NITRATES & NITRITES

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EPA Region 8
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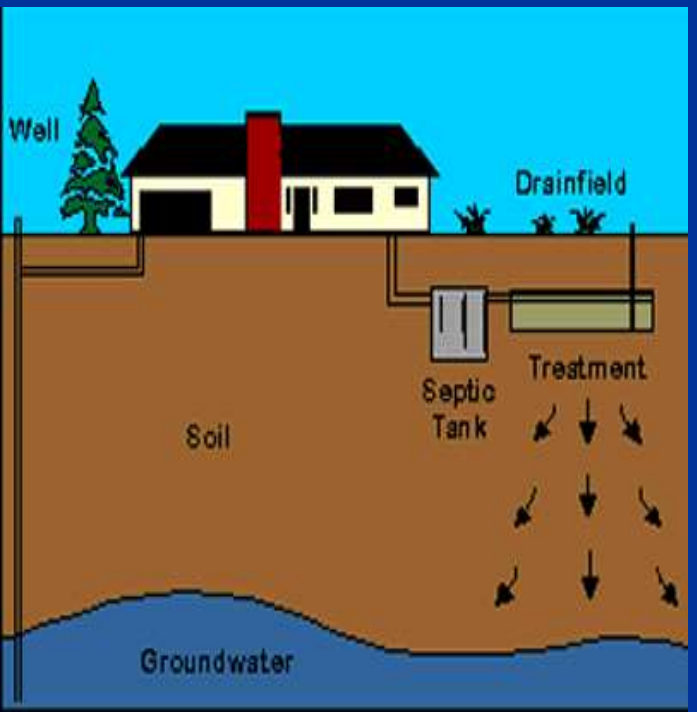
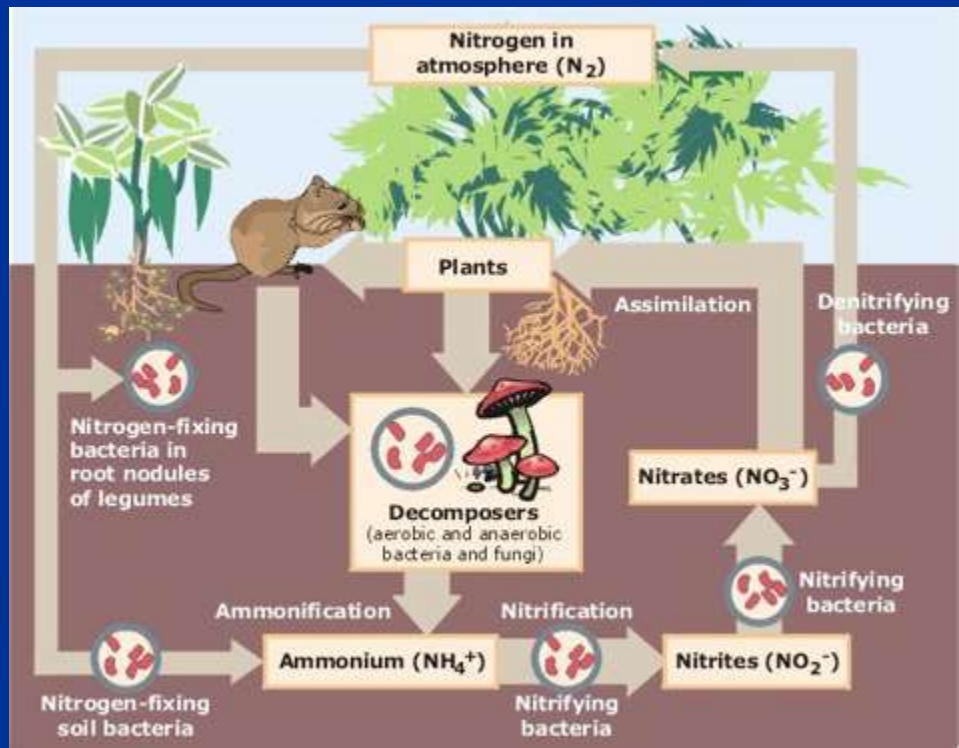
What Are Nitrates & Nitrites???

Nitrate (NO_3) and Nitrite (NO_2)

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





Why Do We Care About Nitrates & Nitrites???

Nitrate (NO_3) and Nitrite (NO_2)

High Levels Can Lead to the Death of Infants

- 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 Levels (MCL)

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

Nitrates MCL = 10.0 mg/L

Nitrites MCL = 1.0 mg/L

Monitoring Requirements

40 CFR 141.23(d)

What You Need To Do #1:

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

Total Coliform (TCR)

Take 1 sample each quarter during the year.
Take samples throughout the distribution system following your site sampling plan.

