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Articles and photographs are encouraged and appreciated. All submissions, comments, or other matters concerning this publication should be directed to:

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CHAIRMAN’S REPORT

The go-to resource for water professionals

The summer days may be getting longer, but the time before we meet again at our annual conference is getting shorter. Registration is open, so head over to www.almsawwa.org and register. We look forward to seeing you in Montgomery in October.

Our final planning meeting took place in June. The conference is shaping up to be something you don’t want to miss. Our entertainment is booked. The program is solid. We have included a plant tour and a first for us: a technical session offered on-site at the treatment plant. More details will follow in the next issue of Pipeline so stay tuned.

Our continued effort to provide value to our membership has resulted in another notable year for our Section. We’ve had a number of education events throughout Alabama and Mississippi covering topics from Internal Corrosion to Small Utility Management to Safe Drinking Water Compliance. We’ve done this on-site and via webinar. If you haven’t attended or tuned into one of these, you’re really missing out on some good training and continuing education hours.

Our Scholarship Program continues to be a model for AWWA Sections throughout the country. By the time you read this, the Committee will have evaluated this year’s applications and recommended awards to be presented at the Conference. We are always looking for deserving students to award scholarships to. If you know of someone wanting to further their education in a water-related industry, please point them to our website for application forms.

I’d like to recognize two long-serving members of our Section. Jimmy Nelson has finished his three-year term as Director. He is a Fuller Award recipient, a past chair of our Section, and a state leader in the Mississippi engineering and water industries. Jimmy has served the Section well on the AWWA Board of Directors and we thank him for his service. Jim Watterson took over as Director in June. Jim is a life member of AWWA, a past chair of the Section and an active member of his community. We welcome him to the Board. When you see these gentlemen, please thank them for their service.

Finally, I want to remind us all of our goal at the AL-MS Section: We want to be the go-to resource for water professionals in Alabama and Mississippi. Thanks to all of you for your part in helping us get there.
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Contact Jim Miller at millerwatermark@gmail.com for more information and scholarship applications.
The Alabama – Mississippi Section and AWWA Deliver!

If you have ever read my column before (even once) you probably noticed that I usually mention some of the value that membership in the Section and in AWWA provide. That value has been particularly evident this spring as the Education Committee has offered a number of opportunities to increase member’s knowledge and to get those required Continuing Education Hours for operators and professionals. The Section Board of Trustees set a goal last year of offering at least one workshop or class each month of the calendar year. We will be very close to meeting that goal again this year with the excellent help of Mississippi Education chair Dr. Jason Barrett.

In March we held a Safe Drinking Water Act Compliance workshop in Hanceville, Alabama at Wallace State Community College in cooperation with the Rural Community Assistance Program. It was well attended by over seventy-four operators and water professionals. Wallace State is a first class venue with a beautiful campus and great facilities. The staff at the college did everything possible to make it a positive experience for the class including a great lunch, state-of-the-art conference facilities, and a comfortable meeting room with a view from twelve stories up.

In April we met in Clarksdale in the Mississippi Delta region for another review of the Safe Drinking Water Act along with our friends from RCAP. Both this workshop and the one in Hanceville were funded by a grant from EPA and were free to attendees. The programs were tailored for small systems, but beneficial to all size systems. In Clarksdale, there was the added benefit of learning some of the local history and getting an education about Abe’s Barbeque…a famous local eating establishment who catered lunch for us.

In May we held a timely seminar on corrosion topics in Raymond, Mississippi. In both Mississippi locations, the sessions were made available by webinar and we had a number of attendees in both states on the web.

By the time you read this we will have had another workshop on June 15 in Montgomery, Alabama. This one will be on water works financial management and held on the Montgomery campus of Faulkner University.

Another workshop is being planned for August in the Southeast Alabama area. So, you get my point. When it comes to education and Operator Hours, the Alabama-Mississippi Section delivers!
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The following bills were passed this session and were pending the Governor’s signature.

- **SB 217**, to make unauthorized entry of a critical infrastructure a Class A misdemeanor. Included in the definition of critical infrastructure is a water intake structure and a water treatment facility.
- **HB 399**, to amend the Birmingham Water Works bill from last year and give the mayor two appointments to the board and the city council four appointments. Language, which would have required confirmation of the mayor’s appointments by the city council and confirmation of the city council’s appointments by the mayor, was amended out of the bill.
- **SB 81**, to preclude public contracts with companies that boycott...
certain persons or entities with whom the state enjoys open trade.

