




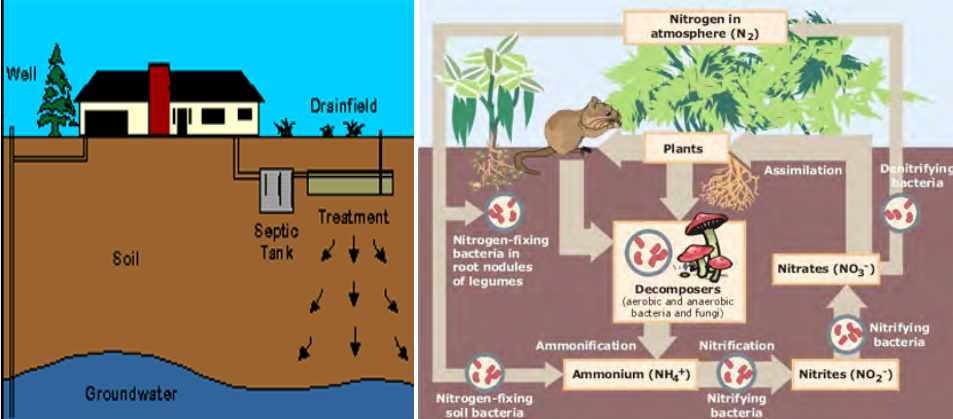
Nitrate & Nitrite Rule for Transient Non-Community Water Systems

- Bailey Smith
- Nitrate Rule Manager
- Smith.Bailey@epa.gov
- 303-312-6940

What are nitrates and nitrites?

Nitrate (NO_3) and Nitrite (NO_2)

Originate from human/animal wastes (septic systems), fertilizers & crop residues

The diagram illustrates the nitrogen cycle in a septic system and the soil. It shows a house with a well, a septic tank, and a drainfield. The septic tank is connected to the drainfield, which is located in the soil. The drainfield is shown with arrows indicating the flow of effluent from the septic tank into the soil. The soil is shown with a layer of effluent and a layer of groundwater. The diagram also shows the nitrogen cycle in the soil, including nitrogen-fixing bacteria in root nodules of legumes, ammonification, nitrification, and denitrification. The cycle starts with nitrogen in the atmosphere (N_2), which is taken up by plants. Plants release nitrogen into the soil through their roots. In the soil, nitrogen is taken up by nitrogen-fixing bacteria in root nodules of legumes. These bacteria convert atmospheric nitrogen into ammonium (NH_4^+). Ammonium is then converted into nitrites (NO_2^-) by nitrifying bacteria. Nitrites are further converted into nitrates (NO_3^-) by nitrifying bacteria. Nitrates can be taken up by plants or released back into the atmosphere by denitrifying bacteria. The diagram also shows the nitrogen cycle in a septic system. Human and animal waste enters the septic tank, where it is broken down into effluent. The effluent is then released into the drainfield, where it is absorbed by the soil. The soil then releases nitrogen into the groundwater, which can be drawn up by a well.



Why Do We Care About Nitrates & Nitrites?

High Levels Can Lead to Infant Death

- ▶ High nitrate/nitrite levels may cause a potentially fatal blood disorder in infants under six months of age called methemoglobinemia or "blue-baby" syndrome.
- ▶ With this disorder there is a reduction in the oxygen carrying capacity of blood, which can cause shortness of breath and a blueness of the skin of infants or even lead to the infant's death.

Maximum Contaminant Level (MCL)

The Environmental Protection Agency (EPA) has set the Maximum Contaminant Level (MCL)* for nitrate and nitrite to the following for drinking water:

Nitrates MCL = 10 mg/L

Nitrites MCL = 1 mg/L

*An **MCL** is the legal threshold limit on the amount of a substance that is allowed in public water systems under the Safe Drinking Water Act (SDWA)*

What You Need To Do #1:

Review Your Monitoring and Reporting Requirements for Any Required Nitrate and Nitrite Sampling:

This document will tell you:

The contaminant you need to sample for on the left-hand side (e.g., nitrates)

The monitoring period the sample must be collected (e.g., April 1- June 30, 2023)