If you have a positive sample be sure to consult: http://www2.epa.gov/region8-waterops/epa-region-8-drinking-water-unit-tech-tips-follow-safetotal-coliform-positive for instructions on further sampling requirements.

If you chlorinate or purchase chlorinated water you must measure chlorine residual at the same place each time you do bacteriological sampling. Write the chlorine residual results on the sampling sheet and ask your laboratory to forward that information to EPA.

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
WL	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

This document will tell you:

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

2) The monitoring period the sample must be collected (e.g., Jan 1- December 31, 2015);

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

What You Need To Do #2:

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

http://www2.epa.gov/sites/production/files/documents/certifiedlabs.pdf

Version: Updated July, 2015			Inorganics					Disinfection By-products				Micro					Radionuclides						
LABORATORY	CONTACT	Certification End Date	Asbestos	Copper, Lead	Cyanide, Fluoride	METALS	Nitrate & Nitrite	DIB HAA5	DIB TTHM	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. Surprenant Ph 303-425-6021 x3114 kapries@accutest.com	5/31/2015		X	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	X												

What You Need To Do #2:

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

<u>Sample Choices:</u>

Nitrate

Nitrite

You may also 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

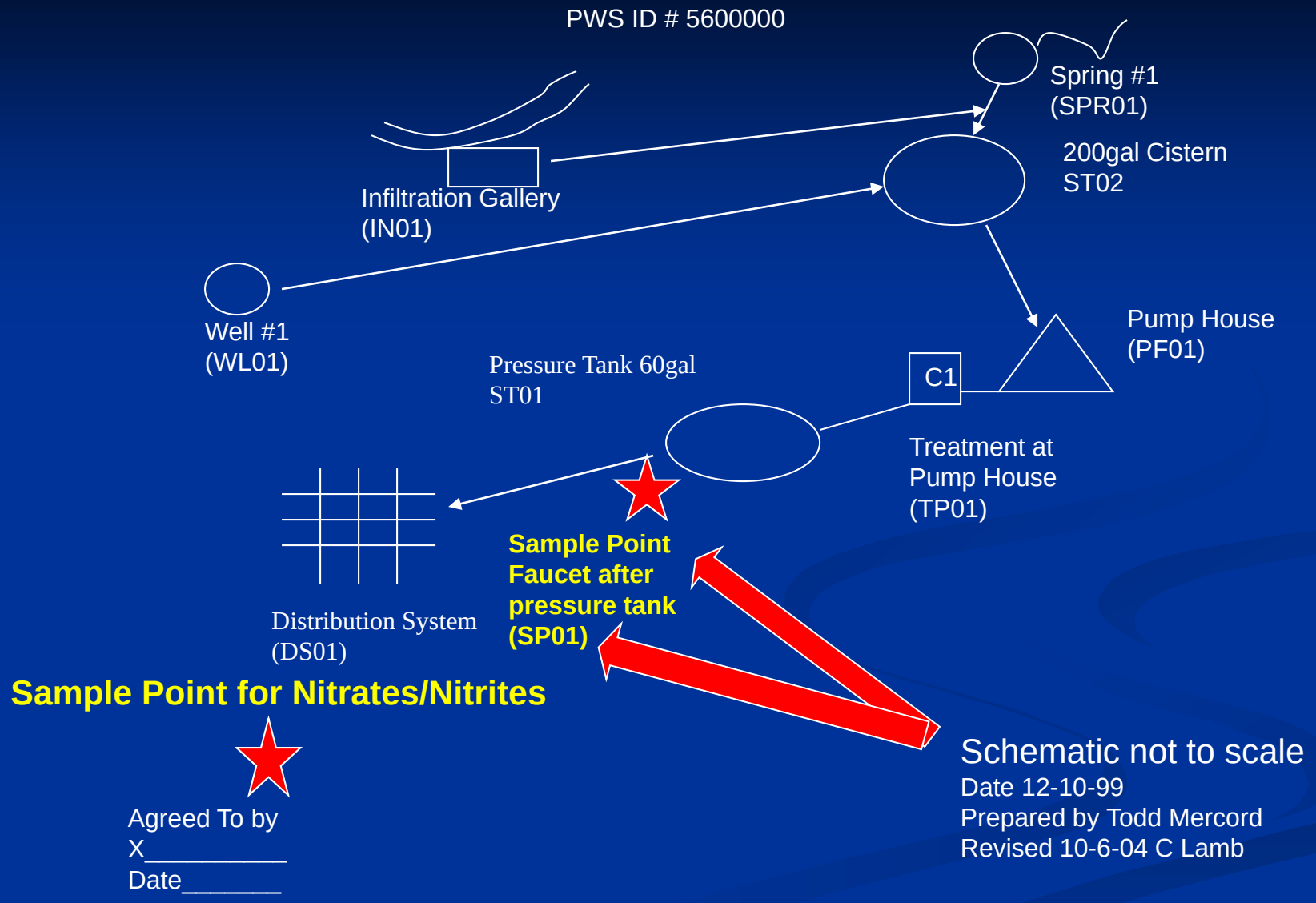
- At the entry point to the distribution system AFTER all treatment

