



US Army Corps
of Engineers
Baltimore District



Washington Aqueduct

U.S. ARMY Corps of Engineers

Annual Report of Water Analysis 2015

Prepared by:

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A handwritten signature in blue ink, appearing to read "Thomas J. ...", with the date "1/14/16" written below it.

Approved by the Chief, Washington Aqueduct





WASHINGTON AQUEDUCT, US ARMY CORPS OF ENGINEERS ANNUAL REPORT OF WATER ANALYSIS (2015)

Potomac River Raw Water Supply

	Miscellaneous Physical Parameters									Inorganic Ions									Microorganisms					
	pH	ALKALINITY	CONDUCTIVITY	DISSOLVED SOLIDS	SUSPENDED SOLIDS	TOTAL SOLIDS	TEMPERATURE	TOTAL HARDNESS	TOTAL ORGANIC CARBON	TURBIDITY	TOTAL AMMONIA - N	BROMIDE	CHLORIDE	FLUORIDE	IODIDE	NITRATE - N	NITRITE - N	ORTHOPHOSPHATE - PO4	PERCHLORATE	SULFATE	TOTAL COLIFORM	E. COLI	GIARDIA	CRYPTOSPORIDIUM
	ppm	uS/cm	ppm	ppm	ppm	°F	ppm	ppm	NTU	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	ppb	ppm	MPN/100mL	MPN/100mL	cysts/L	Oocysts/L	
Jan	7.8	70	356	230	2	232	46	116	2.5	12	ND	0.04	54	ND	ND	2.0	ND	ND	0.4	24	3127	28	ND	ND
Feb	8.0	84	410	212	9	221	43	131	1.9	7	ND	0.05	62	ND	---	2.0	ND	ND	1.5	29	39	2	0.10	ND
Mar	7.7	57	381	129	5	134	52	102	2.6	31	0.08	ND	61	ND	---	1.6	ND	ND	0.3	22	1067	10	ND	ND
Apr	7.7	70	306	204	4	208	62	107	2.5	12	ND	ND	40	ND	ND	1.5	ND	ND	0.3	22	962	39	ND	ND
May	7.8	76	321	143	ND	143	73	118	2.7	10	0.05	0.04	32	ND	---	1.1	ND	ND	0.4	27	1859	23	ND	ND
Jun	7.7	82	345	225	2	227	77	120	3.9	16	0.08	ND	35	0.13	---	1.2	0.02	ND	0.3	25	4826	33	ND	ND
Jul	7.8	79	310	180	3	183	79	115	3.3	8	ND	ND	29	0.10	---	1.3	ND	ND	0.4	26	1342	8	ND	ND
Aug	8.1	100	387	220	ND	220	79	145	2.6	7	ND	0.06	35	0.13	---	0.8	ND	ND	0.5	40	873	12	ND	ND
Sep	8.1	98	408	204	1	205	76	157	2.3	6	ND	0.07	36	0.13	---	0.7	ND	ND	2.2	53	841	15	ND	ND
Oct	8.0	103	407	174	1	175	64	153	2.7	15	0.05	0.04	34	0.10	---	1.4	0.04	ND	0.4	40	3014	191	ND	ND
Nov	7.9	97	372	201	ND	201	59	143	2.9	11	ND	0.05	35	0.11	---	1.3	ND	ND	0.5	35	401	20	ND	ND
Dec	7.9	84	333	201	2	203	55	124	2.7	14	ND	0.04	31	ND	---	1.6	ND	ND	0.5	30	1745	21	ND	ND

