

United States Environmental Protection Agency—Region 8

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Drinking Water Program



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**Correct Significant Deficiencies
Within Six Months of Receiving
Your Final Sanitary Survey Report**

Did you have significant deficiencies identified during your sanitary survey? If so, EPA Region 8 now requires all significant deficiencies to be corrected, and documentation of the corrective actions must be submitted to EPA within six months of your receipt of the final survey report. If you will be unable to meet this six month standard corrective action timeframe, you must contact EPA with a written justification and proposed completion schedule as soon as possible after receiving the sanitary survey report. EPA will review the proposed schedule and will either approve it or request a revised schedule. Failure to correct the significant deficiencies within six months will result in a violation leading to an enforcement action, as will not correcting deficiencies according to an approved alternate schedule. If you are unsure, contact EPA right away after receiving the survey report and figure out the best solution for your system. If you have any questions, you can contact Gail Franklin (ground water systems) or Jake Crosby (surface water systems). Gail can be reached at or (303) 312-6497 or franklin.gail@epa.gov. Jake can be reached at (303) 312-6389 or crosby.jake@epa.gov.

**EPA’s Water/Wastewater All-Hazards
Boot Camp Training**

(Adapted from Association of State Drinking Water Administrators’ Dec 18, 2015 Weekly Update)

EPA has released a new Water/Wastewater All-Hazards Boot Camp Training, a computer-based training for water and wastewater utilities that focuses on emergency planning, response, and recovery activities and how they're incorporated into a comprehensive all-hazard management program. The interactive training includes testimonials from water utility professionals, as well as links to helpful tools and resources to give utilities a head start on building resilience to all hazards. Many states (including Wyoming) have already pre-approved the course for continuing education hours (2 hours) for both water and wastewater personnel. Download the training at:

<http://www.epa.gov/waterresiliencetraining/waterwastewater-utility-all-hazards-bootcamp-training>



Animal Contamination In Your Storage Tank?

We Need To Know About It Within 24 Hours!



Animal contamination in finished water storage tanks presents a serious public health risk as it can carry microbial pathogens, which can cause a waterborne disease outbreak after just a short-term exposure through drinking water. Animal contamination refers to either live animals (e.g. rodents or birds), dead or decomposing animal carcasses, or animal-related debris (feathers, skin, fecal matter, etc).

You may recall the waterborne disease outbreak in Alamosa, Colorado in 2008 where it is suspected that an animal source of fecal contamination containing Salmonella was carried into a storage tank through multiple holes (breaches) in the tank. This incident cost the city over \$27 million. In a separate incident at Anglian Water Limited, a water system in the United Kingdom, operators had continuously monitored for cryptosporidium for years without seeing any detections when they suddenly registered high levels of cryptosporidium in distribution system samples. They found that the source of the cryptosporidium was a dead rabbit in their chlorine contact tank basin. By working with local health officials, they also found that a waterborne disease outbreak from cryptosporidium had occurred in their community. This is a very important cause and effect public health connection, and it demonstrates that an animal carcass can cause a waterborne disease outbreak, even in a system that adds chlorine.

Why are we talking about animal contamination in finished drinking water storage tanks now? During sanitary surveys in 2015, we discovered two systems that had histories of dead animals in their tanks; the EPA had not been contacted in either case. When any animal contamination is found in storage tanks, EPA will presume that the potential for serious, adverse human health effects exist from short-term exposure to drinking water. In such situations, ***we expect you to provide public notice and to consult with the EPA as soon as practical, but within no more than 24 hours.*** Please note, however, that if you consult with the EPA within 24 hours and provide information indicating that such a potential for health risks does not exist, the EPA may determine that there is no need to provide public notice.

Once the animal contamination is removed, isn't the health threat gone? Not necessarily! If tanks had motion sensors and you were alerted the moment an animal entered a tank, you could take immediate action to remove the contamination and flush the water out of the tank. In most cases, however, you won't know how long the animal contamination has been present in the tank or whether pathogens from the contamination have left the tank and traveled into the distribution system. *Any time you fix a hole in a tank, you should also thoroughly look into the tank to see if any animal contamination is present.* Removing the animal contamination (carcass or debris) is just the start of eliminating the potential health risk.

