TULSA HEALTH Department	**Environmental Health Services Lab** 5051 S. 129th E. Ave. Tulsa, OK 74134 918-595-4200 • https://www.tulsa-health.org/	**Open 8:00 AM to 5:00 PM** **Samples accepted until 4:30 PM** **West end of building**

FIRST TIME? SEE THESE GENERAL RECOMMENDATIONS FOR WELL WATER TESTING

START HERE	Coliforms (presence/absence)	This is the bare minimum indicator for the safety of drinking water and only from a bacteriological standpoint	**$24 ($30 Friday)** **1 sterile plastic 100 mL bottle from lab**

FOLLOWED BY A PACKAGE OF TESTS (most useful to OK well owners)

GOOD	nitrate+nitrite, solids (total dissolved), & pH	This is the bare minimum indicator for the safety of drinking water from a chemical standpoint	**$62.00** **1 1000 mL plastic bottle from lab**
BETTER	alkalinity, arsenic, chloride, coppper, conductivity, hardness, lead, nitrate+nitrite, pH, solids (total dissolved), sulfate **(10% discount on price)**	A decent set of tests that include some of the more common problems with wells in Oklahoma	**$209.70** **2 1000 mL plastic bottles from lab**
BEST	alkalinity, arsenic, calcium, chloride, conductivity, copper, fluoride, hardness, iron, lead, manganese, nitrate+nitrite, pH, solids (total dissolved), sulfate **(10% discount on price)**	A comprehensive group of tests that will help establish a baseline of water quality for most well owners or help narrow down symptoms to a specific problem.	**$298.80** **1 250 mL & 2 1000 mL plastic bottles from lab**

WHICH TEST? CONDITIONS OR PROBLEMS	ANALYSIS OR TREATMENT
recurrent GI illness	coliform bacteria, sulfate - DISINFECT WELL IF POSITIVE!
scaly plumbing residue, soap doesn't lather, plumbing	alkalinity, hardness, pH
septic concerns	coliform bacteria, nitrate-nitrite
bitter taste	pH, alkalinity, metals
metallic taste	copper, iron, manganese, and/or zinc
metallic taste with blue-green staining	copper
deposits, colored water, staining, salty taste	total dissolved solids (TDS)
salty taste	chloride, sulfate, conductivity, TDS, or sodium
green/blue color in water or plumbing deposits	copper
white plumbing deposits	total dissolved solids, sulfate, calcium
reddish/brown color in water or staining	iron, manganese, iron-related bacteria
black to brown color, rotten-egg smell, bitter taste	coliform bacteria, manganese, sulfate, sulfur-reducing bacteria
rotten-egg smell in hot water only	replace magnesium water heater anode with one made of aluminum
intensive agricultural land use nearby	nitrate-nitrite, coliform bacteria, conductivity
housing built prior to 1988	lead, copper, pH, alkalinity
petroleum smell or oily sheen	total petroleum hydrocarbons (TPH) - **contact ODEQ lab, this is not an analysis we offer**
black flakes in water	**if the flakes smear on your fingers this is likely from the rubber seals degrading (plumbing)**, otherwise check alkalinity, pH, iron, lead, copper, zinc, cadmium depending on pipe composition

TURN-AROUND TIME FOR MOST SAMPLES IS APPROXIMATELY 15 to 20 WORKING DAYS & IS DEPENDENT ON THE NUMBER OF ANALYSES

TULSA HEALTH Department	**Environmental Health Services Lab** 5051 S. 129th E. Ave. Tulsa, OK 74134 918-595-4200 • https://www.tulsa-health.org/	**Open 8:00 AM to 5:00 PM** **Samples accepted until 4:30 PM** **West end of building**

IF YOU PAY A WATER BILL TO A SUPPLIER & THINK YOU NEED TO TEST YOUR WATER:

Testing may be called for when there is a noticeable change in the water. Changes in color or taste may be indicative of a new issue. Before doing any testing we would suggest first contacting your water supplier. The testing performed by Public Water Systems is a matter of public record and may be found at a website callled the Safe Drinking Water Information System (SDWIS). Public Water System information is available at http://sdwis.deq.state.ok.us/DWW/

IMPORTANT NOTES FOR SAMPLING

We suggest avoiding shipping time-sensitive samples whenever possible. If it is necessary to ship samples, please ensure they will meet required conditions upon receipt (such as 30 hrs for coliforms) and are shipped overnight guaranteed. The lab is not responsible for shipping delays. Please consider holidays when shipping samples.	If bringing in a large number of samples or requesting unusual testing, please call our main number to see if special arrangements or preparations need to be made (e.g. enterococcus or BOD).	For soils/sludges, approximately 25 to 30 grams is needed (about a a full plastic sandwich bag).
	IF IN DOUBT, IT'S ALWAYS BETTER TO HAVE MORE SAMPLE THAN NOT ENOUGH!	There may be situations where an uninvolved third party may be required for sampling (e.g. mortgages).