	Metals																								
	ALUMINIUM	ANTIMONY	ARSENIC	BARIUM	BERYLLIUM	CADMIUM	CALCIUM	CHROMIUM	COBALT	COPPER	IRON	LEAD	LITHIUM	MAGNESIUM	MANGANESE	MOLYBDENUM	NICKEL	SELENIUM	SILVER	SODIUM	STRONTIUM	THALLIUM	THORIUM	URANIUM	ZINC
	ppb	ppb	ppb	ppb	ppb	ppb	ppm	ppb	ppb	ppb	ppb	ppb	ppb	ppm	ppb	ppb	ppb	ppb	ppb	ppm	ppb	ppb	ppb	ppb	ppb
Jan	463	ND	ND	34	ND	ND	35	ND	ND	1.6	268	0.2	1.5	7	38	0.5	1.1	ND	ND	28	130	ND	ND	ND	4.0
Feb	442	ND	ND	38	ND	ND	39	ND	ND	1.7	112	ND	2.0	8	40	0.6	1.0	ND	ND	33	166	ND	ND	ND	3.8
Mar	402	ND	0.2	37	ND	ND	31	ND	ND	1.4	337	0.3	1.7	6	43	0.4	1.2	ND	ND	34	121	ND	ND	ND	3.4
Apr	390	ND	ND	34	ND	ND	32	ND	ND	1.1	133	ND	1.5	7	57	0.4	0.9	ND	ND	21	133	ND	ND	ND	2.6
May	187	ND	0.4	38	ND	ND	37	ND	ND	1.0	92	ND	1.8	6	50	0.6	1.0	ND	ND	17	142	ND	ND	ND	2.3
Jun	148	0.3	0.8	46	ND	ND	35	ND	0.2	1.7	112	ND	1.9	8	150	1.0	1.3	ND	ND	17	177	ND	ND	0.2	2.7
Jul	363	ND	0.7	33	ND	ND	36	ND	0.4	2.0	544	0.7	1.5	6	53	0.5	1.8	ND	ND	17	94	ND	ND	ND	3.9
Aug	205	ND	0.6	43	ND	ND	41	ND	0.2	1.8	111	ND	2.5	10	67	0.8	1.0	ND	ND	21	195	ND	ND	0.3	2.4
Sep	225	ND	ND	46	ND	ND	43	ND	0.2	1.6	92	ND	3.3	12	58	1.3	1.5	ND	ND	22	238	ND	ND	0.3	2.1
Oct	23	ND	0.7	51	ND	ND	46	ND	ND	2.7	10	ND	3.3	9	10	1.1	1.0	ND	ND	19	267	ND	ND	ND	0.8
Nov	218	ND	0.5	40	ND	ND	44	ND	ND	1.9	129	0.2	1.8	8	44	0.9	1.3	ND	ND	19	170	ND	ND	0.2	3.1
Dec	145	ND	0.2	39	ND	ND	38	ND	ND	1.3	99	ND	2.1	7	34	0.9	0.9	ND	ND	16	199	ND	ND	0.2	2.8

ppm = Parts Per Million
org/mL = Organisms per milliliter

ppb = Parts Per Billion
CFU/mL = Colony Forming Units per milliliter

ND = Not Detected
NTU = Nephelometric Turbidity Units

MPN/100mL = Most Probable Number per 100 milliliters
µS/cm = microSiemens per centimeter

"---" = No Analysis Required



WASHINGTON AQUEDUCT, US ARMY CORPS OF ENGINEERS ANNUAL REPORT OF WATER ANALYSIS (2015)

EPA MCL*	Inorganic Ions										Metals																											
	TOTAL AMMONIA - N	BROMIDE	CHLORIDE	FLUORIDE	IODIDE	NITRATE - N	NITRITE - N	ORTHOPHOSPHATE - PO4	PERCHLORATE	SULFATE	ALUMINUM	ANTIMONY	ARSENIC	BARIUM	BERYLLIUM	CADMIUM	CALCIUM	CHROMIUM	COBALT	COPPER	IRON	LEAD	LITHIUM	MAGNESIUM	MANGANESE	MERCURY	MOLYBDENUM	NICKEL	SELENIUM	SILVER	SODIUM	STRONTIUM	THALLIUM	THORIUM	URANIUM	VANADIUM	ZINC	
Units	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	ppb	ppm	ppb	ppb	ppb	ppb	ppb	ppm	ppb	ppb	ppb	ppb	ppb	ppb	ppm	ppb	ppb	ppb	ppb	ppb	ppb	ppm	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
			4			10	1				6	10	2000	4	5		100									2			50				2		30			