When you call EPA immediately upon finding the animal contamination, we will want to discuss the proper protocol for cleaning the tank. This protocol will generally involve the following procedures: taking the tank offline; finding and permanently fixing all holes; draining and power washing out the tank (this method is recommended to scour the walls and all other surfaces to remove contamination adhered to the walls); disinfecting the tank; and flushing the distribution system. Until this protocol is completed, EPA will also want to discuss the need for a boil water notice. In preparation for getting your tank cleaned, EPA recommends that you be sure that all holes and breaches are repaired; this will help you avoid having to have the tank cleaned twice if animal contamination is found.

Animal contamination found in finished drinking water storage tanks represents a failure of the sanitary protection practices that the drinking water industry has put in place to protect human health. These contamination events can be avoided by being attentive to the details. In guidance from the American Water Works Association (AWWA) and EPA, daily to twice-per-week inspections of tanks are recommended. These inspections allow operators to observe breaches in tanks as they are developing and repair them quickly. Protection of public health can be challenging and demanding, but can also be extremely rewarding. EPA and PWS operators must operate as a team to achieve our mutual goal to provide the safest drinking water to the people we serve.



We've Updated Our Drinking Water System Operations Website!

If you haven't been to our website lately, the front page has been redesigned to be more user friendly! All of the major topics, including accessing your water system's information, what to do in emergencies, reporting forms, etc. are now presented in an easy to find format. Here is the address: <http://www.epa.gov/region8-waterops>. The link hasn't changed, so if you have it bookmarked there is nothing you need to do. For anyone who hasn't visited the Drinking Water System Operations website, please do! It is loaded with great information tailored just for you.

Below is a snapshot of the new website homepage. As you can see, it is packed full of useful information and links (and there is way more, we just can't show the entire website here!). We'd like to highlight Drinking Water Watch (DWW) which can be found under "Water System Info" and is printed in red below. This is where you can get specific information on your water system. Your most recent monitoring calendar is located here along with all of your monitoring results, a copy of your sanitary survey and more! If you haven't signed up yet, click on the link "Registration and Account Maintenance" shown in the graphic below. To log-in after you've completed the registration step, click on the "Drinking Water Watch Login" link. We also now have a Public Access version of Drinking Water Watch. This is for anyone who would like to learn more about any regulated public water system in Wyoming or Tribal Lands in Region 8. No login is necessary! Just click on the "Drinking Water Watch – Public Access" link shown below. However, you will want to register for the non-public version to access ALL of YOUR drinking water system's information. The public version has great info, it just doesn't contain everything. So check it out and if you can't find what you're looking for, contact us right away!

Drinking Water System Operations in Wyoming and on Tribal Lands in EPA R8 (CO, MT, ND, SD, UT and WY)

This website is designed for use by owners, operators, and administrative staff who work at public water supply systems in **Wyoming and on Tribal lands** within the jurisdiction of **EPA Region 8 (CO, MT, ND, SD, UT and WY)**.

Water System Info



Drinking Water Watch (DWW)

- [Drinking Water Watch Login](#)
- [Drinking Water Watch - Public Access](#)
- [Registration & Account Maintenance](#)

Regulations and Compliance



Rules and Guidance

- [New and Revised Rules](#)
- [Revised Total Coliform Rule \(RTCR\)](#)
- [Regulated Analytes List](#)
- [Tips to Stay in Compliance](#)

Emergencies and Preparedness



Emergencies and Security

- [TC Positive or E. coli Positive](#)
- [Boil Water Advisory Template](#)
- [Loss of Pressure](#)
- [Natural Disasters](#)
- [Water Security](#)

Monitoring and Sampling



General Sampling Information

- [Certified Laboratories](#)
- [Sample Collection Guide](#)
- [Guide to Monitoring Requirements](#)

Reporting and Forms



Reporting, Forms and Instructions

- [Reporting Forms](#)
- [Public Notification](#)
- [Consumer Confidence Reports](#)

Operations and Assistance



System and Operational Improvements

- [Sanitary Surveys](#)
- [Tech Tips](#)
- [Operator Training/Certification](#)
- [Funding Sources](#)
- [Training Presentations](#)



A New Day is Dawning With the revised Total Coliform Rule in April 2016!

