SAINT PAUL REGIONAL WATER SERVICES
MONTHLY WATER QUALITY

December 2023

This report contains a summary of the analysis conducted on the drinking water leaving the treatment plant.
Analytes with Nelac Lab Cert No. are Nelac Accredited analytes

EPA PRIMARY STANDARDS					
Microbiology	Drinking Water	Number of Samples	Method Reference	MCL	NELAC Certification Number
Total Coliform 35°C/100 ml (presence/absence)	Absent	248	SM 9223 B-2016 (IDEXX Colilert)	<5% of samples	2420071
E. coli 35°C/100 ml (presence/absence)	Absent	248	SM 9223 B-2016 (IDEXX Colilert)	<5% of samples	2420071
Chemistry	Drinking Water	Reporting Limit	Method Reference	MCL	NELAC Certification Number
Arsenic (ppm)	<0.0010	0.0010	EPA 200.8	0.01	2420071
Cadmium (ppm)	<0.0010	0.0010	EPA 200.8	0.005	2420071
Chlorine Residual (ppm)	3.50	0.085	Hach 10101	4	
Copper (ppm)	0.0012	0.0010	EPA 200.8	1.3	2420071
Fluoride (ppm)	0.70	0.08	EPA 9214	4	
Lead-Pb (ppm)	<0.0010	0.0010	EPA 200.8	0.015	2420071
Nitrate-Nitrite Nitrogen (ppm)	0.210	0.050	EPA 353.2	10	2420071
Total Organic Carbon (ppm)	3.36	2.50	SM 5310 B - 2011	30% removal	
Turbidity (NTU)	0.021	0.020	EPA 180.1	<1	2420071
EPA SECONDARY STANDARDS	Drinking Water	Reporting Limit	Method Reference	SMCL	NELAC Certification Number
Aluminum (ppm)	0.0117	0.0010	EPA 200.8	0.05-0.2	2420071
Chloride (ppm)	44	8	SM 4500-CL-B (20th)	250	
Color (Color Units)	<4	4	Hach Method 8025	15	
Iron-Fe (ppm)	0.0641	0.0127	EPA 200.8	0.3	
Manganese (ppm)	<0.0010	0.0010	EPA 200.8	0.05	2420071
pH	8.92	0.04	SM 4500-H+ B - 2011	6.5-8.5	2420071
Sulfate (ppm)	18.0	2.7	Hach 8051	250	
Total Dissolved Solids (ppm)	<140	140	SM 2540 C-2011	500	2420071
Zinc (ppm)	<0.0010	0.0010	EPA 200.8	5	2420071
OTHER					
Physical Characteristics/Metals	Drinking Water	Reporting Limit	Method Reference	SMCL	NELAC Certification Number
Alkalinity (ppm as $CaCO_3$)	51	0.40	SM 2320B	N/A	
Dissolved Oxygen (ppm)	11.4	1.2	SM 4500-O G (20th)	N/A	
Temperature (^0C)	6	NA	SM 2550 B-93	N/A	
Total Hardness (ppm as $CaCO_3$)	91	0.40	SM 2340 C	N/A	
Total Hardness (grains/Gal as $CaCO_3$)-	5.32				
Carbonate Hardness (ppm as $CaCO_3$)	51	0.40	SM 2340 C	N/A	
Non-Carbonate Hardness (ppm)	40	0.40	SM 2340 C	N/A	
Calcium (ppm)	22	0.4000	SM 2340 C	N/A	
Magnesium (ppm)	9	0.4000	SM 2340 C	N/A	
Total Volatile Solids (ppm)	<84	<84	SM 2540 E	N/A	
Non-Volatile Salts (ppm)	90	<84	SM 2540 E	N/A	
Hexavalent Chromium (ppm)	<0.04	0.04	Hach 8023	N/A	
Inorganic/Nutrients	Drinking Water	Reporting Limit	Method Reference	SMCL	NELAC Certification Number
Ammonia Nitrogen (ppm)	0.510	0.100	EPA 350.1	N/A	
Bromide (ppm)	<0.080	0.0800	EPA 300.0	N/A	2454188*
Total Phosphorus (ppm)	<0.025	0.025	EPA 365.1	N/A	2420071
Sulfide (ppm)	<0.020	0.020	Hach 8131	N/A	

*Subcontracted to Pace Analytical

Definitions

NELAP: National Environmental Laboratory Accreditation Program. We are an accredited lab through The NELAC Institute (TNI), which is a non-profit organization whose mission is to foster the generation of environmental data of known and documented quality through an open, inclusive, and transparent process that is responsive to the needs of the community. The accredited methods have a NELAC certification number.