Dalecarlia Water Treatment Plant Finished Water

Jan	0.7	ND	53	0.7	ND	2.1	ND	2.5	0.5	40	19	ND	ND	30	ND	ND	37	ND	ND	1.0	ND	ND	1.4	7	0.8	ND	0.5	0.7	ND	ND	32	146	ND	ND	ND	ND	1.0
Feb	0.7	ND	62	0.6	---	2.0	ND	2.3	0.8	43	15	ND	0.3	33	ND	ND	38	ND	ND	1.2	ND	ND	1.4	9	0.8	ND	0.6	0.8	ND	ND	39	168	ND	ND	ND	ND	1.2
Mar	0.6	ND	63	0.6	---	1.6	ND	2.4	0.3	37	17	ND	0.3	32	ND	ND	34	ND	ND	1.0	ND	ND	1.6	6	0.6	ND	0.4	0.9	ND	ND	37	132	ND	ND	ND	ND	5.3
Apr	ND	ND	42	0.6	ND	1.6	ND	2.3	0.4	36	19	ND	0.3	35	ND	ND	35	ND	ND	0.8	ND	ND	1.4	7	0.5	ND	0.4	0.8	ND	ND	24	143	ND	ND	ND	ND	1.1
May	0.8	ND	37	0.7	---	1.1	ND	2.4	0.3	41	23	ND	0.3	37	ND	ND	40	ND	ND	0.7	ND	ND	1.7	7	0.6	ND	0.5	0.8	ND	ND	22	149	ND	ND	ND	ND	0.7
Jun	0.8	ND	40	0.8	---	1.2	ND	2.5	0.3	42	36	ND	0.4	40	ND	ND	39	ND	ND	0.9	ND	ND	2.0	8	1.9	ND	0.7	0.9	ND	ND	24	187	ND	ND	ND	---	0.9
Jul	0.7	ND	34	0.8	---	1.2	ND	2.4	0.4	43	22	ND	0.4	29	ND	ND	40	ND	ND	1.0	ND	ND	1.3	7	0.6	ND	ND	1.0	ND	ND	22	97	ND	ND	ND	0.7	0.5
Aug	0.8	ND	41	0.8	---	0.8	ND	2.4	0.7	54	68	0.2	0.4	40	ND	ND	41	ND	ND	1.1	ND	ND	2.0	11	0.7	ND	1.1	1.0	ND	ND	29	192	ND	ND	ND	ND	0.6
Sep	0.7	ND	40	0.7	---	0.6	ND	2.4	1.8	67	55	ND	0.4	42	ND	ND	46	ND	ND	1.0	ND	ND	2.6	12	1.2	ND	1.1	1.2	ND	ND	26	240	ND	ND	ND	ND	0.5
Oct	0.8	ND	36	0.7	---	1.5	ND	2.4	0.5	48	29	ND	ND	36	ND	ND	45	ND	ND	1.0	ND	ND	1.8	8	0.6	ND	1.0	0.9	ND	ND	25	188	ND	ND	ND	ND	ND
Nov	0.7	ND	38	0.7	---	1.4	ND	2.4	0.5	49	25	ND	ND	35	ND	ND	46	ND	ND	1.1	ND	ND	1.8	8	0.8	ND	0.7	0.9	ND	ND	27	152	ND	ND	ND	ND	ND
	0.7	ND	34	0.7	---	1.5	ND	2.4	0.4	45	22	ND	ND	34	ND	ND	41	ND	ND	0.9	ND	ND	1.6	7	0.7	ND	0.6	0.8	ND	ND	23	192	ND	ND	ND	ND	ND

