



City of Raleigh
North Carolina

2015 Annual Finished Water Quality Report Tests of Finished Water From the EM Johnson Water Treatment Facility

The City of Raleigh consistently provides a reliable supply of high quality drinking water that surpasses all State and Federal drinking water quality requirements. This report contains water quality test results for the City of Raleigh Finished Water. Many of the parameters listed in this report are commonly requested by our customers. If you have any questions regarding this report, please contact the City of Raleigh Drinking Water Laboratory at (919)996-2870.

Microbiologicals

Contaminant	Your water	MCL	Sources of Contaminant
Cryptosporidium, Oocysts/L (11/16/15)	0	NA	Human and animal fecal waste
Giardia, cyst/L (11/16/15)	0	NA	Human and animal fecal waste
Heterotrophic Plate Count, MPN/ml, Distribution	11	NA	HPC measures a range of bacteria that are naturally present in the environment
Total Coliform (240 samples per month), Distribution	1.25% were positive	No more than 5% samples are positive	Coliforms are naturally present in the environment
E Coli (240 samples per month), Distribution	0% were positive	(Note: The MCL is exceeded if a routine sample and repeat sample are total coliform positive and one is also fecal coliform or E Coli positive)	Human and animal fecal waste
Viruses* (11/2/15)	Negative	NA	Human and animal fecal waste

*Viruses include Adenovirus, Astrovirus, Rotavirus and Panterterovirus

Disinfectants and Disinfection Byproducts

Contaminant	Your water	MCL	Sources of Contaminant
Bromate, mg/l	<0.005	0.01	Byproduct of drinking water disinfection
Haloacetic Acids (HAA5), ppb	11.9	60	Byproduct of drinking water disinfection
Total Trihalomethanes (TTHMs), ppb	20.1	80	Byproduct of drinking water disinfection
Total Organic Carbon, ppm	1.98	na	Naturally present in the environment
Free Chlorine, ppm (March to Mid April)	2.2	MRDL = 4	Water additive used to control microbes
Chloramines, ppm	3.00	MRDL = 4	Water additive used to control microbes

Lead and Copper: Sample Date 2013

Contaminant	Your water	MCL	Sources of Contaminant
Copper (ppm) (90th percentile)	0.064	AL = 1.3	Corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives
Lead (ppb) (90th percentile)	<3	AL = 15	Corrosion of household plumbing systems, erosion of natural deposits

Asbestos

Contaminant	Your water	MCL	Sources of Contaminant
Total Asbestos (MF/L)	<0.2	7	Decay of asbestos cement water mains; erosion of natural deposits

Turbidity (Combined Filter Effluent Turbidity Values)

Contaminant	Your water (AVG)	MCL	Sources of Contaminant
Turbidity, NTU	0.06	TT = 1 NTU	Soil runoff

Nitrate and Nitrite

Contaminant	Your water	MCL	Sources of Contaminant
Nitrate, ppm	<1.0	10	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Nitrite, ppm	<0.1	1	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits

Minerals

Contaminant	Your water	MCL
Calcium, mg/l	6.60	N/A
Sodium, mg/l	30.9	N/A
Magnesium, mg/l	2.26	N/A
Potassium, mg/l	2.60	N/A

Inorganic Chemicals

Contaminant	Your water	MCL	Sources of Contaminant
Antimony, mg/l	<0.001	0.006	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder
Arsenic, mg/l	<0.005	0.01	Erosion of natural deposits; runoff from orchards, runoff from glass & electronic production wastes
Barium, mg/l	<0.400	2	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Beryllium, mg/l	<0.002	0.004	Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace, and defense industries
Cadmium, mg/l	<0.001	0.005	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints
Chromium (Total), mg/l	<0.020	0.1	Discharge from steel and pulp mills; erosion of natural deposits
Chromium 6 (Hexavalent Chromium), mg/l	0.00006	NA	Commonly discharged from steel and pulp mills as well as metal plating and leather tanning facilities
Cyanide, mg/l	<0.050	0.2	Discharge from steel/metal factories; discharge from plastic and fertilizer factories
Fluoride, mg/l	0.75	4	Water additive which promotes strong teeth; erosion of natural deposits; discharge from fertilizer and aluminum factories
Mercury, mg/l	<0.0004	0.002	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills and croplands
Selenium, mg/l	<0.010	0.05	Discharge from petroleum refineries; erosion of natural deposits; discharge from mines
Thallium, mg/l	<0.001	0.002	Leaching from ore-processing sites; discharge from electronics, glass and drug factories