Method Reference: The certified method used to measure each analyte listed in the table above. These are methods that have been widely accepted as accurate procedures for measruing that analyte.

Reporting limit: The sample concentration or reading that can be confidently reported. For any reading below the reporting limit, data cannot be confidently stated as correct as is reported as "less than < the reporting limit".

Parts per million (ppm): Means 1 part per 1,000,000 parts. 1 ppm would be equal to putting ONE drop of water from an eyedropper into 10 gallons of water. Interchangeable with milligrams per liter (mg/L)

EPA Primary Standards: Drinking water contaminants that have legally enforceable limits based on protecting the public health and being met by the best treatment technology available.

Regulatory MCL (Maximum contaminate level): Recommended limits set by the EPA that protect human health and can be reached by utilities using the best treatment technology available.

EPA Secondary Standards: These standards are not mandatory but rather recommended limits based on aesthetic considerations such as taste, color, and odor. The contaminants with secondary standards are not considered a risk to public health.

Secondary MCL (Maximum Contaminant Level): Recommended limits set by the EPA for water contaminants to prevent aesthetic issues with drinking water color, taste, or odor. Contaminants at the secondary MCL are not considered a risk to public health.

EPA Primary Standards

Total coliform: A pathogen indicator grouping of bacteria. While many of the bacteria in this group are harmless, total coliform presence can indicate the possibility that disease causing organisms could be in the water system. . Rather than individually identifying bacteria in a sample which is time consuming and costly it is much more efficient and accurate to test for presence/absence of total coliform. No more than 5% of samples can fail for total coliform in one month.

E. coli: A grouping of bacteria that can cause gastrointestinal sickness. Like total coliform, a simple test can detect presence/absence. Samples are collected throughout each day of the month and checked for total coliofrom and E. coli.

Arsenic: A semi-metal that can be found naturally in the ground or produced through agricultural and industrial processes. The EPA regulatory MCL is 0.01 ppm. Long term affects include circulatory system and skin damage.

Cadmium: A metal found naturally and from human sources such as paints, batteries, and industrial runoff. High levels of exposure can lead to kidney damage. The EPA regulatory limit is 0.005 ppm.

Chlorine residual: The disinfectant concentration found in drinking water as it leaves the treatment plant. Over time the chlorine residual decays and so the residual leaving the plant should be high enough to kill harmful bacteria while the water remains in the drinking water distribution system. The chlorine residual must be below 4 ppm. High chlorine concentrations can cause stomach pain and eye and nose irritation.

Copper: A metal found in plumbing materials that can leach into water if it corrodes. The EPA action limit for copper is 1.3 ppm. This means that if more than 10% of customer taps exceed this number, the supplier must take addition steps to control corrosion. Short term exposure can lead to gastrointestinal distress while long term exposure can lead to liver and kidney damage.

Fluoride: A mineral that is found naturally in the ground but also added to drinking water to promote healthy teeth. Minnesota adds fluoride to the water for a target concentration of 0.7 ppm. The regulatory limit for fluoride is 4 ppm. Too much fluoride can cause mottled teeth or bone disease.

Lead: A metal that can leach into drinking water when plumbing materials with lead corrode. There is no safe level of lead. The EPA action limit for lead is 0.015 ppm. This means that if more than 10% of customer taps exceed this number the supplier must take addition steps to control corrosion.

Nitrate and Nitrite: While Nitrate and Nitrite are naturally found in the environment, high levels are usually caused by fertilizers or human and animal wastes. The EPA regulatory limit is 10 ppm for nitrate and 1 ppm for nitrite. High levels of Nitrate and Nitrite can cause methemoglobinemia, or blue baby syndrome. With this syndrome nitrite interferes with the bloods ability to carry oxygen in infants. Nitrate and Nitrite are commonly analyzed together.

Total Organic Carbon: Organic carbon represents all the material that was once living, such as plants, animals, or bacteria. It is beneficial to remove as much carbon as possible in the treatment process. Organic carbon is not only a food source for bacteria, but it also can interact with chlorine to form carcinogens commonly referred to as disinfection by-products. The current removal requirement in the EPA Disinfectants and Disinfection By-products rule is 30%. This removal rate is based on the source water TOC concentration and alkalinity.

Turbidity: Simply stated turbidity is a measure of how cloudy the water is. In addition to being aesthetically unappealing, the additional particles in the water also can harbor harmful bacteria and viruses. The regulatory limits for turbidity state that drinking water must be less than 1 NTU and 95% of readings must be below 0.3 NTU.

EPA Secondary Standards

Aluminum: A metal that in high enough concentrations can discolor the water. The secondary MCL is set at 0.05-0.2 ppm.