The small sterile bottles MUST be filled to the 100 mL line without washing out the dechlorination powder already in the bottle. Use care when filling so as to not contaminate the inside of the bottle. Please remove the plastic shrinkwrap ring completely and do not tape the bottle shut.

HOW OFTEN SHOULD A WELL BE TESTED?

The minimum recommended testing is total coliform bacteria, nitrate-nitrite, total dissolved solids, and pH yearly. A well should also be tested if any change in the water's appearance, taste, smell, or feel. Groundwater is not static - it can and does change based on a number of conditions and circumstances. Proper maintenance of a well can reduce the likelihood of intrusion by contaminants.The final responsibility for maintaining access to clean water lies with the well owner.

EXPOSURES: ACUTE VS. CHRONIC

An acute exposure is one in which a person is exposed to a substance in a single instance. A chronic exposure is one in which a person is exposed to the same substance multiple times. The degree to which a substance may harm a person is dependent on amount, frequency of exposure, physiology, etc.& may vary widely.

IF YOU ARE TRYING TO DETERMINE THE SOURCE OF A LEAK OR ANOMALOUS SURFACE WATER

If you suspect septic or other sewage runoff:	Test for quantitated *E. coli* if you suspect a potential animal source
	Test for quantitated enterococcus if you suspect a potential human source (septic tank, etc.)
If you suspect drinking water runoff or leak:	Test for fluoride if you suspect a potential drinking water leak (not chlorine - it dissipates rapidly)

We cannot definitively pinpoint the source of a leak or contamination based on the results of any analysis. There are far too many variables such as topography, rainfall, geology, etc. to do so. We can provide you with numbers and usually a likely, unlikely, or inconclusive opinion. The lab does not have field personnel available to evaluate a situation.

TURN-AROUND TIME FOR MOST SAMPLES IS APPROXIMATELY 15 to 20 WORKING DAYS & IS DEPENDENT ON THE NUMBER OF ANALYSES

TULSA HEALTH Department		Environmental Health Services Lab 5053 S. 129th E. Ave. Tulsa, OK 74134 918-595-4200 • https://www.tulsa-health.org/		Open 8:00 AM to 5:00 PM Samples accepted until 4:30 PM West end of building
ANALYSIS	**DEPT.**	**PRICE**	**SAMPLE REQUIRED PER TEST PER LOCATION**	**IMPORTANT! SPECIAL NOTES**
Total Coliforms (presence/absence)	Microbiology	$24 ($30 Friday)	100 mL sterile bottle filled to just past 100 mL line	**Received by lab within 30 hrs**
Total Coliforms (quantitated - MPN)	Microbiology	$26 ($32.50 Friday)	100 mL sterile bottle filled to just past 100 mL line	**DW received by lab within 24 hours (Monday - Friday), NW received by lab within 6 hours (Monday - Thursday only)**
E. coli (quantitated - MPN)	Microbiology	$26 ($32.50 Friday)	100 mL sterile bottle filled to just past 100 mL line	
Heterotrophic bacteria (quantitated - MPN)	Microbiology	$40.00	100 mL sterile bottle filled to just past 100 mL line	
Fecal coliforms (quantitated - MPN)	Microbiology	$26.00	100 mL sterile bottle filled to just past 100 mL line	
Enterococcus (quantitated - MPN)**	Microbiology	$30.00	100 mL sterile bottle filled to just past 100 mL line	
Iron-related bacteria (BART)	Microbiology	$40.00	100 mL sterile bottle filled to just past 100 mL line	**BART samples received by lab within 30 hours (please call in advance if bringing multiple)**
Slime-forming bacteria (BART)	Microbiology	$40.00	100 mL sterile bottle filled to just past 100 mL line	
Sulfate-reducing bacteria (BART)	Microbiology	$40.00	100 mL sterile bottle filled to just past 100 mL line	
Ammonia (undistilled)	Wet Chemistry	$24.00	**Minimum of 250 mL in a plastic bottle from lab for each test to the left (nitrate/nitrite testing only needs 250 mL in total). Tests marked ** have a short hold time & must be analyzed within 48 hrs - please notify lab before sampling unless already scheduled or sampling on a known regular basis.**	**PLEASE DELIVER ANY SAMPLES FOR WET CHEMISTRY TESTING TO LAB WITHIN 48 HOURS TO REMAIN WITHIN SAMPLE HOLD TIMES**
Ammonia (distilled)	Wet Chemistry	$30.00		
Nitrate+nitrite	Wet Chemistry	$25.00		
Nitrate	Wet Chemistry	$25.00		
Nitrite**	Wet Chemistry	$25.00		
Phosphorous (total)	Wet Chemistry	$25.00		
Phosphorous (ortho)**	Wet Chemistry	$22.00		
BOD** or CBOD**	Wet Chemistry	$42.00	**1000 mL in plastic bottle from lab**	
Solids (total suspended)	Wet Chemistry	$25.00	**Minimum of 250 mL in a plastic bottle from lab for each test to the left. "Clean" samples may require 1000 mL for TSS.**	
Solids (total)	Wet Chemistry	$25.00		
Solids (total dissolved)	Wet Chemistry	$25.00		
Alkalinity	Wet Chemistry	$20.00	**1000 mL in plastic bottle from lab for any/all analyses to the left**	
Chloride	Wet Chemistry	$24.00		
COD	Wet Chemistry	$20.00		
Conductivity	Wet Chemistry	$15.00		
Dissolved oxygen	Wet Chemistry	$10.00		
Fluoride	Wet Chemistry	$27.00		
pH	Wet Chemistry	$12.00		
Stability	Wet Chemistry	$12.00		
Sulfate	Wet Chemistry	$18.00		
Turbidity	Wet Chemistry	$15.00		
Chlorine (free or total)	Wet Chemistry	$20.00	**500 mL amber glass bottle received by lab ASAP**	