Where to sample (e.g., sample point code- SP01)

Monitoring and Reporting Requirements for the Calendar Year 2023 February 11, 2023

PWS Name _____ PWS ID#: WY56 (NC/GW)

Ground Water Rule Within 24 hours of being notified of a routine Revised Total Coliform Rule (RTCR) positive (TC+) sample, you must sample for the presence of E. coli at ALL groundwater sources in use at the time of the original TC+ sample. Collect one source sample for every routine RTCR positive sample at each well. All source samples must be collected at a location prior to any chemical treatment. Utilize the Triggered Groundwater Source Sampling Form found at the following website: <https://www.epa.gov/region8-waters/wyoming-and-tribal-triggered-groundwater-source-sampling-form>. On the form you must write the correct Sample Point Code (ex: GWR WLD1), which can be found below, and mark the sample as "Triggered".

This sampling is in addition to your RTCR repeat samples.

FACILITY CODE	FACILITY DESCRIPTION	SAMPLE POINT CODE	SAMPLE POINT DESCRIPTION
WLD1	SIGNAL BUTTE #1	GWR WLD1	TRIGGERED GWR

Nitrate (NO3) You are required to monitor during one quarter for nitrates. Collect a sample between April 1, and June 30, 2023 at the entry point(s) to the distribution system shown on the system schematic noted by a star and as listed below.

If any sample result exceeds 10.4 mg/L, you MUST collect a confirmation sample within 24 hours of receiving the results and consult with the EPA as soon as possible. Failure to complete follow-up actions may result in monitoring violations and endangerment of public health.

FACILITY CODE	FACILITY DESCRIPTION	SAMPLE POINT CODE	SAMPLE POINT DESCRIPTION
TP01	FILTRATION	SP01	TREATMENT BUILDING TAP SAMPLE POINT

Nitrite (NO2) You are required to monitor for nitrites during one quarter. Collect a sample between April 1, and June 30, 2023 at the entry point(s) to the distribution system shown on the system schematic noted by a star and as listed below.

If any sample result exceeds 1.4 mg/L, you MUST collect a confirmation sample within 24 hours of receiving the results and consult with the EPA as soon as possible. Failure to complete follow-up actions may result in monitoring violations and endangerment of public health.

FACILITY CODE	FACILITY DESCRIPTION	SAMPLE POINT CODE	SAMPLE POINT DESCRIPTION
TP01	FILTRATION	SP01	TREATMENT BUILDING TAP SAMPLE POINT

Additional information on the first page of this document:

Public Water System (PWS) information

Rule Manager's Contact Information

How to submit lab results to Region 8 EPA Drinking Water Program

Monitoring and Reporting Requirements for the Calendar Year 2023 February 11, 2023

PWS NAME _____ PWS ID# WY5600000 NC/GW

Water System Inventory

Water Source: GW
Water System Type: NC
Contact: _____
Address: _____
Phone: _____

Where to monitor and Whom to call

The "rule managers" responsible for administering the various drinking water rules are listed here. Any questions or discussion should be directed to the appropriate rule manager at the number given below, or you can call toll-free at 1-800-227-8917 and ask for the appropriate contact.

Monitoring for these contaminants must be at the Entry Point to the Distribution System:	Nitrate	Bailey Smith	303-312-6940
Nitrate/Nitrite			

Monitoring for these contaminants must be within the Distribution System:	RTCR	Jamie Harris	303-312-6072
Revised Total Coliform Rule			

The following rules may apply:

Surface Water Treatment Rules	SWTR	Jake Crosby	303-312-6389
Ground Water Rule	GWR	Jamie Harris	303-312-6072

IMPORTANT

You must use a laboratory certified to test for each specific contaminant in drinking water. See a list of certified labs at Drinking Water Online at: <https://www.epa.gov/region8-waters/wyoming-and-tribal-triggered-groundwater-source-sampling-form>

Please send sample results to our office using one of the methods listed below. Include your PWS name and PWS ID# on all correspondence.