2016 Water Matters Fly-In
More than 130 water utility leaders from 48 states were in Washington, D.C., April 13-14 for AWWA's Water Matters Fly-In.

Investing in the nation's water infrastructure was the overarching theme for this year's Fly-In. Topics such as appropriations for the Water Infrastructure Finance and Innovation Act (WIFIA) and the state revolving loan fund program (SRF) were discussed along with dealing with lead in drinking water.

Hosted by AWWA's Water Utility Council since 2002, the event continues to bring AWWA members from across the country to Washington to bring the water community's concerns directly to members of Congress and their staffs.

Delegates from the Alabama/Mississippi Section included David Stejskal, Scott Cummings, Ed Turner, and Joe Gehrdes (from Alabama) along with Mark Snow and Chris Bryson (from Mississippi). Congressmen that the delegates had the pleasure to meet and discuss issues included Representative Bradley Byrne (1st District, AL), Representative Mike Rogers (3rd District, AL), Representative Gregg Harper (3rd District, MS), and Senator Roger Whicker (MS).
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For over a decade, utilities in North America have been applying asset management strategies to manage their buried water and wastewater infrastructure with various levels of success. Frequently, these strategies have struggled to answer one of the most fundamental questions of asset management — What is the current state of my assets? Answering this question has been particularly difficult for buried assets since inspection and analysis techniques have historically provided low confidence results. Due to the difficulty in answering this question for buried pipeline assets, the most common asset management strategy has been replacement, based on some form of desktop analysis. These desktop studies are typically focused on pipe material, age, break/maintenance history, and water quality. However, since little to no root cause of failure information is evaluated, nor actual condition assessment data collected as it relates to remaining useful or economic life, utilities are replacing a significant percentage of pipe before it’s actually necessary — estimated by various organizations at between 70% and 90%. New approaches and technologies offering significantly more accurate condition assessment of buried assets now allow utilities to renew only those sections of pipe (joint-to-joint) that are truly in need.

The industry as a whole cites aging infrastructure, specifically pipelines, as a top challenge today, but what does this actually mean? A quick online news search for water main breaks and aging infrastructure provide no shortage of quotes such as “classic sign of aging infrastructure” or “faced with an aging infrastructure” laying blame on the age of pipelines for the apparent increase in water main break rates across the country. Using the vintage of a pipe as a fallback position for why breaks occur has increasingly been found to be based on factors other than age. According to AWWA’s Buried No Longer, approximately 50% of pipe in the US was installed between 1920 and 1970. Based on the same report, the estimated service life of cast iron pipe ranges from 90 to 110 years, while ductile iron pipe has a broader range of 55 to 110 years. Assuming the lower estimated service lives of each material, we are approaching the need for replacement planning in the next decade or two if the replacement strategy is based solely on age. However, there are two key questions to answer when considering these estimated ranges for service lives. First, these service life ranges are not only highly variable across North America, but also within a utility. Pipeline deterioration cannot be viewed globally across a full network. Rather, deterioration is often more localized sometimes at a pipe section (joint-to-joint) level. This leads to the second question, why are the main breaks occurring? Is the root cause of deterioration due to external corrosion, water quality, capacity, operation, or installation? Understanding these deterioration factors has less to do with age than they do with the quality of material, design, and installation.

The Water Research Foundation Project #4374, through an investigation of both literature and data from utility sources, confirmed that age is typically not the primary cause leading to a water main break, but rather from a number of factors including material quality, manufacturing, corrosion, operations, and construction. This finding was further confirmed by Water Research Foundation Project #4374, where utilities noted several other failure modes other than age in their water main breaks. An often-cited example of where these factors contribute more to failures than age alone is comparing a cast iron pipe from 1908 to a ductile iron pipe from 1991, both 36-inches in diameter, rated for 150 PSI. Due to improved material quality and changes in design, the wall thickness has decreased by approximately 75% from 1908 to 1991. While the improved material quality and resiliency of ductile iron to operational and construction changes is beneficial for the utility, it has a higher vulnerability to failure mechanisms such as corrosion if not protected since the pipe wall is thinner. Higher break rates with younger vintage pipes have been reported across North America including two recently published examples from a medium (serving more than 100,000 but less than 500,000 people) and a large (serving...
more than 500,000 people) utility. The medium-sized utility specifically reported pipe age was not the problem since 85% of their failures have occurred on pipes installed since the 1950s. They found over two-thirds of failures with pipes installed since 1970. Improved manufacturing process and associated thinner walled ferrous pipe, representing 85% of all failures, combined with highly corrosive soils was cited as the primary cause of these failures. Additional correlation was found between average operating pressure and failures. Managing break rates can be more efficiently and cost effectively managed with techniques other than wholesale pipe replacement based on age.