TURN-AROUND TIME FOR MOST SAMPLES IS APPROXIMATELY 15 to 20 WORKING DAYS & IS DEPENDENT ON THE NUMBER OF ANALYSES

Please check with lab for latest status of regulatory analysis certification if unsure

TULSA HEALTH Department	Please check with lab if regulatory certification of analysis is needed	Environmental Health Services Lab 5053 S. 129th E. Ave. Tulsa, OK 74134 918-595-4200 • https://www.tulsa-health.org/		Open 8:00 AM to 5:00 PM Samples accepted until 4:30 PM West end of building
ANALYSIS	**DEPT.**	**PRICE**	**SAMPLE REQUIRED PER LOCATION**	**IMPORTANT! SPECIAL NOTES**
Aluminum	Metals	$24.00	**1000 mL plastic bottle from lab for metals (any/all) • approximately 50 grams for soils/sludges (any/all)**	***Regulatory lead & copper samples require specific sampling techniques - refer to EPA instructions***
Antimony	Metals	$25.00		
Arsenic	Metals	$25.00		
Barium	Metals	$24.00		
Beryllium	Metals	$24.00		
Cadmium	Metals	$25.00		
Calcium	Metals	$24.00		
Chromium	Metals	$24.00		
Copper	Metals	$24.00		
Hardness	Metals	$20.00		
Iron	Metals	$24.00		
Lead	Metals	$25.00		
Magnesium	Metals	$24.00		
Manganese	Metals	$24.00		
Mercury	Metals	$60.00		
Mercury (solids)	Metals	$70.00		
Molybdenum	Metals	$24.00		
Nickel	Metals	$24.00		
Potassium	Metals	$24.00		
Selenium	Metals	$25.00		
Silica	Metals	$24.00		
Silver	Metals	$24.00		
Sodium	Metals	$24.00		
Thallium	Metals	$25.00		
Vanadium	Metals	$24.00		
Zinc	Metals	$24.00		
THM	Organics	$130.00	**requires 1 set of 4 clear & 4 amber glass vials per site with no bubbles & one trip blank per total group of sites**	**Samples must be received on water ice (not synthetic)**
HAA	Organics	$240.00		
TOC/DOC	Wet Chemistry	$40.00	**500 mL amber glass bottle with phosphoric acid**	
TURN-AROUND TIME FOR MOST SAMPLES IS APPROXIMATELY 15 to 20 WORKING DAYS & IS DEPENDENT ON THE NUMBER OF ANALYSES				
Please check with lab for latest status of regulatory analysis certification if unsure				

TULSA HEALTH Department	Environmental Health Services Lab 5051 S. 129th E. Ave. Tulsa, OK 74134 918-595-4200 • https://www.tulsa-health.org/	**Open 8:00 AM to 5:00 PM** **Samples accepted until 4:30 PM** **West end of building**

A GUIDE TO ABBREVIATIONS

As is common practice in all sciences, we use the metric system. The following might be of use when reading results.