Email: R8DWU@epa.gov Mail: US-EPA Region 8 For after-hours emergency situations please contact EPA at 303-312-6327
Fax: 1-(877) 876-9101 1595 Wynkoop St. Denver, CO 80202-1129 Mail Code 8WD-SD

What You Need To Do #2:

Contact an EPA Certified Laboratory for Nitrates/Nitrites and ask them to send you sample bottles with instructions for the number of samples you need to collect:

Version: Updated July, 2015				Inorganics		Disinfection Byproducts		Micro		Radionuclides												
LABORATORY		CONTACT	Certification End Date	Asbestos	Copper, Lead Cyanide, Fluoride METALS	Nitrate & Nitrite	DIB THAA5	DIB THM4	DIB Chlorite	DIB Bromate	E Coli	Fecal Coliform	Total Coliform	Heterotrophic PC	Cryptosporidium	Natural Gross Alpha	Natural Gross Beta	Natural Radium 226	Natural Radium 228	Uranium	Man made Cesium	Man made Iodine
Accutest Mountain States 4036 Youngfield Street Wheat Ridge, CO 80033		Ms. Kaprie S. Suprenant Ph 303-425-6021 x3114 kapries@accutest.com	5/31/2015		X	X	X	X	X	X												X
ACZ Laboratories Inc 2773 Downhill Dr Steamboat Springs CO 80487		Matt Sowards Ph 800-334-5493 x531 Fax 970-879-2216 matts@acz.com	8/31/2015		X	X	X	X								X	X	X	X	X		
ALS Environmental - Kelso Formerly Columbia Analytical Services 1317 S 13th Ave PO Box 479 Kelso WA 98626		Mr. Lee Wolf Ph 360-577-7222 Direct: 360-501-3371 FAX 360-425-9096 lee.wolf@alsglobal.com	7/8/2015		X	X	X	X	X	X	X											

What You Need To Do #2:

Contact a Certified Laboratory for Nitrates/Nitrites and ask them to send you sample bottles:

Sample Choices:

Nitrate

Nitrite

Total Nitrate

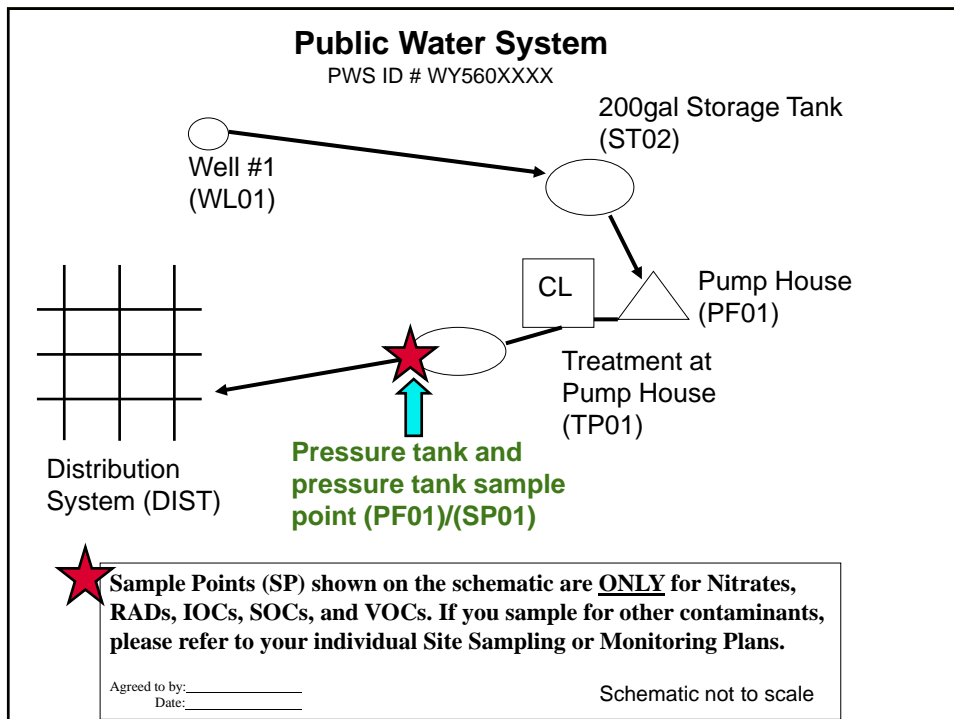


You may take a Total Nitrate, which combines both samples together, BUT the results must be <0.5 mg/L to qualify as BOTH a nitrate and nitrite sample.

