Ohio EPA
40 years and moving forward

Spigot News

A Newsletter for Ohio's Public Drinking Water Systems

Summer 2013
Volume 6, Issue 1

Seeing **Red**: Emerging Harmful Algal Blooms

The 2012 drought contributed to a relatively mild harmful algal bloom season, but some new issues arose. For the first time, a late season red-colored *Planktothrix* bloom developed on an Ohio public water system reservoir (see fig. 1). The bloom appeared on the reservoir surface in November and had microcystin concentrations up to 1400 micrograms per liter or ug/L. The drinking water threshold is 1.0 ug/L. Luckily the reservoir was offline, so it did not pose a human health risk. Given the unique red coloration of the bloom, it was most probably caused by *Planktothrix rubescens*. This species of cyanobacteria contains a red accessory pigment called phycoerythrin that helps it gather more light at significant depths, up to 30 meters.

Figure 1: Planktothrix bloom near water system intake (Nov. 2012)

Based on research in other countries, these blooms reach a maximum biomass in late summer. Unfortunately, the blooms often go undetected during the summer months because they thrive near a lake's thermocline rather than at the water's surface. The blooms can become more obvious in the late Fall if the lake or reservoir waters turn over, or when light becomes more limited and the cyanobacteria move closer to the water's surface.

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SEEING RED

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When *Planktothrix rubescens* cells start to die and break open they can color the water a noticeable red or purplish hue. Since these toxin-producing blooms are often not visually apparent and occur at depths that could be near an intake, they pose a unique threat and monitoring challenge to water supplies. *Planktothrix* can produce the taste and odor compounds geosmin and 2-methylisoborneol (MIB). If a public water system is experiencing a taste and odor problem, but does not see a surface bloom, *Planktothrix rubescens* could be the cause.

Another cause of red water is a *Euglena sanguinea* bloom. In this case, the red pigmentation is due to astaxanthin, a substance that helps shade the organism from intense light radiation. In July, 2012, a *Euglena* bloom on Dillon Lake created a bright red coloration to the water (see fig. 2). These blooms are not caused by cyanobacteria, but they can produce a toxin called euglenophycin, which has a chemical structure similar to fire ant venom and may pose human health concerns.

Ohio EPA has not yet developed recreational or drinking water thresholds for euglenophycin. If new *Euglena* blooms are observed, we will begin testing for the toxin in 2013. Data is limited, but preliminary research shows that carbon can be effective at euglenophycin toxin removal.

Figure 2: Euglena bloom on Dillon Lake (July 2012)

If you "see red" (or any other unusual color) on your water source or have a summer taste and odor event please notify Ohio EPA. If the bloom has the potential to impact drinking water quality Ohio EPA will sample for toxins at no cost to the water supply. More information about harmful algal blooms is available on Ohio EPA's public water system harmful algal bloom website: ***epa.ohio.gov/ddagw/HAB.aspx***.

STABILITY ANALYSIS USING THE ALKALINITY/PH METHOD (STANDARD METHOD 2330)

In Ohio, public water systems (PWSs) providing precipitative softening or membrane technology to reduce hardness, must monitor for stability at least weekly at each entry point to the distribution system. Stability analysis by the alkalinity/pH method is widely used by PWSs and PWS laboratory staff members frequently ask the Ohio EPA's Laboratory Certification section about stability analysis by this method.

The stability test is a comparison of alkalinity and pH values in a sample supersaturated with calcium carbonate ($CaCO_3$) and in an unsaturated sample. The method is designed to determine water chemistry as defined by one of the following three interpretations:

- Corrosive – The water tends to dissolve pipes, resulting in line breaks due to thinning of the pipe wall and potential red water issues such as laundry staining;
- Scale-Forming – The water tends to release minerals (in Ohio these are mostly calcium and magnesium) from solution, allowing mineral salts to be deposited onto the walls of a pipe. The result is line breaks due to pressure increase caused by deposit build-up in the pipe; or,
- Stable – The alkalinity reduction in the super-saturated sample should be 0 to 5 mg/L or slightly scale producing. This is generally the desired water chemistry.