Organic Chemical

Contaminant	Your water	MCL	Sources of Contaminant
Alachlor, mg/l	<0.0002	0.002	Runoff from herbicide used on row crops
Atrazine, mg/l	<0.0001	0.003	Runoff from herbicide used on row crops
Benzene, mg/l	<0.0005	0.005	Discharge from factories; leaching from gas storage tanks and landfills
Benzo(a)pyrene, mg/l	<0.00002	0.0002	Leaching from linings of water storage tanks and distribution lines

Carbofuran, mg/l	<0.0009	0.04	<i>Leaching of soil fumigant used on rice and alfalfa</i>
Carbon Tetrachloride, mg/l	<0.0005	0.005	<i>Discharge from chemical plants and other industrial activities</i>
Chlordane, mg/l	<0.0002	0.002	<i>Residue of banned termiticide</i>
Chlorobenzene, mg/l	<0.0005	0.1	<i>Discharge from chemical and agricultural chemical factories</i>
2,4-D, mg/l	<0.0001	0.07	<i>Runoff from herbicide used on row crops</i>
Dalapon, mg/l	<0.001	0.2	<i>Runoff from herbicide used on row crops</i>
o-Dichlorobenzene, mg/l	<0.0005	0.6	<i>Discharge from industrial chemical factories</i>
p-Dichlorobenzene, mg/l	<0.0005	0.075	<i>Discharge from industrial chemical factories</i>
1,2-Dichloroethane, mg/l	<0.0005	0.005	<i>Discharge from industrial chemical factories</i>
1,1-Dichloroethylene, mg/l	<0.0005	0.007	<i>Discharge from industrial chemical factories</i>
cis-1,2-Dichloroethylene, mg/l	<0.0005	0.07	<i>Discharge from industrial chemical factories</i>
trans-1,2-Dichloroethylene, mg/l	<0.0005	0.1	<i>Discharge from industrial chemical factories</i>
Dichloromethane, mg/l	<0.0005	0.005	<i>Discharge from industrial chemical factories</i>
1,2-Dichloropropane, mg/l	<0.0005	0.005	<i>Discharge from industrial chemical factories</i>
Di(2-ethylhexyl) adipate, mg/l	<0.0006	0.4	<i>Discharge from chemical factories</i>
Di(2-ethylhexyl) phthalate, mg/l	0.0005	0.006	<i>Discharge from rubber and chemical factories</i>
Dinoseb, mg/l	<0.0002	0.007	<i>Runoff from herbicide used on soybeans and vegetables</i>
Endrin, mg/l	<0.00001	0.002	<i>Residue of banned insecticide</i>
Ethylbenzene, mg/l	<0.0005	0.7	<i>Discharge from petroleum refineries</i>
Ethylene dibromide, mg/l	<0.00001	0.00005	<i>Discharge from petroleum refineries</i>
Heptachlor, mg/l	<0.00004	0.0004	<i>Residue of banned termiticide</i>
Heptachlor epoxide, mg/l	<0.00002	0.0002	<i>Breakdown of heptachlor</i>
Hexachlorobenzene, mg/l	<0.0001	0.001	<i>Discharge from metal refineries and agricultural chemical factories</i>
Hexachlorocyclopentadiene, mg/l	<0.0001	0.05	<i>Discharge from chemical factories</i>
Lindane, mg/l	<0.00002	0.0002	<i>Runoff/leaching from insecticide used on cattle, lumber, gardens</i>
Methoxychlor, mg/l	<0.0001	0.04	<i>Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock</i>
Oxamyl (Vydate), mg/l	<0.002	0.2	<i>Runoff/leaching from insecticide used on apples, potatoes, and tomatoes</i>
PCBs (Polychlorinated Biphenyls), mg/l	<0.001	0.0005	<i>Runoff from landfills; discharge of waste chemicals</i>
Pentachlorophenol, mg/l	<0.00004	0.001	<i>Runoff from landfills; discharge of waste chemicals</i>
Picloram, mg/l	<0.0001	0.5	<i>Herbicide runoff</i>
Simazine, mg/l	0.00004	0.004	<i>Herbicide runoff</i>
Styrene, mg/l	<0.0005	0.1	<i>Discharge from rubber and plastic factories; leaching from landfills</i>
Tetrachloroethylene, mg/l	<0.0005	0.005	<i>Discharge from factories and dry cleaners</i>
Toluene, mg/l	<0.0005	1	<i>Discharge from petroleum factories</i>
Toxaphene, mg/l	<0.001	0.003	<i>Runoff/leaching from insecticide used on cotton and cattle</i>
2,4,5-TP (Silvex), mg/l	<0.0002	0.05	<i>Residue of banned herbicide</i>
1,2,4-Trichlorobenzene, mg/l	<0.0005	0.07	<i>Discharge from textile finishing factories</i>
1,1,1-Trichloroethane, mg/l	<0.0005	0.2	<i>Discharge from metal degreasing sites and other factories</i>
1,1,2-Trichloroethane, mg/l	<0.0005	0.005	<i>Discharge from industrial chemical factories</i>
Trichloroethylene, mg/l	<0.0005	0.005	<i>Discharge from metal degreasing sites and other factories</i>
Vinyl chloride, mg/l	<0.0005	0.002	<i>Leaching from PVC pipes; discharge from plastic factories</i>
Xylenes (Total), mg/l	<0.0005	10	<i>Discharge from petroleum factories; discharge from chemical factories</i>