The Revised Total Coliform Rule (RTCR) will finally become effective on April 1, 2016, but do you know if your system has any upcoming new requirements or changes? Be sure to consult <http://www.epa.gov/region8-waterops> for lots of useful information. Please become familiar with the information contained in the RTCR link, which can be found under the “Regulations and Compliance” box on the website. EPA Region 8 has also posted RTCR training presentations from recent conferences under the “Operations and Assistance” box at the bottom of the website. Both of these sites have descriptions of the new monthly and repeat monitoring requirements and required on-site Assessments, and describes the additional changes for seasonal systems.

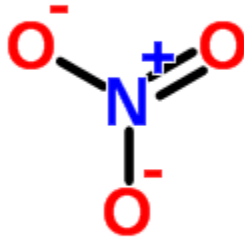
In a nutshell the RTCR requires systems vulnerable to microbial contamination to identify and fix “sanitary defects” that may allow contamination into the distribution system. All systems will be required to conduct an Assessment when monitoring results show potential vulnerabilities (total coliform positive results are considered a potential vulnerability, instead of an automatic MCL violation as under the current TCR). A Level 1 Assessment is triggered when there are multiple total coliform positive (TC+) samples in a single month, or when all repeat samples are not collected after a TC+.

A Level 2 Assessment is triggered if the water system has an *E. coli* MCL violation (a combo of TC+ and/or *E. coli*+ routine and repeat samples), or has continued problems with total coliform positive samples. A Level 2 Assessment must also be conducted if all repeat samples are not collected after an *E. coli* positive sample. Water systems must contact EPA the same day they are notified of any *E. coli* positive sample results. Assessments are a proactive approach to evaluate and identify sanitary defects which may be the likely cause of coliform problems. These defects must then be corrected in a timely manner to prevent additional positive samples.

Additionally do not forget that beginning on April 1, every system must collect monthly samples, only three repeat samples will be required after each total coliform positive routine sample, and additional routine samples will no longer be required during the following month. Seasonal systems will have some big changes in that they must collect samples during each month of operation and an EPA-approved start-up plan must be completed each year prior to serving the public for the season.

Lastly, has your Sample Siting Plan been submitted to our office? This needs to be done as soon as possible, and certainly before April 1 to avoid a violation! If you have any questions, feel free to contact Bre Bockstahler at bockstahler.breann@epa.gov.





Important Note to All PWSs Regarding Nitrate Sampling

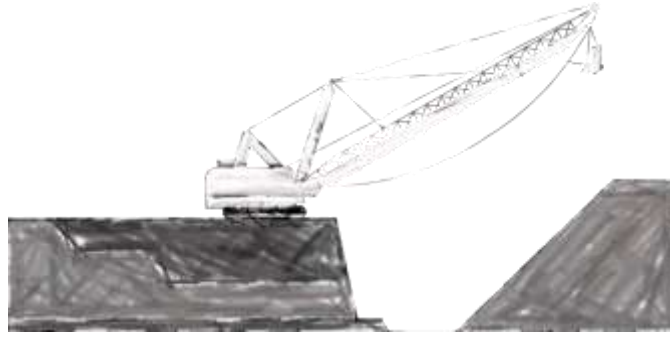
If your drinking water sample is above the Maximum Contaminant Level (MCL) for nitrate (10 mg/L) or nitrite (1 mg/L), then you must collect a confirmation sample within 24 hours of receiving the results or notification from the lab to confirm the elevated presence of nitrate or nitrite in your water supply. If the average of the initial and confirmation samples is above the MCL for nitrate or nitrite, this is considered an MCL violation and you must contact the EPA and conduct Tier 1 Public Notice. You will also be placed on quarterly monitoring. You will be required to pursue some form of treatment for your water source which may be in the form of Reverse Osmosis, Ion Exchange, blending of your water with a drinking water source lower in nitrates or nitrites, or obtaining a new source of water that meets all regulatory requirements. If the average of the two results is lower than the MCL, then it isn't considered an MCL violation and you won't need to conduct Public Notice. For non-Transient systems, if your nitrate or nitrite levels are above half of the MCL (5 mg/L for nitrate and 0.5 mg/L for nitrite), you will be placed on quarterly monitoring until you are able to show that you are reliably and consistently below the MCL for nitrate and nitrite. If you have any questions regarding monitoring for nitrates or nitrites, please contact the Nitrate Rule Manager, Michael Copeland by phone at 303-312-6010 or by email at copeland.michael@epa.gov.