- 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 <u>ALL</u> sampling points & include your PWS# on the lab form.

Public Water System

PWS ID # 5600000



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Nitrite (NO2)

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What You Need To Do #4:

Fill out the lab forms:

Chain of Custody and Analytical Request Record

Page 1 of 1

PLEASE PRINT- Provide as much information as possible.

Company Name: Example System	Project Name, PWS, Permit, Etc.: WY5600000	Sample Origin State: WY	EPA/State Compliance: Yes [X] No [ ]
Report Mail Address: 123 Example Road, Cody, WY	Contact Name: Mr. Example; Phone/Fax: 307-123-1234	Email: Ex.sample@ex.com	Sampler: (Please Print) Mr. Example
Invoice Address: 123 Example Road, Cody, WY	Invoice Contact & Phone: 307-123-1234	Purchase Order:	Quote/Bottle Order:

Special Report/Formats – ELI must be notified prior to sample submittal for the following:

- [ ] DW
- [ ] GSA
- [ ] POTW/WWTP
- [ ] State: _____
- [ ] Other: _____
- [ ] A2LA
- [ ] EDD/EDT (Electronic Data) Format: _____
- [ ] LEVEL IV
- [ ] NELAC

Contact ELI prior to RUSH sample submittal for charges and scheduling – See Instruction Page

Comments:

Shipped by: Mr. Example

Cooler ID(s):

Receipt Temp _____ °C

On Ice: Yes No

Custody Seal Y N

Intact Y N

Signature Match Y N

1	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX (Number of Containers; Sample Type: A W S V B O; Air Water Soils/Solids Vegetation Bioassay Other)	Nitrates									SEE ATTACHED	Normal Turnaround (TAT)	RUSH	Comments	LABORATORY USE ONLY
1	SP01	9/18/13	11 am		X													
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Custody Record MUST be Signed

Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
Mr. Ex Example	9/18/12	Ex Example			

Received by Laboratory: Date/Time: Signature:

Sample Disposal: Return to Client: _____ Lab Disposal: _____

We recommend using the "Chem/Rad Sample form" generator
https://sdwisr8.epa.gov/Region8DWW/JSP/loginForm.jsp

Located in the "Sample Schedules and Reminder" link on the left.

Drinking Water Branch

Sample Schedules

Water System No. :	WY5600164	Federal Type :	C
Water System Name :	TORRINGTON MUN. WATER SYSTEM	State Type :	C
Principal County Served :	GOSHEN	Primary Source :	GW
Status :	A	Activity Date :	04-01-1978

Monitoring and Reporting Requirements for Water System WY5600164

Latest Reminder To Sample And Report

TCR Schedules

Sample Count	Sample Type	Sample Frequency	Effective Begin Date	Effective End Date	Seasonal Start MM/DD	Seasonal End MM/DD	Analyte Code	Analyte Name
7	RT	MN	01-01-1991		1/1	12/31	3100	COLIFORM (TCR)

Total Number of Records Fetched = 1

Then you'll click the ChemRad Sample Form

Drinking Water Branch

Reminder to Sample and Report - 08-07-2013

Water System No. :	WY5600164	**Federal Type :**	C
Water System Name :	TORRINGTON MUN. WATER SYSTEM	**State Type :**	C
Principal County Served :	GOSHEN	**Primary Source :**	GW
Status :	A	**Activity Date :**	04-01-1978