Radionuclides

Contaminant	Your water	MCL	Sources of Contaminant
Alpha Particles, pCi/L	<3	15	Erosion of natural deposits of certain minerals that are radioactive and may emit a form of radiation known as alpha radiation
Beta particles and photon emitters, pCi/L	<4.0	50	Decay of natural and man made deposits of certain minerals that are radioactive and may emit forms of radiation known as photons and beta radiation
Radium 226 , pCi/L	<1	5	Erosion of natural deposits
Radium 228 , pCi/L	<1	5	Erosion of natural deposits
Uranium, pCi/L	<1	20.1	Erosion of natural deposits

Water Quality Characteristics

Contaminant	Your water	MCL
Alkalinity, mg/l as CaCO3	30.2	NA
Aluminum, mg/l	<0.01	0.2
Total Ammonia, mg/l	0.51	NA
Carbon Dioxide, mg/l	0.27	NA
Chloride, mg/l	15.0	250
Color, CU	0.48	15
Conductivity, uS/cm	228	NA
Dissolved Oxygen, mg/l	12.8	NA
Hardness, Total, mg/l as CaCO3	27.6	Classified as "Soft"
Hardness, Total, grains per gallon	1.61	Classified as "Soft"
Iron, mg/l	0.03	0.3
Manganese, mg/l	0.003	0.05
Nickel, mg/l	<0.100	NA
Odor, TON	0.09	3
pH, SU	8.38	6.5 to 8.5
Silica, mg/l	6.03	NA
Sulfate, mg/l	46.8	250
Temperature, °C	19.3	NA
Total Dissolved Solids, mg/l	152	500
UV 254, mg/l	0.03	NA
Zinc, mg/l	<0.01	5