P/A	P/A signifies a presence (P) or absence (A) result for coliform testing. Any present (P) result is unacceptable for drinking water & means there were bacteria of that type in the sample.
MPN/100 mL	This signifies the Most Probable Number of bacteria per 100 mL of sample & is used when quantitating bacteria (how many there were in the sample).
MPN/mL	This signifies the Most Probable Number of bacteria per mL of sample & is used when quantitating bacteria for a heterotrophic plate count (how many of any type of bacteria were in the sample).
mg/L	milligrams per liter, also sometimes referred to as parts per million (PPM). One drop of water in the average-sized bathtub is about 2 mg/L. While this sounds like a very small amount, many substances have no taste or odor that can cause serious harm or death at this concentration (lead for example).
ug/L	micrograms per liter, also sometimes referred to as parts of billion. One drop of water in an Olympic-size swimming pool is about 1 ug/L. Sounds small, but there are uncommon substances at this concentration that can cause serious harm or death as well (dioxin & PCBs for example). The limit of cadmium in drinking water is 5 ug/L and for thallium 2 ug/L.
mg/kg	milligrams per kilogram, used only for soils or sludges. 1 mg/kg equals 1 millionth of the total 1000 grams of soil. A large paper clip weighs about a gram.
mL	milliter (one-thousandth of a liter). 5 mL is equal to about 1 teaspoon
mg	milligram (one-thousandth of a gram). 1 ounce is eaqual to about 28.4 grams
ug	microgram (one-millionth of a gram). 1 ounce contains about 28349541 micrograms. A very small unit of weight and difficult to think about, but that is how harmful some substances have the potential to be.
L	Liter. One liter is roughly euqal to one-quarter of a gallon.
umhos/cm	micromhos per cm, a standard unit of electrical conductivity in water
MCL	Maximum Contaminant Level. The highest amount of a substance permissable in drinking water as set forth byt the Safe Drinking Water Act passed by Congress in 1974 & updated intermittently since. These levels are noted in the following pages for regulated substances.
NPDWR	National Primary Drinking Water Regulations. Part of the Safe Drinking Water Act from which the list of regulated substances is derived.
NSDWR	National Secondary Drinking Water Regulations. A list of substances for which a maximum amount is recommended for aesthetic or technical reasons but not enforceable by law.

TIPS & RESOURCES

*It's usually best to test for coliforms first, disinfect the well if necessary, & proceed with any further testing from there.

*Narrow down the source of the problem by checking both the cold and hot water side. Water heaters age and can be a source of foul odors & plumbing issues.

*If relying on a well, make sure it is in good physical shape. Groundwater intrusion is a frequent culprit in well problems.

*Groundwater changes over time. A good well test one year is no guarantee that it will remain so for the remainder of its lifespan.

*Remember, if you're relying on a well you are responsible for the drinking water supply for yourself & for those under your care.

*Private Well Class (an excellent non-profit resource for well owners) https://privatewellclass.org/

*Oklahoma Water Resource Board https://www.owrb.ok.gov/	Safe Drinking Water Information System http://sdwis.deq.state.ok.us/DWW/
*US EPA https://www.epa.gov/privatewells	*Oklahoma Department of Environmental Quality https://www.deq.ok.gov/

TURN-AROUND TIME FOR MOST SAMPLES IS APPROXIMATELY 15 to 20 WORKING DAYS & IS DEPENDENT ON THE NUMBER OF ANALYSES

TULSA HEALTH Department	Environmental Health Services Lab 5051 S. 129th E. Ave. Tulsa, OK 74134 918-595-4200	Open 8:00 AM to 5:00 PM Samples accepted until 4:30 PM West end of building

SIGNIFICANCE OF ANALYTES

MCL=Maximum Contaminant Level • NPDWR=National Primary Drinking Water Standards (regulated) • NSDWR=National Secondary Drinking Water Regulations (recommended)