Information from the second, large utility, was collected from a monthly reporting package delivered to its commission. For the month of July 2015, the utility reported that 47% of its more than 60 water main breaks occurred in pipes 25 to 50 years old. Review of historical data indicates these results are common. Approximately 50% of all water main breaks are on pipes installed within the last 25 to 50 years with the majority consisting of ferrous materials and 12-inches in diameter or smaller. With corrosion as the primary failure mechanism for these failures, which is consistent with the previous example. Additionally, despite an aggressive water main replacement program based on a desktop risk analysis, water main break rates have not decreased, indicating traditional risk analysis and large capital investments alone aren’t sufficient to meet pipeline management goals.

While there certainly are examples where age is correlated to deterioration and replacement needs, it is predominantly found to correlate far less than other factors previously noted. With utilities facing significant and frequently unattainable funding gaps to keep up with replacement needs based on a generalized desktop analysis management strategy, a new approach is emerging. Several utilities are now opting to manage their pipeline assets using a more holistic approach utilizing advanced engineering principles, improved condition assessment technologies, better software, and multiple cost effective renewal strategies. Under this holistic approach, utilities are not only optimizing the service life of the buried assets, thereby reducing or deferring the capital costs of replacement, but also seeing improved data sets emerge to better manage their infrastructure. This data indicates that factors such as age and failure history alone provide poor correlation to the actual condition and remaining life of a pipe.

New innovative holistic pipeline network optimization strategies can now be deployed with recent improvements in condition assessment technologies, advanced analytics, and new data management software, offering a more accurate and effective approach than age or break history alone. Let’s stop age discrimination with pipeline replacement strategies and take advantage of recent advances for network buried asset management optimization.

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The rise in number of cyanobacteria blooms in our region is becoming more and more of a concern for water utilities that utilize surface water supplies across the country. Cyanotoxins are less commonly found in drinking water than T&O compounds, however their toxicity and public perception is a concern for water utilities. Global climate change (increased temperatures) seems to be one of the primary drivers pushing toxin-producing cyanobacteria into more temperate regions and becoming more widespread.

In order to better understand cyanobacteria, some background on algal blooms should first be discussed.

**What are Algal Blooms?**
Algal blooms occur when algae reach extremely high cell densities (20,000 – 100,000 cells per milliliter); there is a proliferation of algae dominated by a single or a few species; and there is a visible accumulation of algae (floating mats, green water).

**When do algal Blooms Occur?**
Algal Blooms can occur any time of the year. Green algae blooms are common in the spring. Cyanobacterial blooms are common during the summer and fall. All types of algae can cause blooms under the right conditions.

**What Causes Algal Blooms?**
Many environmental factors influence the occurrence of algal blooms. In general, an algal bloom indicates that an ecosystem is in some form of imbalance. Factors include: nutrients (phosphorus and nitrogen); water clarity (sediment); circulation patterns; hydrology; biological community interactions; and weather. Algal blooms are caused primarily by eutrophication (the decaying of plant material) and man-made pollution, which increase nutrient loading of waterbodies and leads to increases in taste and odor (T&O) compounds and toxin production.

**Characteristics of Algal Blooms**
Each algal-driven T&O and harmful algal bloom event is unique. They are also highly unpredictable in that “change” happens, and their patterns will vary. This is mainly due to the myriad of factors that go into the generation of an algal event. Each water body is unique and this drives the dynamics of what is required for conditions to be “right” for a bloom. Often, multiple producers are common with each having different environmental factors that favor one over the other. The time scales of an event can vary from days to weeks. And there is often a short response time for management of the problem. The bottom line is a water source manager that has algal issues needs to know and understand their system in order to truly be able to manage the situations that may arise.