In about a day's time, the stability analysis is designed to give a representation of what happens between the finished water and the distribution system over the course of several months. A sample volume of water is collected into two identical bottles for the procedure. One of the bottles is super-saturated by adding $CaCO_3$; the other is left as collected (unsaturated sample). Both are stoppered with no headspace in the bottles. After filtration, samples from both bottles are analyzed for alkalinity and pH.

Alkalinity, reported in mg/L, determines the water's capacity to buffer acid. Acidity is indicated through the pH analysis, which is also used to confirm that the procedure was performed correctly. For the test to be considered valid, pH results between the unsaturated sample and $CaCO_3$ saturated sample must increase or decrease in accordance with the alkalinity results.

Example of invalid analysis

$CaCO_3$ super-saturated sample results:	pH – 7.55, alkalinity – 84 mg/L
Unsaturated sample results:	pH – 7.25, alkalinity – 90 mg/L

If the alkalinity in the super-saturated sample is less than the unsaturated sample, the water is considered to be scale-forming or super-saturated with minerals. The addition of $CaCO_3$ has encouraged precipitation of the minerals dissolved in the water sample. This decreases the alkalinity of the water sample. In the distribution system these minerals would gradually precipitate out of water, depositing onto the sides of the pipes as the water moves through the distribution system.

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STANDARD METHOD 2330

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Example of valid analysis with a scale-forming water sample

$CaCO_3$ super-saturated sample results:	pH – 7.55, alkalinity – 84 mg/L
Unsaturated sample results:	pH – 7.75, alkalinity – 90 mg/L

If the alkalinity in the super-saturated sample is greater than the unsaturated sample, the water is considered corrosive. The water sample has the ability to dissolve some of the added $CaCO_3$, causing an increase in the alkalinity concentration of the water sample. The water would have aggressive tendencies that would strip calcium from the walls of the distribution system.

Example of valid analysis indicating a corrosive water sample

$CaCO_3$ super-saturated sample results:	pH – 7.45, alkalinity – 84 mg/L
Unsaturated sample results:	pH – 7.25, alkalinity – 78 mg/L

If the alkalinity in the super-saturated sample is similar to the unsaturated sample, the water is considered stable. The water sample neither dissolves the added $CaCO_3$ nor precipitates minerals from solution. The water should not negatively affect the pipes in the distribution system.

Example of valid analysis indicating a stable water sample

$CaCO_3$ super-saturated sample results:	pH – 7.55, alkalinity – 84 mg/L
Unsaturated sample results:	pH – 7.60, alkalinity – 86 mg/L

Note: Significant change may be defined as an increase/decrease in pH greater than 0.1 pH units and alkalinity increase/decrease in mg/L greater than 3% of the $CaCO_3$ super-saturated sample result.

When interpreting the results of the analysis, one must take into consideration the changes in alkalinity between the super-saturated and unsaturated sample relative to the base water alkalinity. A 10 mg/L change between the super-saturated and unsaturated sample in water with a base alkalinity concentration of 50 mg/L is more significant than when the water has a base alkalinity concentration of 350 mg/L.

Accurate interpretation of the stability analysis can only be accomplished when comparing the saturated and unsaturated alkalinity results, so it is important to collect the super-saturated and unsaturated water samples at the same time from the same source. Reporting alkalinity results from a tap sample collected at 8 a.m. and reporting saturated sample alkalinity (alkalinity stability) results from a saturated sample collected at 3 p.m. may be independently accurate, but useless when determining stability.

For more information, please contact Ohio EPA's Division of Environmental Services (DES), Laboratory Certification Section at (614) 644-4245.

LEARN FROM EACH OTHER

What's that smell?

Have you ever arrived at your plant and had the feeling that something wasn't right? Most public water system (PWS) operators have their routine finely tuned. Just be careful, sometimes our focus on the routine can blind us to what's happening in our surroundings. As one of our operators recently discovered, sometimes things can happen right under our noses…

Earlier this year, the operator at the Chrystal Clearville began noticing an ammonia/strong urine smell at the plant. In the days that followed, he realized that things were out of place and several items were in the trash, including two-liter soda bottles, which he had not put there. The operator made the decision to contact local authorities.

Upon investigation, the plant was allegedly used as a location to make methamphetamine and it appears Clearville funds were used to finance the drug operation.