ANALYSIS	DEPT.	MCL	NPDWR	NSDWR	SIGNIFICANCE
Total Coliforms (presence/absence)	Microbiology	zero	X		Coliforms are bacteria that indicate that other potentially harmful bacteria may be present (see fecal coliforms & *E. coli*). They are naturally present in environment.
E. coli (quantitated - MPN)	Microbiology	zero			E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes may cause short term effects such as diarrhea, cramps, nasuea, headaches, or other symptoms. They may pose a special health risk for infacnts, young children, & people with severely compromised immune systems. They are found in human & animal fecal waste.
Heterotrophic bacteria (quantitated - MPN)	Microbiology	500 MPN	X		HPC has no health effects; it is an analytical method uses to measure the variety of bacteria that are common in water. The lower the concentration of bacteria in drinking water the better maintained the system is. (>500 MPN may indicate compromised water)
Fecal coliforms (quantitated - MPN)	Microbiology	zero	X		Fecal coliforms are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes may cause short term effects such as diarrhea, cramps, nasuea, headaches, or other symptoms. They may pose a special health risk for infants, young children, & people with severely compromised immune systems. They are found in human & animal fecal waste.
Enterococcus (quantitated - MPN)**	Microbiology				Enterococcus are indicators of the presence of fecal material in water, and, therefore, of the possible presence of disease-causing bacteria, viruses, & protozoa. These pathogens can sicken swimmers & others who use rivers & streams for recreation or eat raw shellfish or fish. Sources of fecal indicator bacteria such as enterococci include wastewater treatment plant effluent, leaking septic systems, stormwater runoff, sewage discharged or dumped from recreational boats, domestic animal and wildlife waste, improper land application of manure or sewage, & runoff from manure storage areas, pastures, rangelands, & feedlots. There are also natural, non-fecal sources of fecal indicator bacteria, including plants, sand, soil & sediments, that contribute to a certain background level in ambient waters & vary based on local environmental and meteorological conditions.
Iron-related bacteria (BART)	Microbiology		.		Iron-Related bacteria are difficult to enumerate because they are subdivided into several groupings (e.g., iron-oxidizing and iron-reducing bacteria). Iron-related bacteria can use iron in their metabolism. Taste and odor problems and "red water" are common symptoms of problems due to iron-related bacteria.

TURN-AROUND TIME FOR MOST SAMPLES IS APPROXIMATELY 15 to 20 WORKING DAYS & IS DEPENDENT ON THE NUMBER OF ANALYSES

TULSA HEALTH Department	Environmental Health Services Lab 5051 S. 129th E. Ave. Tulsa, OK 74134 918-595-4200	Open 8:00 AM to 5:00 PM Samples accepted until 4:30 PM West end of building

SIGNIFICANCE OF ANALYTES

MCL=Maximum Contaminant Level • NPDWR=National Primary Drinking Water Standards (*regulated*) • NSDWR=National Secondary Drinking Water Regulations (*recommended*)

ANALYSIS	DEPT.	MCL	NPDWR	NSDWR	SIGNIFICANCE
Slime-forming bacteria (BART)	Microbiology				Slime-forming bacteria are able to produce copious amounts of slime without necessarily having to use any iron. Iron bacteria also produce slime but usually it is thinner & involves the accumulation of various forms of iron.
Sulfate-reducing bacteria (BART)	Microbiology				Sulfate-Reducing bacteria are a group of anaerobic bacteria that generate hydrogen sulfide (H2S). This product can cause a number of significant problems in water. Problems range from “rotten egg” odors to the blackening of equipment, slime formations, & the initiation of corrosive processes. SRB microorganisms are difficult to detect because they are anaerobic & tend to grow deep down within biofilms (slimes) as a part of a microbial community. SRB may not be present in the free-flowing water over the site of the fouling.
Ammonia	Wet Chemistry				Ammonia is one form of nitrogen that exists in aquatic environments which, at elevated concentrations, can cause direct toxic effects on aquatic life. It can enter the environment via municipal effluent discharges, animal & human waste, & runoff from agricultural lands.
Nitrate and/or nitrite	Wet Chemistry		X		Infants below the age of 6 months who drink water containing nitrate in excess of 10 mg/L or nitrate in excess of 1 mg/L could become seriously ill, and if untreated may die. Symptoms include shortness of breath & blue-baby syndrome. Sources of nitrate & nitrite include runoff from fertilizer use, leaching from septic tanks, & erosion of natural deposits.
Phosphorous (total)	Wet Chemistry				Phosphorous is a critical nutrient required for all life. The most common form of phosphorous used by biological organisms is phosphate. It is also a common ingredient in commercial fertilizers. An excess of phosphorous can cause increased growth of algae & large aquatic plants, which can result in decreased levels of dissolved oxygen needed by aquatic organisms such as fish. Excess phosphorous can result from runoff from agricultural land, lawns, leaking septic systems, & discharges from wastewater treatment plants.
Phosphorous (ortho)**	Wet Chemistry				Orthophosphorous is commonly used as a safe additive to prevent the release of metals in drinking water, such as lead & copper (corrosion control).
BOD	Wet Chemistry				Biochemical oxygen demand (BOD) is the measure of dissolved oxygen (DO) consumed by aerobic bacteria growing on the organic material present in water over 5 days at 20°C. It is most commonly used to determine the degree of organic pollution in the watewater treatment process, but can also be used to measure overall water quality in surface water.