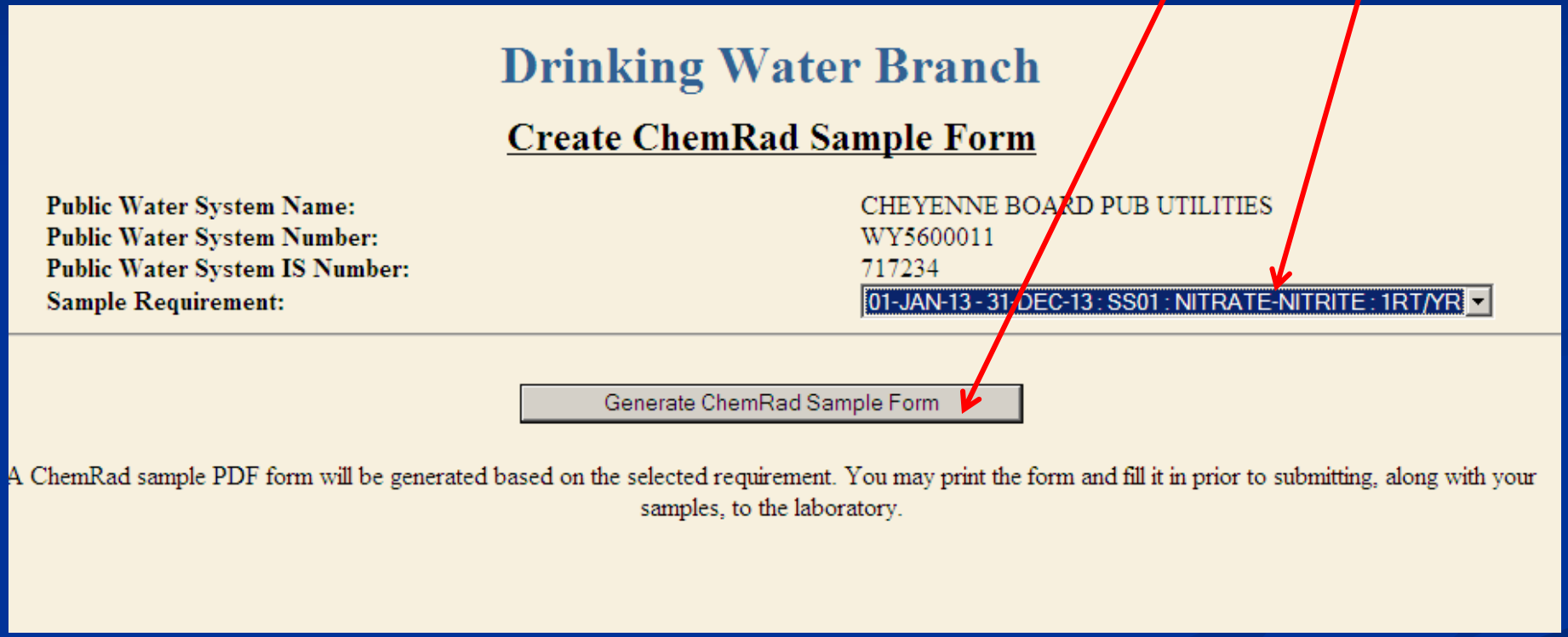
The following data is from the latest email reminder to sample and report. Water System Operators may sign up for email reminders for their water systems.

- Monitoring reports must be received at USEPA Region 8 on or before the 10th of the month following the end of the monitoring period.
- If you monitor monthly for DBP precursors, bromide/bromate, or chlorites, please report by the 10th of the month following the end of the quarter.
- **SEASONAL SYSTEMS** are only required to sample during the season of operation. All requirements must be completed before closing for the season.
- You must **collect chemical and radiological samples from EACH ENTRY POINT TO THE DISTRIBUTION SYSTEM.** Check your system schematics for the sampling site(s).

FOR THE COMPLETE LIST OF MISSING ANALYTE TEST RESULTS WITHIN EACH REQUIRED ANALYTE GROUP, CLICK HERE

To create a printable form, click this: ChemRad Sample Form

Then you'll use the pull down menu to select nitrate/nitrite
And then click the Generate ChemRad Sample Form



Chemical and Radiological Sample Collection Form

(Please complete all remaining blank spaces as applicable)

Public Water System Name: CHEYENNE BOARD PUB UTILITIES	*PWS #:* WY5600011
Mailing Address:	
Email:	*Phone:*
Collected By:	*Fax:*
Lab Name: *Date Collected:*	*Time Collected:* *(24 Hour Clock)*
WSF ID/Facility Name: SS01/SHERARD ENTRY POINT *(Please check your water system schematic for the sampling location)*	*Sample #:*
Sample composited? Yes ___ No ___ If Yes, PWS ID #s in the composite:	
Samples Required: 1RT/YR *Sampling Period:* 01-JAN-13 - 31-DEC-13	
Analysis Requested: NITRATE-NITRITE, analyte code: 1038	

Form is generated with all the necessary info we need, including the correct sampling point name/sample point. Viola!