**SAMPLING
WORKS!**

New Chemical Reporting Requirements for Tribal Drinking Water Systems

Starting in the next compliance period (January 1, 2017 to December 31, 2019), the EPA will be requiring that ALL community and non-transient non-community public water systems on tribal lands sample for 5 Synthetic Organic Contaminants (SOCs) that your PWS may not have historically sampled for. These 5 SOC's include Endothall, Diquat, Glyphosate, 1,2-Dibromo-3-chloropropane (DBCP), and 1,2-Dibromoethane (EDB). Please plan ahead and include the laboratory costs of the analyses of these additional 5 SOC's at all entry points to the distribution system. Make sure the laboratory that you use is EPA certified for analyzing these additional SOC's. Feel free to call Natalie Cannon with questions at (303) 312-6625.





**Is Your Tribal Public Water System
Planning New Construction
or Modifications?**

If so, it can be important to send your initial plans/specifications to EPA Region 8.

For construction that is partially or totally EPA-funded using Tribal Set-aside (TSA) grant dollars, we **require** you to provide your plans and specifications for EPA review. Please send full plans and specifications IN DRAFT FORM to the EPA Drinking Water Tribal Set Aside Program Coordinator, Minnie Adams, at email adams.minnie@epa.gov. EPA will review them according to our Region 8 Significant Deficiency List and the 10 State Standards.

For construction that is not EPA funded, please have the design agency (IHS, BOR, BIA and/or your consulting engineers) check the plans for compliance with the Region 8 Significant Deficiency List and the 10 State Standards. Also, for **wells, springs, storage tanks, and surface water treatment plant modifications,** we *encourage* you to send these to EPA Region 8 Tribal Liaison, Mindy Mohr (mohr.mindy@epa.gov). She will have the proposed project reviewed against our Significant Deficiency list, and also have the surface water treatment plans evaluated for regulatory compliance.

Ensuring that your new construction will not have significant deficiencies in its design is critical, and will help protect you and your consumers -- and possibly save you money!

Reminder to Sample Properly for the Ground Water Rule (GWR)

If you are subject to the Ground Water Rule (GWR) (it will be listed as a requirement on your annual Monitoring and Reporting Requirements), you only need to collect a GWR source sample anytime you have a routine Total Coliform (TC) positive sample. When you have a routine TC positive sample, you must collect a groundwater source sample from each active groundwater source for the same number of routine TC positive samples (e.g. if you have three routine TC positive samples, you will need to collect three source water samples from *each* active ground water source). The GWR source sample is required to be collected in addition to your regular repeat TC samples; you cannot count a TC distribution sample as a GWR source sample or a GWR source sample as a TC distribution sample. If you have repeat TC positive samples, no GWR source sample is required for the positive repeat samples.

Please ensure you are noting the proper GWR sample location(s) on the lab forms. A violation for failing to sample at the proper sampling location may be issued if you fail to indicate the correct name of the groundwater source sampling location (e.g. Well #1, or WL01). If you are unsure of the name of your groundwater source(s), you may check your system's annual Monitoring and Reporting Requirements; all facility names will be included on it. If your groundwater sources combine before treatment you may take a combined source sample, but make sure to mark the sample location as "combined" and note the ground water sources that were combined (e.g. Combined Wells #1, 2, 3, 4). If any groundwater sources are not active, include that statement on the GWR Source Sampling Form.

A copy of the GWR Source Sampling Form may be found at the following website <http://www.epa.gov/region8-waterops>; click on the "Reporting Forms" link under the picture, and select the "Ground Water Rule" link. If the GWR source sample is safe, or is only total coliform positive (TC+), there is no further sampling requirement. However, if the source is TC+, you should inspect your system to identify the cause of the positive result. If the GWR source sample is *E. coli* positive (EC+), you must call Gail Franklin, Region 8 GWR Manager, immediately at (303) 312-6497, and issue a Tier 1 Public Notice with a boil water advisory to your customers.



Community Engineering Corps Can Assist with Small Community Needs
**(Adapted from Association of State Drinking Water Administrators’
Dec 18, 2015 Weekly Update)**



The Community Engineering Corps® (CECorps) combines the strengths of three organizations -- American Water Works Association, American Society of Civil Engineers, and Engineers Without Borders USA -- to assist underserved U.S. communities in meeting their infrastructure needs and improving the quality of life for the communities’ members.