McMillan Water Treatment Plant Finished Water

Jan	0.7	ND	47	0.7	ND	2.0	ND	2.4	0.5	41	16	ND	ND	30	ND	ND	33	ND	ND	3.8	ND	ND	1.3	7	ND	ND	0.5	0.8	ND	ND	29	143	ND	ND	ND	ND	1.1
Feb	0.8	ND	62	0.7	---	2.0	ND	2.3	0.8	42	17	ND	ND	33	ND	ND	32	ND	ND	3.5	ND	ND	1.3	8	0.2	ND	0.5	0.8	ND	ND	36	157	ND	ND	ND	ND	1.2
Mar	0.6	ND	71	0.7	---	1.7	ND	2.4	0.4	39	24	ND	ND	32	ND	ND	26	ND	ND	2.9	ND	ND	1.6	6	0.2	ND	0.5	0.9	ND	ND	46	136	ND	ND	ND	ND	1.1
Apr	ND	ND	45	0.7	ND	1.6	ND	2.4	0.4	36	18	ND	ND	32	ND	ND	28	ND	ND	2.2	ND	ND	1.2	6	ND	ND	0.3	0.8	ND	ND	26	126	ND	ND	ND	ND	3.5
May	0.8	ND	35	0.8	---	1.1	ND	2.4	0.4	40	18	ND	ND	34	ND	ND	31	ND	ND	4.9	ND	ND	1.7	7	ND	ND	0.3	0.7	ND	ND	22	131	ND	ND	ND	ND	ND
Jun	0.8	ND	41	0.8	---	1.2	ND	2.5	0.4	45	61	ND	0.3	37	ND	ND	36	ND	ND	7.7	16	ND	1.6	8	1.1	ND	0.6	0.7	ND	ND	27	169	ND	ND	ND	---	ND
Jul	0.7	ND	35	0.8	---	1.2	ND	2.5	0.5	45	21	ND	0.3	36	ND	ND	28	ND	ND	8.7	ND	ND	1.5	7	1.1	ND	0.6	0.7	ND	ND	25	127	ND	ND	ND	0.6	ND
Aug	0.8	ND	41	0.8	---	0.8	ND	2.5	0.7	56	57	ND	0.2	40	ND	ND	37	ND	ND	6.2	ND	ND	1.6	10	0.3	ND	0.8	0.6	ND	ND	27	188	ND	ND	ND	ND	ND
Sep	0.7	ND	40	0.7	---	0.6	ND	2.5	1.9	68	42	ND	0.3	41	ND	ND	41	ND	ND	6.7	ND	ND	2.1	12	1.1	ND	1.1	0.7	ND	ND	27	224	ND	ND	ND	ND	ND
Oct	0.8	ND	35	0.7	---	1.2	ND	2.5	0.5	57	23	ND	ND	38	ND	ND	37	ND	ND	11	ND	ND	2.4	8	ND	ND	1.0	0.9	ND	ND	25	202	ND	ND	ND	ND	ND
Nov	0.7	ND	39	0.7	---	1.3	ND	2.5	0.5	54	22	ND	ND	36	ND	ND	41	ND	ND	17.0	ND	ND	2.3	8	ND	ND	0.8	1.0	ND	ND	25	177	ND	ND	ND	ND	ND
Dec	0.8	ND	36	0.6	---	1.4	ND	2.5	0.4	47	15	ND	ND	34	ND	ND	33	ND	ND	12.4	ND	ND	1.8	7	ND	ND	0.7	0.8	ND	ND	25	192	ND	ND	ND	ND	0.7

*EPA MCL = Environmental Protection Agency's Maximum Contaminant Level for regulated parameters

ppm = Parts Per Million

ppb = Parts Per Billion

ND = Not Detected

"---" = No Analysis Required



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	Synthetic Organic Compounds																				Miscellaneous				Nitrosamines									
	METOLACHLOR	METRIBUZIN	MOLINATE	trans-NONACHLOR	OXAMYL	PARAQUAT	PARATHION	PENDIMETHALIN	PERMETHRIN	PENTACHLOROPHENOL	PHENANTHRENE	PICLORAM	PROPACHLOR	PYRENE	SIMAZINE	TERBACIL	TERBUTHYLAZINE	THIOBENCARB	TRIFLURALIN	TOXAPHENE	2,4,5-T	2,4,5-TP (SILVEX)	DIBROMOCHLOROPROPANE (DBCP)	ETHYLENE DIBROMIDE (EDB)	CYANIDE	2,3,7,8-TCDD (DIOXIN)	N-NITROSODIMETHYLAMINE (NDMA)	N-NITROSO-n-PROPYLAMINE (NDPA)	N-NITROSODIBUTYLAMINE (NDBA)	N-NITROSODIETHYLAMINE (NDEA)	N-NITROSOMETHYLETHYLAMINE (NMEA)	N-NITROSPYROLIDINE (NPYR)		
EPA MCL*					200				1		500			4						3		50	200	50	0.2	30								
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppt	ppt	ppm	ppq	ppt	ppt	ppt	ppt	ppt	ppt	ppt	ppt	ppt

Dalecarlia Water Treatment Plant Finished Water

Jan	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Feb	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
Mar	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
Apr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
May	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Jun	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Jul	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Aug	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---	---	---
Sep	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Oct	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.01	ND	3.0	ND	ND	ND	ND	ND	ND	ND		
Nov	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Dec	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

McMillan Water Treatment Plant Finished Water

Jan	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
Feb	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
Mar	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Apr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
May	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Jun	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Jul	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Aug	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Sep	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Oct	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.4	ND	ND	ND	ND	ND	ND	ND		
Nov	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Dec	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

EPA MCL* = Environmental Protection Agency's Maximum Contaminant Level for regulated parameters ppb = Parts Per Billion (µg/L) ppt = Parts Per Trillion (ng/L) ND = Not Detected "----" = No Analysis Required