What You Need To Do #3:

Sample at each designated sampling point on your schematic, which is indicated by a ★
OR as noted on your Monitoring and Reporting Requirements (might have multiple locations).

- At the entry point to the distribution system AFTER all treatment
- More than one source & the sources combine?
 - * Sample at the entry point to the distribution system
 - * After all treatment
 - * Sample during periods of normal operating conditions
- Make sure to sample at ALL sampling points & include your Public Water System ID # on the lab form (Chain of Custody).



Ground Water Rule

Within 24 hours of being notified of a routine Total Coliform Rule positive (TC+) sample, you must sample for the presence of E. coli at ALL ground water sources in use at the time of the original TC+. Collect one source sample for every routine TCR positive sample. Utilize the Groundwater Source Sampling Form found at the following website: <http://www2.epa.gov/region8-waterops/wy-and-tribal-ground-water-rule-source-water-sampling-triggered-source-monitoring>. On the form you must write the correct Sample Point Code (e.g. GWR Elm Well), which can be found below, and mark the sample as 'Triggered'.

This sampling is in addition to your Total Coliform Rule repeat samples.

FACILITY CODE	FACILITY DESCRIPTION	SAMPLE POINT CODE	SAMPLE POINT DESCRIPTION
WL01	WELL 1	GWR WL01	TRIGGERED GWR SOURCE

Nitrate (NO3)

You are required to monitor annually for nitrates. Collect a sample between January 1 and December 31, 2015 at the entry point(s) to the distribution system shown on the system schematic and as listed below.

FACILITY CODE	FACILITY DESCRIPTION	SAMPLE POINT CODE	SAMPLE POINT DESCRIPTION
SS01	POINT OF ENTRY TAP/SAMPLING STATION	SP01	POINT OF ENTRY TAP/SAMPLING ST

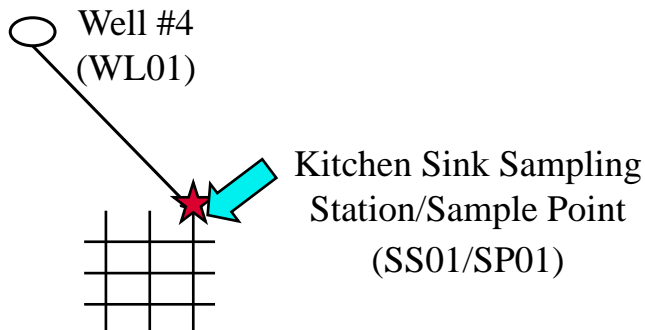
Nitrite (NO2)

This is a new drinking water source. You are required to monitor for nitrites once during the first three years of operation. Collect a sample between January 1, 2014 and December 31, 2016 at the entry points to the distribution system shown on the system schematic and as listed below.

FACILITY CODE	FACILITY DESCRIPTION	SAMPLE POINT CODE	SAMPLE POINT DESCRIPTION
SS01	POINT OF ENTRY TAP/SAMPLING STATION	SP01	POINT OF ENTRY TAP/SAMPLING ST

CHAIN OF CUSTODY (aka Lab Form)

Best Water System in Wyoming PWSID WY5600000



Distribution (DIST)

★ Entry Point - Sample Points (SP) shown on the schematic are **ONLY** for Nitrates, RADs, IOC, SOC, and VOCs. If you sample for other contaminants, please refer to your individual Site Sampling or Monitoring Plans.