TURN-AROUND TIME FOR MOST SAMPLES IS APPROXIMATELY 15 to 20 WORKING DAYS & IS DEPENDENT ON THE NUMBER OF ANALYSES

TULSA HEALTH Department	Environmental Health Services Lab 5051 S. 129th E. Ave. Tulsa, OK 74134 918-595-4200	Open 8:00 AM to 5:00 PM Samples accepted until 4:30 PM West end of building

SIGNIFICANCE OF ANALYTES

MCL=Maximum Contaminant Level • NPDWR=National Primary Drinking Water Standards (regulated) • NSDWR=National Secondary Drinking Water Regulations (recommended)

ANALYSIS	DEPT.	MCL	NPDWR	NSDWR	SIGNIFICANCE
Solids (total suspended)	Wet Chemistry				Total suspended solids (TSS) are exactly what they sound like - particulate matter suspended in water. Usually only applicable to surface & waste waters and not drinking water.
Solids (total)	Wet Chemistry				Total solids (TS) is simply the sum of TSS + TDS.
Solids (total dissolved)	Wet Chemistry	500 mg/L		X	Total dissolved solids (TDS) is a measure of the amount of material (such as minerals) dissolved in water. A sample high in TDS is usually high in mineral content and will have a high conductivity value as well. Water over 500 mg/L may have a poor taste and cause health problems. High TDS values may originate from natural deposits or contamination of a water source.
Alkalinity	Wet Chemistry				Alkalinity is the acid-neutralizing capacity of water. It is an aggregate property of water that in combination with pH is indicative of whether a water source promotes deposition or corrosion in water lines.
Chloride	Wet Chemistry	250 mg/L		X	Chloride is one of the major inorganic anion components in water & wastewater. Water over 250 mg/L may have a detectable salty taste. Water with a high chloride content may damage metallic pipes and harm growing plants. High chloride values may result from erosion of natural deposits or wate contamination.
COD	Wet Chemistry				Chemical oxygen demand (COD) is used as a measure of pollutants in wastewater and natural waters. It is not applicable to drinking water.
Conductivity	Wet Chemistry				Conductivity is the measure of the ability of water to carry an electrical current. High conductivity values are usually associated with high mineral content. While no limit is specified for conductivity, most drinking water falls below 1000 umho/cm.
Dissolved oxygen	Wet Chemistry				Simply the amount of oxygen dissolved in water. Dissolved oxygen is necessary for aquatic life. Levels below 5 mg/L are stressful for fish and incapable of supporting most life at less than 3 mg/L. Many factors may reduce dissolved oxygen in water, such as pollutants & algae blooms.
Fluoride	Wet Chemistry	4.0 mg/L	X		A water additive that promotes strong teeth in moderation, over 4.0 mg/L fluoride may cause bone disease and fluorosis (discolored teeth). It can be found in ground water due to erosion of natural deposits.
pH	Wet Chemistry	6.5 - 8.5		X	Water with a low pH may have a bitter metallic taste & be corrosive to plumbing. Water with a high pH may have a slippery feel, a soda taste, & leave deposits on plumbing. Possible sources of either are far too numerous to list here.