**Characteristics of Problem Algae**
Relatively few cyanobacteria produce 2-methylisoborneol (MIB) and Geosmin, and even fewer produce algal toxins. These problem algae (T&O and toxin) producers are frequently minor components of a bloom, meaning they are hard to find. Complicating the matter, they can be either benthic (associated with the bottom and often attached) or planktonic (floating or drifting in the water column) with each having critical management implications. They are opportunistic (waiting to exploit the perfect conditions), many are photosynthetic (light controls their distribution) and nutrient levels (phosphorus and nitrogen) control their mass. Also some are nitrogen fixers, and accumulate their own levels of nitrogen meaning they can wait out periods when nitrogen input levels are low, but can pull this ace out of their sleeve when they are ready. If it sounds like a problem, that’s because it is!

The most frequently cited cyanobacterial metabolites are the T&O compounds of Geosmin and MIB. However, attempts to use T&O compounds as indicator of toxins have been inconclusive. Complicating the management of toxins, most cyanobacterial species don’t cause T&O problems, or produce toxins; however, some species that produce T&O compounds can produce toxins.

As previously mentioned, and to be discussed further in this document, a water manager really needs to know his water source. Obviously for algal toxins, there is no easy replacement for...
monitoring algal populations. This may seem like a daunting task because there are greater than 10,000 species of all algae. Of this number approximately 2,000 species are cyanobacteria. Of these cyanobacteria, only about 3% are known to produce taste and odor components, and even less are known to produce cyanotoxins. So it would seem like this is looking for the needle in the haystack. However, with a willing staff member, a good microscope, some basic training, and patience, water managers can achieve the intimate knowledge of the algal population in their waterbody.

**What are some common types of algae that produce T&O and toxin compounds?**

The following table provides a listing (not all inclusive) of some of the more common taste- and odor- and toxin-producing algae genera in the mid-South where I have most of my experience. Many of these genera also occur in other parts of the United States, and could be used as a quick guide for water managers to be aware of. These genera have been divided into four general classes: diatoms, green & yellow-greens, bluegreens (cyanobacteria) and flagellates. All of the genera listed are known to produce T&O compounds, and those bolded and asterisked are also known to produce toxins.

<table>
<thead>
<tr>
<th>Diatoms</th>
<th>Bluegreens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synedra</td>
<td>Anabaena*</td>
</tr>
<tr>
<td>Tabellaria</td>
<td>Aphanizomenon*</td>
</tr>
<tr>
<td>Asterionella</td>
<td>Cylindrospermopsis*</td>
</tr>
<tr>
<td>Nitzshia</td>
<td>Merismopedia</td>
</tr>
<tr>
<td></td>
<td>Microcystis*</td>
</tr>
<tr>
<td></td>
<td>Oscillatoria*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Green and Yellow-Greens</th>
<th>Flagellates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actinastrium</td>
<td>Ceratium</td>
</tr>
<tr>
<td>Ankistrodesmus</td>
<td>Euglena</td>
</tr>
<tr>
<td>Chlorella</td>
<td>Peridinium</td>
</tr>
<tr>
<td>Closterium</td>
<td>Phacus</td>
</tr>
<tr>
<td>Oocystis</td>
<td></td>
</tr>
<tr>
<td>Scenedesmus</td>
<td></td>
</tr>
<tr>
<td>Staurastrum</td>
<td></td>
</tr>
<tr>
<td>Tribonema</td>
<td></td>
</tr>
<tr>
<td>Zygnema</td>
<td></td>
</tr>
</tbody>
</table>

**Lyngbya** *

* Denotes genera that can produce both T&O and toxins.

**Why are Algal Blooms Bad?**

The problems associated with algal blooms can generally be summed up into three general concerns: public health, ecologic and economic. Let's briefly look at each.

**Public Health Concerns** – Exposure to algal toxins may occur through consumption of tainted water, fish, or shellfish; recreational activities; or inhalation of aerosolized toxins. Algal toxins are known to cause illness immediately (hours to days) after exposure. In addition, several algal toxins are believed to be carcinogens or to promote tumor growth, although more research on the effects of long-term exposure is needed.