What You Need To Do #5:

Send samples to the certified laboratory
NOT EPA!

Holding time & Preservation Requirements

Nitrate + Nitrite (i.e. Total Nitrate)–
28 days from sample collection
(lab must provide H_2S0_4 preservative with sample container)

Nitrate alone & unpreserved–
48 hrs from sample collection
If the sample is chorinated and at 4C, 14 days

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 us!!!
- The results must be submitted within 10 days of the end of the compliance period (if you are on annual monitoring, this is normally January 10 the year following when your sample was taken).

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!!!
- The following slides will help walk you through what happens with the respective results for nitrites and nitrates.

NITRITE
Results

NITRITES- SAMPLE RESULTS

Less than 0.5 mg/L (aka less than 50% of MCL)

EPA may waive further nitrite sampling

Greater than 0.5 mg/L (aka greater than 50% of MCL)

Go on quarterly monitoring for nitrites for at least one year

NITRITES- SAMPLE RESULTS

Greater than 1.0 mg/L (aka greater than MCL)

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 confirmation sample within 2 weeks

4) Bottled water will need to be provided as boiling water actually <u>increases</u> the nitrite concentration!!!

5) Then you will be put on quarterly nitrite sampling

NITRITES- SAMPLE RESULTS

Quarterly Sampling Reduction

Nitrate Rule Manager May Reduce Sampling to Annual

After four consecutive quarterly samples are "reliably and consistently" below the MCL (1 mg/L)

After the initial round of quarterly sampling is completed, take subsequent samples during the quarter(s) which previously resulted in the highest result

NITRATE Results

NITRATES- SAMPLE RESULTS

Less than 10 mg/L (aka less than the MCL)

No further nitrate samples required for that year (annual sampling requirement)

NITRATES- SAMPLE RESULTS

Greater than 10 mg/L (aka greater than MCL)

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) Systems unable to comply with the 24 hour sampling requirements must immediately notify persons served by the water system in a form and manner reasonably calculated to reach all persons served (Tier 1 Public Notice). Must take confirmation sample w/in 2 weeks!

4) Bottled water will need to be provided.

5) If the average of the initial and confirmation samples are over 10 mg/L public notice will need to be provided.

6) You'll need to install treatment

Treatment Options

Treatment Best Available Technology (BAT)

- Ion Exchange
- Reverse Osmosis
- Electrodialysis

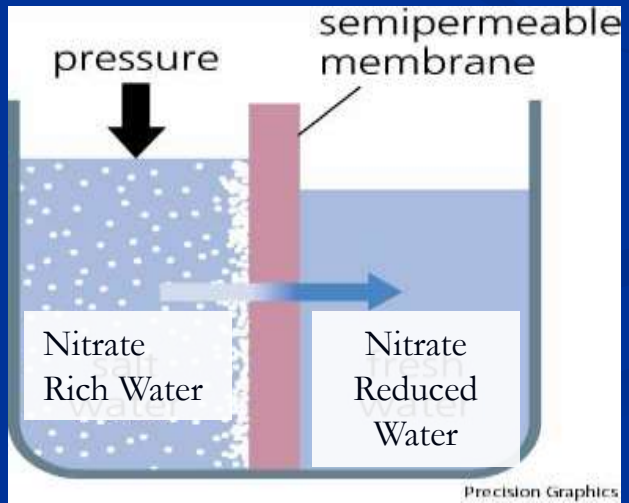
Ion Exchange

- 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)

Let's Recap

Let's Recap

- Make sure to mark samples with PWS ID # and **ALL** sample point(s)!
- **Send results to EPA Region 8** within 10 days of the end of the compliance period- normally January 10th the year following taking your sample.
- Most labs **DO NOT** automatically send EPA your nitrate results. It is YOUR responsibility.

Let's Recap

- Maintain contaminant level below MCL
- If the MCL is exceeded-

  * Call Michael Copeland, Nitrate Rule Manager, w/ EPA at 303-312-6010 IMMEDIATELY
  * Michael will have you take confirmation samples
  * Michael will also have you provide public notice if needed
- Provide treatment if necessary

Happy 1st Birthday
BiRtHdaY!
Mikey