Chloride: An anion that occurs naturally but has risen dramatically in surface waters from human sources such as road salt application and water softeners. The EPA set a secondary MCL of 250 ppm. At levels higher than this drinking water can have a salty taste.

Color: The term color refers to the true color of the water after turbidity is removed. The natural colors (yellow to brown) of surface and ground water is typically from organic matter such as leaf material or dead algae. Colored water is aesthetically unappealing, but it is also an indication of not removing enough of the organics (and associated color that comes with it) in the treatment process. The secondary MCL is 15 color units.

Iron: A metal that in high enough concentrations can cause reddish or rusty drinking water. The EPA secondary standard MCL is 0.3 ppm.

Manganese: An EPA secondary standard contaminant that can cause black or brown discoloration in addition to a bitter metallic taste in drinking water. The secondary standard MCL for manganese is 0.05 ppm.

pH: An abbreviation for potential hydrogen ion concentration, pH is a measure of the acidity of the water. Low pH can cause corrosion which can lead to drinking water having a strong metallic taste. High pH can encourage deposits to form on pipes and can create a soda taste. The EPA sets a secondary MCL at 6.5-8.5. SPRWS drinking water pH is set close 9 to encourage CaCO3 to precipitate on pipe walls. This acts as a protective buffer between the pipes and your drinking water.

Sulfate: An EPA secondary standard contaminant that can cause a salty taste to drinking water. The secondary MCL for sulfate is 250 ppm.

Total Dissolved Solids (TDS): A term that describes all the salts and minerals that are dissolved in drinking water. High levels can result in hard water, staining, and a salty taste. The secondary MCL is 500 ppm.

Zinc: A metal that in high enough concentrations can cause drinking water to have a metallic taste. The secondary MCL is 5 ppm.

Other:

Physical Characteristics/Metals:

Dissolved Oxygen: The concentration of oxygen in the water.

Alkalinity: Is a measure of water's buffering capacity. Basically, it is how well the water resists changes in pH.

Temperature: Living in a seasonal climate, our drinking water temperatures fluctuate from close to 0°C in winter to 28°C in the summer. Each extreme poses challenges to SPRWS. The coldest temperatures can result in water main breaks while the warmest temperatures deplete chlorine much faster.

Total Hardness: Water hardness is term describing the calcium and magnesium concentration in water. Water is considered hard if it has a hardness >150 ppm CaCO3. Complaints associated with hard water include itchy skin, soap scum buildup, and damaging industrial plumbing. SPRWS drinking water treatment process includes water softening which reduces the hardness to around 80-100 ppm CaCO3. You shouldn't need a water softener if you have SPRWS water.

Carbonate Hardness: The concentration of calcium and magnesium carbonate and bi-carbonate salts.

Non-Carbonate Hardness: Hardness that includes calcium and magnesium salts other than carbonate and bicarbonate.

Calcium: Along with magnesium, calcium is one of the main culprits of hard water. Calcium is found naturally in the ground and consequently groundwater can have much higher magnesium concentrations than surface water
Magnesium: Along with calcium, magnesium is one of the main culprits of hard water. Magnesium is found naturally in the ground and consequently groundwater can have much higher magnesium concentrations than surface water.

Total Volatile Solids (Loss Ignition): Volatile solids are measured by first drying a water sample and then combusting the remaining solids. Volatile solids represent the fraction of solids that ignite after drying a water sample and are generally considered organics. SPRWS water typically has low or below detection limit volatile solids.

Non-Volatile Salts: After drying a water sample followed by combusting the solids, non-volatile salts represent the remaining solids that do not ignite. It is normal to have some salts in drinking water.

Inorganics/Nutrients:

Ammonia Nitrogen: A nutrient found naturally in surface waterbodies that is readily usable by aquatic plants and algae. Water utilities such as SPRWS use a combination of ammonia and chlorine to form monochloramine, a disinfectant suitable for large distribution systems. The use of ammonia in disinfection does cause elevated ammonia concentrations that are harmful to aquarium fish but safe for people.

Bromide: While bromide itself is not toxic in drinking water, it can react with chlorine and carbon to form disinfection by-products, known carcinogens in high enough quantity.

Orthophosphate: Orthophosphates are formed from the element phosphorous. Orthophosphate can be added to drinking water as a corrosion control technique.

Total Phosphorus: A measure of all the phosphorus in a water sample. Drinking water typically has low levels of phosphorus. However, these levels can be slightly elevated if phosphorus is used as a corrosion control measure.

Sulfide: Sulfide in water is a byproduct of the breakdown of organic matter by bacteria. At high enough levels (0.025-0.25 ppb) a rotten egg smell is noticeable.

Hexavalent chromium: A known carcinogen that is used in numerous industrial processes such as wood preservation and textile manufacturing.