TURN-AROUND TIME FOR MOST SAMPLES IS APPROXIMATELY 15 to 20 WORKING DAYS & IS DEPENDENT ON THE NUMBER OF ANALYSES

TULSA HEALTH Department	Environmental Health Services Lab 5051 S. 129th E. Ave. Tulsa, OK 74134 918-595-4200	Open 8:00 AM to 5:00 PM Samples accepted until 4:30 PM West end of building

SIGNIFICANCE OF ANALYTES

MCL=Maximum Contaminant Level • NPDWR=National Primary Drinking Water Standards (regulated) • NSDWR=National Secondary Drinking Water Regulations (recommended)

ANALYSIS	DEPT.	MCL	NPDWR	NSDWR	SIGNIFICANCE
Stability	Wet Chemistry				Stability is another way of measuring the corrosivity of water to water lines. Large negative values indicate corrosive water while large positive numbers indicate water more likely to leave deposits. Also known as Langlier Index or corrosivity, this is generally used by water systems & not individuals.
Sulfate	Wet Chemistry	250 mg/L		X	Sulfate is a naturally ocurring mineral that can be dissolved into groundwater. Sulfates can be chemically changed to hydrogen sulfide in some water heaters due to a reaction with a magnesium corrosion control rod. This will result in the hot water side of a tap having a rotten egg odor. When present above 250 mg/L, sulfate can cause water to taste salty and have a laxative effect on the digestive system.
Turbidity	Wet Chemistry				Turbidity is the meaure of the cloudiness of water. It is used to indicate water quality & filtration effectiveness (e.g. whether disease-causing organisms are present). Higher turbidity levels are often associated with higher levels of disease-causing organisms such as viruses, parasites, & some bacteria. These organisms can cause short-term symptoms such as nausea, cramps, diarrhea, & associated headaches. Most common cause is soil runoff.
Chlorine (free or total)	Wet Chemistry	4 mg/L			Chlorine is an invaluable substance used to control microbes in drinking water. However, too much of even a good thing can be detrimental. Chlorine levels over the MCL can cause eye and nose irritation as well as stomach discomfort.
TOC/DOC	Wet Chemistry				Total Organic Carbon (TOC) is most commonly used as a measure of drinking water treatment and as such is really only useful to drinking water treatment plant operators.
Aluminum (Al)	Metals	0.2 mg/L		X	Generally associated with scale & sediment buildup, aluminum over the MCL causes a coloration in water. Aluminum at harmful levels in water would render it undrinkable.
Antimony (Sb)	Metals	0.006 mg/L	X		Long-term exposure above the MCL may result in nervous system or blood problems; decrease in blood sugar
Arsenic (As)	Metals	0.01 mg/L	X		Arsenic over the MCL can cause skin damage or problems with circulatory systems & may increase the risk of cancer. The most common sources of arsenic in drinking water is erosion of natural deposits, runoff from orchards as well as glass & electronics production wastes.
Barium (Ba)	Metals	2 mg/L	X		At levels over the MCL, barium can cause an increase in blood pressure. The most common sources of barium in drinking water are discharge of drilling wastes, metal refineries, & erosion of natural deposits.

TURN-AROUND TIME FOR MOST SAMPLES IS APPROXIMATELY 15 to 20 WORKING DAYS & IS DEPENDENT ON THE NUMBER OF ANALYSES

TULSA HEALTH Department	Environmental Health Services Lab 5051 S. 129th E. Ave. Tulsa, OK 74134 918-595-4200	Open 8:00 AM to 5:00 PM Samples accepted until 4:30 PM West end of building

SIGNIFICANCE OF ANALYTES

MCL=Maximum Contaminant Level • NPDWR=National Primary Drinking Water Standards (regulated) • NSDWR=National Secondary Drinking Water Regulations (recommended)