CECorps volunteers work with U.S. communities that do not have the financial resources to hire engineers. They work directly with communities, or for organizations that represent communities. All publicly owned water systems are eligible to apply for technical assistance. Private water systems held by a for-profit entity serving a non-transient community are also eligible as are private water systems held by nonprofit organizations serving private nonprofit businesses. There are no costs associated with CECorps assistance to qualified disadvantaged or underserved communities.

Delta Junction, Alaska, is an example where the Snowed Inn RV and Trailer Park has applied for technical assistance to address violations listed on the community’s 2014 Sanitary Survey and to help identify potential grants that could fund capital improvements to the water and sanitation systems.

Chloride, Arizona, is another open project under CECorps. The community, with a customer base of mainly retirees and armed forces veterans on limited incomes, has applied for technical assistance to assess distribution infrastructure including managing leaks and meter issues, as well as developing a long term plan for future improvements.

CECorps is currently accepting project applications through the following process:

1. Visit the CECorps website for FAQs, application instructions, and additional information;
2. Complete and submit the Community Application for a Community Engineering Corps Project through either cecinfo@ewb-usa.org or www.communityengineeringcorps.org.

For More Information: Send your questions to Lauren Wasserstrom, Project Engineer, American Water Works Association at lwasserstrom@awwa.org



New Online Tool Can Assist with the Development of Consumer Confidence Reports

A new tool has been made available on EPA Region 8's Drinking Water Online website to assist owners and operators with developing their annual Consumer Confidence Report (CCR). The purpose of the CCR, or drinking water quality report, is to raise customers' awareness about the source and quality of their drinking water. It also provides an opportunity for customers to better understand the costs and services associated with the provision of safe drinking water. The CCR is due to customers and the Region 8 office by July 1 each year.

The CCR data generator tool creates a document that captures data from Region 8's database for regulated contaminants that have been sampled for and detected, as well as identifies the violations associated with community water systems required to report under the CCR Rule. The document *cannot* serve as a substitute for the CCR because it does not satisfy the complete requirements of the CCR Rule. However, the document provides some valuable information that can be used to streamline the development of the annual report. This tool is now available for your use in creating the 2015 CCRs (due July 1, 2016).

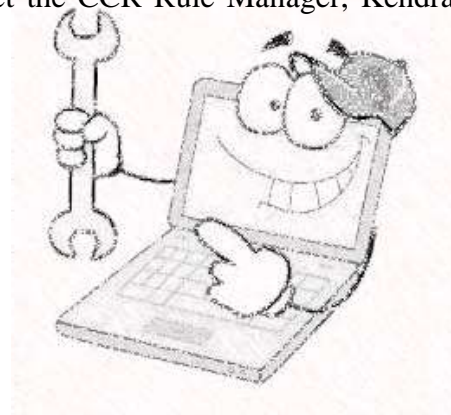
Directions to Use the CCR Data Generator Tool

- Step 1:** Go to Region 8's Drinking Water Online website at <http://www.epa.gov/region8-waterops>
- Step 2:** Under "Water System Info," click on "Drinking Water Watch - Public Access (DWWPUB)"
- Step 3:** Make a selection from the drop-down menu of "Wyoming" or "Region 8 Tribes" based on the location of the water system
- Step 4:** Click "Submit"
- Step 5:** On the bottom of the page, click on "Review Consumer Confidence Data."
- Step 6:** At the top of the page, enter the complete PWS ID no. for the system or select it from the alphabetical listing in the adjacent drop down menu (i.e. Wyoming systems have a PWS ID no. that begins with "WY," whereas Tribal systems begin with the numbers "08.")
- Step 7:** Select the year of interest under "Select CCR Year"
- Step 8:** Select the report format you desire under "Select Report Format." You may choose Adobe PDF or rich text format (RTF).
- Step 9:** Click "Generate Report"
- Step 10:** Open the report

Remember:

- If you had sample results above the detection limit for any unregulated contaminants you monitored for, be sure to include them in your CCR since the tool only provides data for regulated contaminants.
- If you purchase water, make sure you contact the seller or use the CCR data generator tool to search for and obtain the wholesaler's detection data and include it in your CCR.

If you want more information, need assistance with using the tool, and/or find discrepancies between the water quality data and records you maintain at your water system, please contact the CCR Rule Manager, Kendra Morrison, at (303) 312-6145 or morrison.kendra@epa.gov.