Treatment Process Information

Chemical	Typical Dosage Range	Purpose of Treatment
Ozone, ppm	1 - 3	Oxidant
Potassium Permanganate, ppm	1 - 4	Pre Oxidant
Ferric Sulfate, ppm	50 - 90	Coagulant
Polymer, ppm	0.05 - 0.10	Coagulant Aid
Sodium Hydroxide, ppm	15 - 35	pH Control
Carbon, ppm	1 - 5	Taste and Odor and organics removal
Silicate, ppm	1.5 - 13	Corrosion control
Hydrofluorosilicic Acid, ppm	0.7 - 1	Fluoride Additive
Chlorine, ppm	6 - 7	Disinfectant
Ammonia, ppm	3.5:1 Cl ₂ :NH ₃ Ratio	Disinfectant when use in conjunction with chlorine to form chloramines
Filter Aid Polymer, ppm	0.08 - 0.12	Enhanced Filtration



2015 Annual Finished Water Quality Report

Tests of Finished Water From the DE Benton Water Treatment Facility

The City of Raleigh consistently provides a reliable supply of high quality drinking water that surpasses all State and Federal drinking water quality requirements. This report contains water quality test results for the City of Raleigh Finished Water. Many of the parameters listed in this report are commonly requested by our customers. If you have any questions regarding this report, please contact the City of Raleigh Drinking Water Laboratory at (919)996-2870.

Microbiologicals

Contaminant	Your water	MCL	Sources of Contaminant
Cryptosporidium, Oocysts/L (11/9/2015)	0	NA	Human and animal fecal waste
Giardia, cyst/L (11/9/2015)	0	NA	Human and animal fecal waste
Viruses* (11/2/2015)	Negative	NA	Human and animal fecal waste

*Viruses include Adenovirus, Astrovirus, Rotavirus and Panterterovirus

Disinfection Byproducts

Contaminant	Your water	MCL	Sources of Contaminant
Bromate, mg/l	<0.005	0.01	Byproduct of drinking water disinfection
Haloacetic Acids (HAA5), ppb	9.1	60	Byproduct of drinking water disinfection
Total Trihalomethanes (TTHMs), ppb	16.2	80	Byproduct of drinking water disinfection
Total Organic Carbon, ppm	1.50	NA	Naturally present in the environment

Asbestos

Contaminant	Your water	MCL	Sources of Contaminant
Total Asbestos (MF/L)	<0.2	7	Decay of asbestos cement water mains; erosion of natural deposits

Nitrate and Nitrite

Contaminant	Your water	MCL	Sources of Contaminant
Nitrate, ppm	<1.0	10	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Nitrite, ppm	<0.1	1	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits

Turbidity (Combined Filter Effluent Turbidity Values)

Contaminant	Your water (AVG)	MCL	Sources of Contaminant
Turbidity, NTU	0.05	TT = 1 NTU	Soil runoff

Minerals

Contaminant	Your water	MCL
Calcium, mg/l	6.02	N/A
Sodium, mg/l	28.8	N/A
Magnesium, mg/l	1.65	N/A
Potassium, mg/l	2.70	N/A

Inorganic Chemicals

Contaminant	Your water	MCL	Sources of Contaminant
Antimony, mg/l	<0.001	0.006	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder
Arsenic, mg/l	<0.005	0.01	Erosion of natural deposits; runoff from orchards, runoff from glass & electronic production wastes
Barium, mg/l	<0.400	2	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Beryllium, mg/l	<0.002	0.004	Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace, and defense industries
Cadmium, mg/l	<0.001	0.005	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints
Chromium (Total), mg/l	<0.020	0.1	Discharge from steel and pulp mills; erosion of natural deposits
Chromium 6 (Hexavalent Chromium), mg/l	<0.00003	NA	Commonly discharged from steel and pulp mills as well as metal plating and leather tanning facilities
Cyanide, mg/l	<0.050	0.2	Discharge from steel/metal factories; discharge from plastic and fertilizer factories
Fluoride, mg/l	0.7	4	Water additive which promotes strong teeth; erosion of natural deposits; discharge from fertilizer and aluminum factories
Mercury, mg/l	<0.0004	0.002	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills and croplands
Selenium, mg/l	<0.010	0.05	Discharge from petroleum refineries; erosion of natural deposits; discharge from mines
Thallium, mg/l	<0.001	0.002	Leaching from ore-processing sites; discharge from electronics, glass and drug factories