Agreed to by: _____

Date: _____

What You Need To Do #4:

Fill out the lab forms:

Chain of Custody & Analytical Request Record

Account Information (Billing information)				Report Information (if different than Account Information)																											
Company/Name: Best Water System in Wyoming				Company/Name: _____																											
Contact: John and Jill Doe				Contact: _____																											
Phone: 307 - 123 - 4567				Phone: _____																											
Mailing Address: 1 Main Street				Mailing Address: _____																											
City, State, Zip: Jackson, WY 83001				City, State, Zip: _____																											
Email: Wyomingwatersystem@gmail.com				Email: _____																											
Receive Invoice: <input checked="" type="checkbox"/> Hard Copy <input type="checkbox"/> Email		Receive Report: <input checked="" type="checkbox"/> Hard Copy <input type="checkbox"/> Email		Receive Report: <input type="checkbox"/> Hard Copy <input type="checkbox"/> Email																											
Purchase Order: _____		Quote: _____		Bottle Order: _____																											
Project Information				Matrix Codes																											
Project Name, PWSID, Permit, etc: WY5600000				<div style="display: flex; flex-direction: column; font-size: x-small;"> <div>A - Air</div> <div>W - Water</div> <div>S - Soils/ Solids</div> <div>V - Vegetation</div> <div>B - Bioassay</div> <div>O - Other Drinking Water</div> <div>DW -</div> </div>																											
Sampler Name: Jill Doe		Sampler Phone: 307 - 123 - 4567		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="8" style="text-align: left; font-size: small;">Analysis Requested</th> </tr> <tr> <th style="width: 12.5%;">Nitrate</th> <th style="width: 12.5%;"></th> <th style="width: 12.5%;"></th> <th style="width: 12.5%;"></th> <th style="width: 12.5%;"></th> <th style="width: 12.5%;"></th> <th style="width: 12.5%;"></th> <th style="width: 12.5%;"></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">✓</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				Analysis Requested								Nitrate								✓							
Analysis Requested																															
Nitrate																															
✓																															
Sample Origin State: _____		EPA/State Compliance: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No																													
Sample Identification (Name, Location, Interval, etc.)				Collection		Matrix (See Codes Above)																									
				Date		Time																									
1 SP01 - Pressure Tank Sampling Point		4/2/19		11:30 am		1 DW																									

Chain of Custody & Analytical Request Record

Page 1 of 1

Account Information (Billing Information) Company Name: <u>Best Water System in Wyoming</u> Contact: <u>John and Jill Doe</u> Phone: <u>307 - 123 - 4567</u> Mailing Address: <u>1 Main Street</u> City, State, Zip: <u>Jackson, WY 83001</u> Email: <u>Wyomingwatersystems@gmail.com</u> Receive Invoice: <input checked="" type="checkbox"/> Hard Copy <input type="checkbox"/> Email Receive Report: <input checked="" type="checkbox"/> Hard Copy <input type="checkbox"/> Email Purchase Order: <u> </u> Quote: <u> </u> Bill of Order: <u> </u>				Report Information (if different than Account Information) Company Name: <u> </u> Contact: <u> </u> Phone: <u> </u> Mailing Address: <u> </u> City, State, Zip: <u> </u> Email: <u> </u> Receive Report: <input type="checkbox"/> Hard Copy <input type="checkbox"/> Email				Comments Please send results to myself and US EPA at R8DWU@EPA.GOV This is a EPA compliance sample for nitrate annual monitoring taken at SP01 - Pressure Tank Sampling Point																																																																																																																								
Project Information Project Name, FWSID, Permit, etc. <u>WY5600000</u> Sampler Name <u>Jill Doe</u> Sampler Phone <u>307 - 123 - 4567</u> Sample Origin State: <u> </u> EPA/State Compliance: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				Matrix Codes A - Air W - Water S - Solid V - Vegetation B - Biomass O - Other DW - Drinking Water		Analysis Requested <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 10%;">Nitrate</th> <th style="width: 10%;">Nitrite</th> <th style="width: 10%;">Ammonia</th> <th style="width: 10%;">Total Nitrogen</th> <th style="width: 10%;">Total Phosphorus</th> <th style="width: 10%;">Dissolved Oxygen</th> <th style="width: 10%;">pH</th> <th style="width: 10%;">Temperature</th> <th style="width: 10%;">Conductivity</th> <th style="width: 10%;">Turbidity</th> <th style="width: 10%;">Total Solids</th> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table>		Nitrate	Nitrite	Ammonia	Total Nitrogen	Total Phosphorus	Dissolved Oxygen	pH	Temperature	Conductivity	Turbidity	Total Solids																																																																																																														
Nitrate	Nitrite	Ammonia	Total Nitrogen	Total Phosphorus	Dissolved Oxygen	pH	Temperature	Conductivity	Turbidity	Total Solids																																																																																																																						
Sample Identification (Name, Location, Interval, etc.) 1. <u>SP01 - Pressure Tank Sampling Point</u> 2. <u> </u> 3. <u> </u> 4. <u> </u> 5. <u> </u> 6. <u> </u> 7. <u> </u> 8. <u> </u> 9. <u> </u> 10. <u> </u>				Collection Date: <u>4/2/19</u> Time: <u>11:30 am</u> Number of Containers: <u>1</u> Matrix (See Codes Above): <u>DW</u>		LAB ID (Laboratory Use Only) <u> </u>																																																																																																																										
Custody Record MUST be signed Received by (print): <u> </u> Date/Time: <u> </u> Signature: <u> </u> Received by Laboratory (print): <u> </u> Date/Time: <u> </u> Signature: <u> </u>		LABORATORY USE ONLY Shipped By: <u> </u> Cooler (Dis): <u> </u> Custody Seals: <u>Y N C B</u> Intact: <u>Y N</u> Receipt Temp: <u> </u> °C Temp Blank: <u>Y N</u> On Ice: <u>Y N</u> Payment Type: <u>CC</u> Cash: <u> </u> Check: <u> </u> Amount: <u> </u> \$ Receipt Number (attach to box only): <u> </u>																																																																																																																														

