorobenzene.....	0.001	<0.0001	<0.0001	ND	--	--	--
Hexachlorobutadiene.....	NR	<0.0001	--	--	--	--	--
Hexachlorocyclopentadiene.....	0.05	<0.0001	<0.0001	ND	--	--	--
Methomyl.....	NR	<0.0005	<0.0005	ND	--	--	--
Methoxychlor.....	0.04	<0.0001	<0.0001	ND	--	--	--
Methyl-t-butyl ether (MTBE) (UCMR).....	NR	<0.0005	--	--	0.002	--	--
Metolachlor (Dual).....	NR	<0.0001	<0.0001	ND	--	--	--
Metribuzin (Sencor).....	NR	<0.0001	<0.0001	ND	--	--	--
Oxamyl (Vydate).....	0.2	<0.001	<0.001	ND	--	--	--
PAHs(benzo(a)-pyrene).....	0.0002	<0.00002	<0.00002	--	--	--	--
p-Dichlorobenzene.....	--	--	<0.0005	--	--	--	--

Table D-2 (continued)

Class and Parameter	Concentration ^a						
	Allowable Concentration Standard	Milwaukee 2005 (Median)	Racine 2005	Kenosha 2005	Port Washington 2004	Oak Creek 2005	South Milwaukee 2004
Organic Chemicals (continued)							
Pentachlorophenol	0.001	<0.00004	<0.00004	ND	--	--	--
Picloram (Tordon).....	0.5	<0.0001	<0.0001	ND	--	--	--
Polychlorinated Byphenyls (PCB's), Total.....	0.0005	--	<0.0005	--	--	--	--
Aroclor 1016.....	NR	<0.00008	--	<0.00008	--	--	--
Aroclor 1221.....	NR	<0.002	--	<0.002	--	--	--
Aroclor 1232.....	NR	<0.0005	--	<0.0005	--	--	--
Aroclor 1242.....	NR	<0.0003	--	<0.0003	--	--	--
Aroclor 1248.....	NR	<0.0001	--	<0.0001	--	--	--
Aroclor 1254.....	NR	<0.0001	--	<0.0001	--	--	--
Aroclor 1260.....	NR	<0.0002	--	<0.0002	--	--	--
Propachlor.....	NR	<0.0001	<0.0001	ND	--	--	--
Simazine.....	0.004	<0.00007	<0.00007	ND	--	--	--
Styrene.....	0.1	<0.0005	<0.0002	ND	--	--	--
Tetrachloroethylene.....	0.005	<0.0005	<0.0005	ND	--	--	--
Toluene.....	1	<0.0005	<0.0005	ND	--	--	--
Toxaphene.....	0.003	<0.001	<0.001	ND	--	--	--
Trichloroacetic Acid.....	NR	<0.001	0.0061	--	--	--	--
Trichloroethylene.....	0.005	<0.0005	<0.0005	ND	--	--	--
Trihalomethanes, Total.....	0.08	0.0036	--	--	0.02	0.024	--
Vinyl Chloride.....	0.002	--	<0.0002	ND	--	--	--
Xylenes Total.....	10	--	<0.0005	ND	--	--	--
Radionuclides (pCi/L) (2003)							
BETA/photon emitters.....	0	--	--	--	3 pCi/l	--	--
Gross Alpha.....	15 pCi/L	<2.9 pCi/L	0.9 pCi/L	--	1 pCi/l	0.1 pCi/l	0.1 pCi/l
Gross Beta.....	50 pCi/L	<4 pCi/L	2.5 pCi/L	--	--	--	--
Radium – 226.....	5 pCi/L	0.15 pCi/L	0.18 pCi/L	--	--	--	--
Radium – 228.....	Combined	0.7 pCi/L	1.3 pCi/L	--	--	--	--
Radon-222.....	NR	<17 pCi/L	22 pCi/L	--	--	--	--
Strontium-90.....	8 pCi/L	0.7 pCi/L	1.3 pCi/L	--	--	--	--
Tritium.....	20,000 pCi/L	<300 pCi/L	170 pCi/L	--	--	--	--
Uranium, Total.....	20 pCi/L	0.54 pCi/L	1.1 pCi/L	--	--	--	--

NOTE: NR = Not regulated; ND = Not detected

^aConcentration in mg/l, except where noted.

Source: U.S. Environmental Protection Agency, Water Utilities, Consumer Confidence Reports, and SEWRPC.