Organic Chemical

Contaminant	Your water	MCL	Sources of Contaminant
Alachlor, mg/l	<0.0002	0.002	Runoff from herbicide used on row crops
Atrazine, mg/l	<0.0001	0.003	Runoff from herbicide used on row crops
Benzene, mg/l	<0.0005	0.005	Discharge from factories; leaching from gas storage tanks and landfills
Benzo(a)pyrene, mg/l	<0.00002	0.0002	Leaching from linings of water storage tanks and distribution lines
Carbofuran, mg/l	<0.0009	0.04	Leaching of soil fumigant used on rice and alfalfa
Carbon Tetrachloride, mg/l	<0.0005	0.005	Discharge from chemical plants and other industrial activities
Chlordane, mg/l	<0.0002	0.002	Residue of banned termiticide
Chlorobenzene, mg/l	<0.0005	0.1	Discharge from chemical and agricultural chemical factories
2,4-D, mg/l	<0.0001	0.07	Runoff from herbicide used on row crops
Dalapon, mg/l	<0.001	0.2	Runoff from herbicide used on row crops
o-Dichlorobenzene, mg/l	<0.0005	0.6	Discharge from industrial chemical factories

p-Dichlorobenzene, mg/l	<0.0005	0.075	<i>Discharge from industrial chemical factories</i>
1,2-Dichloroethane, mg/l	<0.0005	0.005	<i>Discharge from industrial chemical factories</i>
1,1-Dichloroethylene, mg/l	<0.0005	0.007	<i>Discharge from industrial chemical factories</i>
cis-1,2-Dichloroethylene, mg/l	<0.0005	0.07	<i>Discharge from industrial chemical factories</i>
trans-1,2-Dichloroethylene, mg/l	<0.0005	0.1	<i>Discharge from industrial chemical factories</i>
Dichloromethane, mg/l	<0.0005	0.005	<i>Discharge from industrial chemical factories</i>
1,2-Dichloropropane, mg/l	<0.0005	0.005	<i>Discharge from industrial chemical factories</i>
Di(2-ethylhexyl) adipate, mg/l	<0.0006	0.4	<i>Discharge from chemical factories</i>
Di(2-ethylhexyl) phthalate, mg/l	<0.00132	0.006	<i>Discharge from rubber and chemical factories</i>
Dinoseb, mg/l	<0.0002	0.007	<i>Runoff from herbicide used on soybeans and vegetables</i>
Endrin, mg/l	<0.00001	0.002	<i>Residue of banned insecticide</i>
Ethylbenzene, mg/l	<0.0005	0.7	<i>Discharge from petroleum refineries</i>
Ethylene dibromide, mg/l	<0.00001	0.00005	<i>Discharge from petroleum refineries</i>
Heptachlor, mg/l	<0.00004	0.0004	<i>Residue of banned termiticide</i>
Heptachlor epoxide, mg/l	<0.00002	0.0002	<i>Breakdown of heptachlor</i>
Hexachlorobenzene, mg/l	<0.0001	0.001	<i>Discharge from metal refineries and agricultural chemical factories</i>
Hexachlorocyclopentadiene, mg/l	<0.0001	0.05	<i>Discharge from chemical factories</i>
Lindane, mg/l	<0.00002	0.0002	<i>Runoff/leaching from insecticide used on cattle, lumber, gardens</i>
Methoxychlor, mg/l	<0.0001	0.04	<i>Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock</i>
Oxamyl (Vydate), mg/l	<0.002	0.2	<i>Runoff/leaching from insecticide used on apples, potatoes, and tomatoes</i>
PCBs (Polychlorinated Biphenyls), mg/l	<0.001	0.0005	<i>Runoff from landfills; discharge of waste chemicals</i>
Pentachlorophenol, mg/l	<0.00004	0.001	<i>Runoff from landfills; discharge of waste chemicals</i>
Picloram, mg/l	<0.0001	0.5	<i>Herbicide runoff</i>
Simazine, mg/l	<0.00007	0.004	<i>Herbicide runoff</i>
Styrene, mg/l	<0.0005	0.1	<i>Discharge from rubber and plastic factories; leaching from landfills</i>
Tetrachloroethylene, mg/l	<0.0005	0.005	<i>Discharge from factories and dry cleaners</i>
Toluene, mg/l	<0.0005	1	<i>Discharge from petroleum factories</i>
Toxaphene, mg/l	<0.001	0.003	<i>Runoff/leaching from insecticide used on cotton and cattle</i>
2,4,5-TP (Silvex), mg/l	<0.0002	0.05	<i>Residue of banned herbicide</i>
1,2,4-Trichlorobenzene, mg/l	<0.0005	0.07	<i>Discharge from textile finishing factories</i>
1,1,1-Trichloroethane, mg/l	<0.0005	0.2	<i>Discharge from metal degreasing sites and other factories</i>
1,1,2-Trichloroethane, mg/l	<0.0005	0.005	<i>Discharge from industrial chemical factories</i>
Trichloroethylene, mg/l	<0.0005	0.005	<i>Discharge from metal degreasing sites and other factories</i>
Vinyl chloride, mg/l	<0.0005	0.002	<i>Leaching from PVC pipes; discharge from plastic factories</i>
Xylenes (Total), mg/l	<0.0005	10	<i>Discharge from petroleum factories; discharge from chemical factories</i>