ANALYSIS	DEPT.	MCL	NPDWR	NSDWR	SIGNIFICANCE
Beryllium (Be)	Metals	0.004 mg/L	X		At levels over the MCL, beryllium can cause intestinal lesions. The most common sources of beryllium in drinking water is discharge from metal refineries, coal-burning factories, & electrical, aerospace, & defense industries.
Cadmium (Cd)	Metals	0.005 mg/L	X		At levels over the MCL, cadmium can cause intestinal lesions. The most common sources of cadmium in drinking water is corrosion of galvanized pipes, erosion of natural depsoits, discharge from metal refineries, & runoff from waste batteries & paints.
Calcium (Ca)	Metals				A vital mineral, approximately 2% of the human body is made up of calcium. However, an excess of calcium in water pipes can lead to buildup & restriction of flow. It is also a major component of hard water.
Chromium (Cr)	Metals	0.1 mg/L	X		Required by the human body in very small amounts to properly process sugar, proteins, & fats, chromium in excess of the drinking water limit can cause allergic dermatitis. The most common sources are discharge from steel & pulp mills, cement manufacturing, & the erosion of natural deposits.
Copper (Cu)	Metals	1.3 mg/L	X		Short-term exposure to copper over the drinking water limit can cause gastrointestinal distress. Long-term exposure can cause liver or kidney damage. Anyone with Wilson's Disease should consult their physician.
Hardness	Metals				The simple definition of water hardness is the amount of dissolved calcium and magnesium in the water. Hard water is high in dissolved minerals, largely calcium and magnesium. Hard water can leave scale on plumbing, spots on dishes, and require more soap or detergent to get things clean.
Iron (Fe)	Metals	0.3 mg/L		X	In excess of the recommended limit, water can have a rusty color, leave sediment or a reddish-orange staining when used, & have a metallic taste.
Lead (Pb)	Metals	0.015 mg/L	X		Lead exposure can cause delays in physical or mental development in infants & children. It can also cause deficits in attention span & learning abilities in children. In adults, lead exposure can cause kidney problems and high blood pressure.
Magnesium (Mg)	Metals				A component of water hardness, magnesium is a mineral with no established limit. Moderate amounts of magnesium in drinking water can be beneficial.
Manganese (Mn)	Metals	0.05 mg/L		X	In excess of the recommended limit, water may be black to brown in color, cause black staining, and have a bitter metallic taste

TURN-AROUND TIME FOR MOST SAMPLES IS APPROXIMATELY 15 to 20 WORKING DAYS & IS DEPENDENT ON THE NUMBER OF ANALYSES

TULSA HEALTH Department	Environmental Health Services Lab 5051 S. 129th E. Ave. Tulsa, OK 74134 918-595-4200	Open 8:00 AM to 5:00 PM Samples accepted until 4:30 PM West end of building

SIGNIFICANCE OF ANALYTES

MCL=Maximum Contaminant Level • NPDWR=National Primary Drinking Water Standards (regulated) • NSDWR=National Secondary Drinking Water Regulations (recommended)

ANALYSIS	DEPT.	MCL	NPDWR	NSDWR	SIGNIFICANCE
Mercury (Hg)	Metals	0.002 mg/L	X		In excess of the regulated limit, mercury in drinking water can cause kidney damage. The most common sources of mercury are erosion of natural deposits, discharge from refineries & factories, & runoff from landfills & croplands.
Molybdenum (Mo)	Metals				No established regulatory limit exists for molybdenum in drinking water. In very small quantities it is an important biological micronutrient for plants & animals.
Nickel (Ni)	Metals				No established regulatory limit exists for nickel in drinking water.
Potassium (K)	Metals				No established regulatory limit exists for potassium in drinking water. It is an mineral essential to human life and is almost never in quantities harmful for consumption in drinking water.
Selenium (Se)	Metals	0.05 mg/L	X		In excess of the regulatory limit, selenium in drinnking water can cause hair or fingernail loss, numbness in fingers or toes, and circulatory problems. Common sources of selenium are discharge from petroleum & metal refineries and mines as well as erosion of natural deposits.
Silica (Si)	Metals				No established regulatory limit for silica in drinking water exists.
Silver (Ag)	Metals	0.1 mg/L		X	in excess of the recommended limit, silver in drinking water can cause skin discoloration & graying of the white part of the eye.
Sodium (Na)	Metals				No established regulatory limit exists for sodium in drinking water. It is an mineral essential to human life and is almost never in quantities harmful for consumption in drinking water.
Thallium (Tl)	Metals	0.002 mg/L	X		In excess of the reulatory limit, thallium in drinking water can cause hair loss, changes in blood, and kidney, intestine, & liver problems. The most common sources of thallium are leaching from ore-processing sites and discharge from electronics, glass, & drug factories.
Vanadium (V)	Metals				No established regulatory limit for vanadium in drinking water exists.
Zinc (Zn)	Metals	5 mg/L		X	In excess of the recommended limit, zinc in drinking water can have a metallic taste.
THM	Organics	0.08 mg/L	X		A byproduct of drinking water disinfection (when chlorine contacts organic matter), the four combined substances that make up the regulated trihalomethanes are concidered carcinogens.
HAA	Organics	0.06 mg/L	X		A byproduct of drinking water disinfection (when chlorine contacts organic matter), the five combined substances that make up the regulated haloacetic acids are concidered carcinogens.

TURN-AROUND TIME FOR MOST SAMPLES IS APPROXIMATELY 15 to 20 WORKING DAYS & IS DEPENDENT ON THE NUMBER OF ANALYSES