Compliance Tips for the Consumer Confidence Report Table of Detected Contaminants

The table of detected contaminants is a key part of your Consumer Confidence Report (CCR), or water quality report. It portrays the concentrations of all detected contaminants (both regulated and unregulated) found in your water samples at levels at or above the laboratory's method detection limit (i.e. reportable limit). Developing the table can be challenging, but the following reminders can help you meet the requirements of this item of the CCR:

- ✓ Report monitoring data completed during the previous calendar year
- ✓ If you monitor less often than once per year for certain contaminants, include the results from the most recent sampling period for those contaminants that were detected. Then include a brief statement explaining that the data presented is from the most recent monitoring done in compliance with the regulations.
- ✓ Data older than 5 years can be excluded from your report
- ✓ If you purchase water from another system, make sure you include the wholesaler's contaminant detection data in addition to your own system's contaminant detection data
- ✓ Include information about likely sources of the contaminants that have been detected
- ✓ Report any additional monitoring data (i.e. contaminants that are not detected or voluntary monitoring data) in another section of the CCR
- ✓ A maximum contaminant level (MCL), maximum residual disinfectant level (MRDL), or action level (AL) must be expressed as a number equal to or greater than 1.0. This may require multiplying these standards by a factor, thereby changing the unit of measure. In turn, the contaminant concentrations would be multiplied by the same factor to express the results in equivalent units to the standards.

For an illustration on how to convert compliance values to units required for your CCR, refer to EPA's new fact sheet located at <http://www.epa.gov/ccr/how-water-systems-comply-ccr-requirements>. Click on "Converting Laboratory Units to CCR Units." *Preparing Your Drinking Water Consumer Confidence Report Guidance For Water Suppliers* is a guide that can also help you develop the table of detected contaminants and a regulatory-compliant CCR. This resource is also available on the website. Click on "Preparing your CCR."

If you have any questions or need assistance with the preparation of your CCR, please contact the CCR Rule Manager, Kendra Morrison, at (303) 312-6145 or morrison.kendra@epa.gov.



Distribution Requirements for the Consumer Confidence Report

As a reminder, Community water systems are required to **mail or otherwise directly deliver** one copy of the consumer confidence report (CCR) to each customer and EPA by July 1 each year [40 CFR 141.155(a)]. **Customers are defined as billing units or service connections to which water is delivered by a community water system** [40 CFR 141.151(c)]. Each community water system must also provide a certification to EPA that the CCR has been distributed to customers, and that the information is correct and consistent with the compliance monitoring data previously submitted to EPA by October 1 each year [40 CFR 141.155(c)].

In addition to direct delivery, community water systems must make serious and “good faith” efforts to reach customers who do not receive water bills [40 CFR 141.155(b)]. A “good faith” effort means selecting the most appropriate means to reach those consumers who do not have direct contact with the water system. Good faith efforts can include posting reports on the internet; advertising availability of the report in news media; publication in the local newspaper; posting in public places such as cafeterias, libraries, or post offices; delivery of multiple copies for distribution (e.g. apartment buildings); and delivery to community organizations (e.g. YMCA).

The CCR certification form for community water systems has been updated and redesigned to make it quicker and easier to complete. The form is available on EPA Region 8’s web site at <http://www.epa.gov/region8-waterops/reporting-forms-and-instructions-consumer-confidence-reports>. Click on the link to “Reporting Forms” in the box located on the top right-hand side of the screen, and then the link for “Consumer Confidence Reports (CCR).” Choose the first form for community water systems. Do NOT use copies of older certification forms, nor the downloadable form from EPA’s CCRiWriter tool.

For more information about delivery methods, visit Part 2, Delivering Your CCR, in EPA’s new fact sheet “Best Practices Fact Sheet: Consumer Confidence Report” (July 2015): <http://www.epa.gov/ccr/best-practices-water-systems-preparing-consumer-confidence-reports>.

If you have any questions or need assistance with the preparation of your CCR certification, please contact the CCR Rule Manager, Kendra Morrison, at (303) 312-6145 or morrison.kendra@epa.gov.





Toxins from algae can be more toxic than cobra venom!