Radionuclides

Contaminant	Your water	MCL	Sources of Contaminant
Alpha Particles, pCi/L	<3	15	Erosion of natural deposits of certain minerals that are radioactive and may emit a form of radiation known as alpha radiation
Beta particles and photon emitters, pCi/L	<4	50	Decay of natural and man made deposits of certain minerals that are radioactive and may emit forms of radiation known as photons and beta radiation
Radium 226 , pCi/L	<1	5	Erosion of natural deposits
Radium 228 , pCi/L	<1	5	Erosion of natural deposits
Uranium, pCi/L	<1	20.1	Erosion of natural deposits

Water Quality Characteristics

Contaminant	Your water	MCL
Alkalinity, mg/l as CaCO ₃	23.6	NA
Aluminum, mg/l	<0.01	0.2
Carbon Dioxide, mg/l	0.17	NA
Color, CU	0.75	15
Chloride, mg/l	14.1	250
Conductivity, uS/cm	197	NA
Hardness, Total, mg/l as CaCO ₃	26.2	Classified as "Soft"
Hardness, Total, grains per gallon	1.53	Classified as "Soft"
Iron, mg/l	0.01	0.3
Manganese, mg/l	<0.010	0.05
Nickel, mg/l	<0.100	NA
pH, SU	8.44	6.5 to 8.5
Silica, mg/l	8.94	NA
Sulfate, mg/l	41.8	250
Temperature, °C	19.5	NA
Total Dissolved Solids, mg/l	131	500
UV 254, mg/l	0.03	NA
Zinc, mg/l	<0.01	5

Treatment Process Information

Chemical	Typical Dosage Range	Purpose of Treatment
Ozone, ppm	1.8 - 3.6	Oxidant
Potassium Permanganate, ppm	1 - 2.5	Pre Oxidant
Ferric Sulfate, ppm	60 - 100	Coagulant
Polymer, ppm	0.15 - 0.50	Coagulant Aid
Sodium Hydroxide, ppm	10 - 35	pH Control
Carbon, ppm	3 - 6	Taste and Odor and organics removal
Silicate, ppm	1 - 2	Corrosion control
Hydrofluorosilicic Acid, ppm	0.75 - 0.90	Fluoride Additive
Chlorine, ppm	2 - 5	Disinfectant
Ammonia, ppm	3.5:1 Cl ₂ :NH ₃ Ratio	Disinfectant when use in conjunction with chlorine to form chloramines
Filter Aid Polymer, ppm	0.08 - 0.12	Enhanced Filtration