Ohio EPA was notified of the situation and worked with investigators to determine if any spills had occurred and how this situation could affect the PWS. Although the site was cleaned up and it didn't appear any spills had occurred, staff took water samples to ensure the safety of the PWS.

If you ever notice something strange at your system, please notify your local authorities and Ohio EPA as soon as possible.

Have a hard-learned lesson to share? Submit it to susan.baughman@epa.ohio.gov.

RULE-MAKING ACTIVITIES

Below is a brief summary of recent and upcoming rule changes. For more details, including notice of opportunities to comment on draft rules, sign up for our electronic mailing list, or visit us at ***www.epa.ohio.gov/ddagw***.

Upcoming Proposed Rules

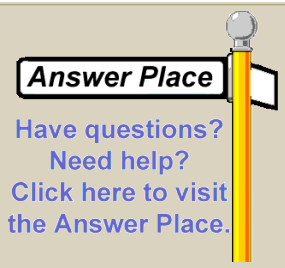
- PWS Definition and water source designation: clarify definition of a PWS and who is under Ohio EPA's jurisdiction; allow Ohio EPA to designate the majority of water sources by rule (propose fall/winter 2013)
- Surface Water Treatment Rules: minor revisions, including updating references (propose summer 2013)

Interested Party Review

- Misc. Amendments: reference backflow prevention manual in rule, revise self-certification provisions, revise investigation of water use practices (currently reviewing comments)

In the Works

- Laboratory Certification: update rule-by-references, revise interim authorization requirements



DEAR ANSWER PLACE:

I received a letter saying I am late paying for my public water system license, but I don't remember seeing a license renewal?

- Responsible Owner

DEAR RESPONSIBLE OWNER:

DDAGW mails pre-renewal notices annually in early Fall. This pre-renewal application gives you an opportunity to make corrections to the owner name, phone number, etc. In late November of every year, a renewal application is mailed. Renewal applications and payments are always due by December 31st. If you have not received a renewal application by mid-December, please contact us.

- Answer Place

HAVE A QUESTION?
ohioepa.custhelp.com

OHIO EPA'S SPIGOT NEWS

John R. Kasich, Governor
Mary Taylor, Lt. Governor
Scott J. Nally, Director

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24-HOUR EMERGENCY HOTLINE

For emergencies occurring after 5 p.m. or on a weekend or holiday, please call Ohio EPA's emergency hotline at **(800) 282-9378**

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Visit us on the web at ***epa.ohio.gov/ddagw***

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OPERATOR CERTIFICATION UPDATE

Earlier this year, DDAGW's Operations and Operator Certification Unit initiated a program to ensure all public water systems (PWSs) have appropriately certified operators of record (ORCs). In early May of this year, notices of violation were sent to PWSs that had not identified an appropriately certified ORC. PWSs were required to obtain an ORC within thirty (30) days and failure to do so could result in an enforcement action, including a penalty of up to $25,000 per day of violation.

The ORC notification form is available online at ***epa.ohio.gov/ddagw/opcert.aspx#LiveTabsContent111264***.

Ohio EPA
40 years and moving forward

Operator of Record (ORC) Notification Form

Ohio Environmental Protection Agency
Division of Drinking and Ground Waters
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Columbus, OH 43216-1049

Phone: (614) 644-2752
1- 866 - 411-OPCT (6728)
Fax: (614) 644-2909
email: opcert@epa.state.oh.us
website: http://www.epa.ohio.gov/ddagw/opcert.aspx

I. SYSTEM INFORMATION

Name of System: _____ Phone Number: _____

PWS ID/NPDES Permit #:_____ STU #:_____ Classification:_____

_____ _____
Name of Facility Owner or Permittee, Title (Print) Facility Owner or Permittee (Signature)

2013 FALL EXAM DEADLINES AND DATES		
	Application Due	**Exam Date**
Wastewater	August 8, 2013	November 6, 2013
Water	August 9, 2013	November 7, 2013

FOR MORE INFORMATION

Call the Operator Certification hotline at **1-866-411-OPCT (6728)** or visit ***epa.ohio.gov/ddagw/opcert.aspx***.

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