What You Need To Do #5:

Send water samples to the certified laboratory
NOT EPA! (EPA wants the results)



Holding time & Preservation Requirements

Nitrate + Nitrite (i.e. Total Nitrate)

28 days from sample collection

lab must provide H₂SO₄ preservative with sample container

Nitrate alone & unpreserved

48 hours from sample collection

What You Need To Do #6:

Once you receive your results send them
to EPA right away!

Labs DO NOT always send the nitrate/nitrite
sample results to EPA. **YOU need to send them
to EPA!!!**

R8DWU@epa.gov

Send results to EPA Region 8 within 10 days of
the end of the compliance period or 10 days
from the receipt of results from lab, whichever is
shortest.

Drinking Water Watch

Web search: EPA region 8 Drinking Water Watch

Check to see if EPA has received your lab results.

Drinking Water Branch

Water System Details

Water System No. :		Federal Type :	NC
Water System Name :		State Type :	NC
Principal County Served :	GOSHEN	Primary Source :	GW
Status :	A	Activity Date :	08-16-2004

Points of Contact

Name	Job Title	Type	Phone	Address
	PRESIDENT/CEO	LC		
	OP	DO		
	MANAGER	AC		

Annual Operating Periods & Population Served

Service Connections

Start Month	Start Day	End Month	End Day	Population Type	Population Served	Type	Count	Meter	Meter Size
----------------	-----------	--------------	---------	-----------------	----------------------	------	-------	-------	---------------

What You Need To Do #7:

Review the results right away!

- The MCL for nitrites = **1.0 mg/L**
- The MCL for nitrates = **10 mg/L**
- If you exceed the MCL, call EPA IMMEDIATELY!
 - Bailey Smith - 303-312-6940
- The following slides will help walk you through what happens with the respective results for nitrites and nitrates.

Nitrate & Nitrite Sample Results Over Half the MCLs

- 1) Call EPA and tell Bailey Smith that your results are more than half the MCL.

► Nitrate = Greater than 5.0 mg/L

► Nitrite = Greater than 0.5 mg/L

- 2) Monitoring is increased to quarterly.

- 3) Monitoring remains quarterly until EPA approves reduced monitoring. If you think your system qualifies, email Bailey Smith.