It's true! Some common algae toxins are microcystin, cylindrospermopsin, anatoxin and saxitoxin. The LD₅₀ (individual dose required to kill 50% of the population) for cobra venom is 20 µg/kg, but for saxitoxin the LD₅₀ is only 10 µg/kg. Saxitoxin is more toxic than cobra venom! Saxitoxin is a potent neurotoxin that blocks the flow of sodium in the nerve cells leading to numbness, paralysis and death. Microcystins are the most common algae toxins; they have an LD₅₀ of 50 µg/kg and are liver toxins that cause cells to shrink, which causes blood to spill into the liver and can quickly lead to death.

The algae that produce toxins are not algae at all, but actually photosynthetic bacteria called cyanobacteria. Cyanobacteria, common to freshwater and marine ecosystems, can under certain conditions (high nutrient concentrations and high light intensity) form scums or blooms at the surface of a water body. These blooms can produce toxic compounds (or "cyanotoxins") that are harmful to the environment, animals and human health. Winds and water currents can transport cyanobacterial blooms within proximity to drinking water intakes at treatment plants that, if not removed during treatment, can cause odor, taste and color problems in treated drinking water and can be harmful to human health.

You may recall hearing about microcystins in the news after they were found in the finished water at Toledo, Ohio in August of 2014. In response to this and similar events, in June of 2015 EPA published 10-day health advisories for microcystins (0.3 ppb for children under 6, and 1.6 ppb for all others) and cylindrospermopsin (0.7 ppb for children under 6, and 3.0 ppb for all others). For more information on the health advisories, see <http://www.epa.gov/nutrient-policy-data/drinking-water-health-advisory-documents>.

Some PWSs have experienced treatment challenges from algae for decades. What's changed? The conditions that favor algae that produces toxins are both nitrogen (N) and phosphorous (P) and high temperatures. Concentrations of N and P in surface waters are increasing, and records show temperatures continue to rise, leading to more frequent algae blooms.

So does every algae bloom these days have toxins in them? Unfortunately, it is much more complicated than that. In algae blooms, the majority of the bloom can be cyanobacteria (~60 to 90 %), but of the blooms tested world-wide only about 59% produce toxins. It is currently unknown what environmental conditions trigger cyanobacteria to produce toxins. Therefore, one bloom may be toxic and the next one may not be, or this entire year's blooms may be diatoms and the next year's blooms may be toxic. You may not detect toxins when the bloom is going through its rapid growth phase, but may detect toxins during the die off phase, or vice versa. It is the episodic nature of toxin production that makes it very challenging to predict when to test.

It gets trickier. If you wanted to test for toxins and are looking for a visual bloom to trigger testing you may not find a bloom during a particular time of day. Cyanobacteria have air vacuoles in them that allows them to float to the level where the best nutrients are located. Sometimes, there may be no visible indication of a bloom from the surface, yet toxins are being produced.

What can we do to deal with these challenges that for years may have caused treatment problems but were otherwise thought to be harmless? The best strategy is to stay vigilant and to track either the visual progress of a bloom, treatment changes (diurnal pH swings of the raw water, taste and odor, shortened filter runs, etc.) or direct measurements like algae identification or cell counts. To assist you, EPA Region 8 developed a Harmful Algae Bloom (HAB) Strategy that is based upon Ohio's strategy, the state with the most experience dealing with HABs.

When you become concerned that an algae bloom may be toxic, we suggest you call EPA Region 8 to get assistance. In the strategy, the first step we recommend is that the raw water be tested with a test strip to see if toxins are present. If toxins are present, EPA's Regional Lab may be able to assist with testing of the raw and finished water at no cost to you. If toxins are found in the raw water, we will work with you to determine how best to optimize your treatment for toxin removal. The toxins are held within the cells therefore, the treatment strategy is focused on removing whole cells and not lysing them. Adding copper sulfate or an algaecide to actively break up the algae bloom may fix the filter clogging problem, but if the cyanobacteria happen to be producing toxins then the algaecide is going to lyse the algae cells and release those toxins. Toxins are smaller and much more difficult to remove through treatment than the whole algae cells. The most responsible strategy relative to algaecide addition is to test first for toxins. Then if toxins are not present, it is safe to add the algaecide. If there are toxin levels found in the finished water, testing should be conducted as often as possible. If toxins are detected over the health advisory LEVELS, then public notice needs to be conducted.

Please stay tuned! We plan to post the full strategy on our website and email a copy directly to all surface water systems later this spring. Please contact Bob Clement at 303-312-6653 or clement.robert@epa.gov if you have any questions.