Because of potential human-health risks, freshwater algal toxins are on the U.S. Environmental Protection Agency drinking-water contaminant candidate list, and fish and shellfish advisories are frequently posted in coastal areas.

**Ecologic Concerns** – HABs may cause mortality of aquatic organisms because of low dissolved oxygen or algal toxins resulting in fish kills and potential disruption to the ecosystem. Algal toxins also may cause mortality of terrestrial organisms using the water source. It is not uncommon for pets and livestock to succumb to exposure to algal toxins as well. Additionally, the long-term effects of persistent HABs on ecosystem structure and function are not well understood.

**Economic Concerns** – Economic concerns associated with HABs include increased drinking-water treatment costs, loss of recreational revenue, loss of aquaculture and fisheries revenue, and livestock sickness or fatalities. Taste- and odor compounds are of particular concern to drinking-water suppliers because of customer dissatisfaction with malodorous drinking water and increased treatment costs. This can lead to distrust in the drinking water provider and questioning of the safety of consumption. Economic losses (mainly coastal fishery and shellfish production) in the United States because of HABs during the last decade are estimated to be in excess of $1 billion (U.S. Congress, 1998).

**How Are People and Animals Exposed to These Toxins?**

The pathways for exposure include ingestion and inhalation during recreational activities, inhalation of aerosolized toxins (spraying water), direct contact with blooms (dermatitis) and consumption in drinking water. However, research has shown that drinking water treatment process
effectively removes most toxins, but caution should still be exercised if your water source is experiencing an algal bloom. More effort needs to be undertaken into understanding exactly what the best method is for toxin removal.

**What Are Cyanobacterial Toxins and How Are They Produced?**

Algae and cyanobacteria are natural components of fresh water; however, under favorable conditions, they can rapidly multiply causing “blooms.” Some cyanobacterial species can produce toxins (cyanotoxins) at levels that may be of concern for human health. These cyanobacterial toxins are of particular concern because of their potential impacts on drinking water and the possible affect to human health. Toxins are produced as a natural process during the metabolism of algae. It isn’t clear why the toxins are produced because they aren’t always manufactured. There is a suggestion that it may be a stress response by the organism. Sometimes algae produce toxins, sometimes they don’t.

**How Common Are Toxic Cyanobacterial Blooms?**

At least 36 U.S. states have anecdotal reports of human or animal poisonings associated with cyanotoxins. However, accurate records are rarely kept of how frequently cyanotoxin exposures occur.

Five states have routine monitoring programs for cyanotoxins. Seventeen states have action plans for cyanotoxins. The USGS has measured cyanotoxins in most states, including five (AK, AR, LA, GA, and DE) which have not had listed poisonings or advisories.

**No Current Environmental Protection Agency (EPA) Regulations**

Algal toxins are not currently regulated under the Safe Drinking Water Act, and therefore are not subject to any national primary drinking water regulation. However, cyanotoxins were included on EPA’s Contaminant Candidate List (CCL3) list and are proposed to be monitored in the Unregulated Contaminant Monitoring Rule (UCMR) 4 by EPA. Ten cyanotoxins are proposed to be monitored from March 2018 through November 2020 and include: Anatoxin-a; Microcystins-total, LA,LF,LR,LY,RR,YR; Cylindrospermopsin and Nodularin.

Microystins is the only cyanobacterial toxin class internationally assessed for health risk. The World Health Organization (WHO) has established a provisional guideline of one microgram per liter of drinking water.

<table>
<thead>
<tr>
<th>Tolerable Daily Intake (provisional)</th>
<th>Microcystin concentration</th>
<th>Cyanobacteria cell/ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Risk</td>
<td>4 ug/L</td>
<td>20,000</td>
</tr>
<tr>
<td>Moderate Risk</td>
<td>20 ug/L</td>
<td>100,000</td>
</tr>
<tr>
<td>High Risk</td>
<td></td>
<td>Scums</td>
</tr>
<tr>
<td>Drinking Water (provisional)</td>
<td>1 ug/L</td>
<td></td>
</tr>
</tbody>
</table>