Nitrate & Nitrite Sample Results

Exceeding the MCLs

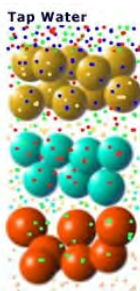
- 1) Call EPA IMMEDIATELY!!!
- 2) Take a confirmation sample w/in 24 hrs of notification. Compliance determination is based on the average of the results of the initial and confirmation samples.
- 3) If you are unable to take a confirmation sample w/in 24 hours, you must post **Tier 1 Public Notice** and take a confirmation sample within 2 weeks.
- 4) **DO NOT BOIL WATER**. Bottled water will need to be provided, boiling water actually increases the concentration of nitrate or nitrite!!!
- 5) Then you will be required to begin quarterly sampling.



Best Available Technology (BAT)

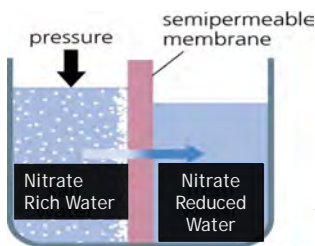
Ion Exchange

- ▶ Ion Exchange uses a resin, where other ions on the resin are exchanged for the nitrate ions, which get trapped in the resin.



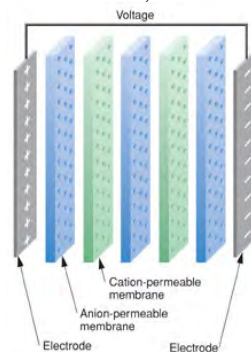
Reverse Osmosis

- ▶ Reverse osmosis (RO) is a method of producing pure water by forcing nitrate contaminated water through a semi-permeable membrane across which nitrates cannot pass.
- ▶ Make sure you change out the filters according to the manufacturers recommendations!!!



Electrodialysis

- ▶ Electrodialysis uses a direct electric current to cause ions to migrate through membranes, trapping the nitrates, etc.



Non-Treatment Option:

Blending

- ▶ Blending water with another source to reduce nitrates before point of entry (POE)
- ▶ You must let EPA know right away that you have a new or blended water source. This may require new monitoring requirements



Let's Recap

Make sure to mark samples with the water system ID # and ALL sample point(s)

Send results to EPA Region 8 within 10 days of the end of the compliance period or 10 days from the receipt of results from lab, whichever is shortest.

Send all results to R8DWU@EPA.GOV. Include in the subject of the email, the water system ID and the contaminant analyzed.

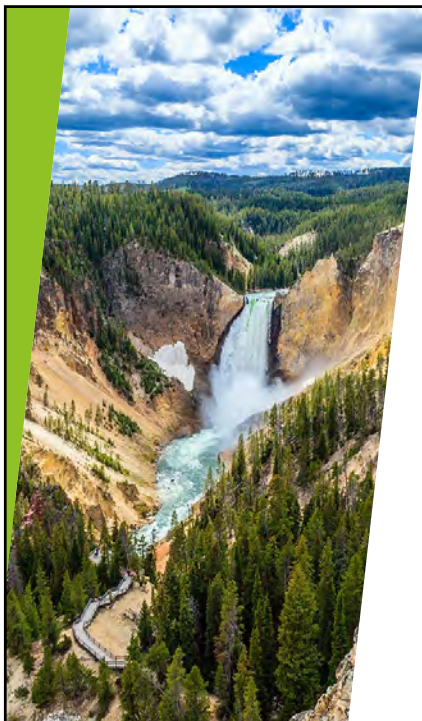
Many labs DO NOT automatically send EPA your nitrate results. It is YOUR responsibility to make sure EPA gets results.

Let's Recap

Maintain contaminant levels below MCL

If the MCL is exceeded:

- Call Bailey Smith, Nitrate Rule Manager, **IMMEDIATELY**, at 303-312-6940
- You will have to take a confirmation sample
- You may be required to provide public notice
- EPA's Enforcement Division may require you to submit a plan and schedule to address the MCL - by installing treatment or obtaining a new water source.



Thank you!

Bailey Smith - she/her
Nitrate & Nitrite Rule
Manager

Smith.bailey@epa.gov

303-312-6940

Resources

- ▶ **EPA certified lab list:**
<https://www.epa.gov/region8-waterops/certified-drinking-water-laboratories-systems-wyoming-and-tribal-lands-epa-region-8>
- ▶ **Drinking Water Watch**
<https://sdwisdww.epa.gov/DWWR8WY/>