**Toxin Type**

<table>
<thead>
<tr>
<th>Toxin Type</th>
<th>Common Toxin</th>
<th>Symptoms of Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatotoxins</td>
<td>Microcystin-LR, Microcystin-LA, Cylindrospermopsin, and Nodularin</td>
<td>vomiting, diarrhea, fever, cramps</td>
</tr>
<tr>
<td>Neurotoxins</td>
<td>Anatoxins and Saxitoxins</td>
<td>paralysis and seizure</td>
</tr>
<tr>
<td>Dermatoxins</td>
<td>Aplysiatoxin, Lipopolysaccharides and Lyngbyatoxin</td>
<td>irritation to eyes, ears and throat; rashes; and skin lesions</td>
</tr>
</tbody>
</table>

**Symptoms of Exposure**

- Vomiting, diarrhea, fever, cramps
- Paralysis and seizure
- Irritation to eyes, ears and throat; rashes; and skin lesions
(ug/L) for Microcystin-LR in drinking water. They have also provided some guidelines and risk levels associated with microcystin (see table below).

Most cyanobacteria poisoning involves three types of toxins: hepatotoxins (liver toxins), neurotoxins (causing nerve damage) and dermatoxins (skin irritant).

The following table briefly summarizes each along with their associated toxins and potential symptoms of exposure.

The following table provides the toxin group, the primary target organ in mammals, and more importantly, the algae genera most often associated with their production.

<table>
<thead>
<tr>
<th>Toxins</th>
<th>Primary organ in mammals</th>
<th>Cyanobacteria Genera</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyclic peptides</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microcystins</td>
<td>Liver</td>
<td>Microsystis, Anabaena, Plankothrix (Oscillatoria), Nostoc, Hapalosiphon</td>
</tr>
<tr>
<td>Nodularin</td>
<td>Liver</td>
<td>Nodularia</td>
</tr>
<tr>
<td>Alkaloids</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anatoxin-a</td>
<td>Nerve synapse</td>
<td>Anabaena, Plankothrix (Oscillatoria), Aphanizomenon</td>
</tr>
<tr>
<td>Anatoxin-a(S)</td>
<td>Nerve Synapse</td>
<td>Anabaena</td>
</tr>
<tr>
<td>Aplysiatoxins</td>
<td>Skin</td>
<td>Lyngbya, Schizothrix, Plankothrix (Oscillatoria)</td>
</tr>
<tr>
<td>Cylindrospermopsins</td>
<td>Liver</td>
<td>Cylindrospermopsis, Aphanizomenon, Umezakia</td>
</tr>
<tr>
<td>Lyngbyatoxin-a</td>
<td>Skin, gastro-intestinal tract</td>
<td>Lyngbya</td>
</tr>
<tr>
<td>Saxitoxins</td>
<td>Nerve axons</td>
<td>Anabaena, Aphanizomenon, Lyngbya, Cylindrospermopsis</td>
</tr>
<tr>
<td>Lipopolysaccharides (LPS)</td>
<td>Potential irritant; affects any exposed tissue</td>
<td>All</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test</th>
<th>Use</th>
<th>Selectivity (Does it measure only the targeted compound?)</th>
<th>Minimum Detection Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELISA</td>
<td>Screening test (generally requires confirmation with another test type)</td>
<td>Based on antibody/antigen interactions. Less selective because of cross reactivity with other similar molecules, including other microcystins, and nonspecific binding.</td>
<td>0.16 ppb</td>
</tr>
<tr>
<td>LC/PDA</td>
<td>Confirmatory</td>
<td>Chromatography separates the microcystins, microcystins identified by UV spectrum. More selectivity than ELISA, less selective than LC/MS/MS</td>
<td>0.1 ppm</td>
</tr>
<tr>
<td>LC/MS/MS</td>
<td>Confirmatory</td>
<td>Chromatography separates the microcystins, identifies microcystins by precursor ion. Most selective.</td>
<td>0.1 - 10 ppb</td>
</tr>
</tbody>
</table>
### Cyanotoxin Detection Methods

The following table describes the commonly used analytical methodology used to detect algal toxins, their use as a tool (whether screening or confirmatory), the analysis selectivity, and their associated detection limits. The ELISA method is a relatively low-cost and simple screening tool that could be used by drinking water utility and recreational water managers. However, its use is intended to be just that, a simple screening tool. Liquid Chromatography/Mass Spectroscopy/Mass Spectroscopy (LC/MS/MS) is considered the premier tool for obtaining confirmation and quantification of toxins. Those using the ELISA method for screening should always consider additional analyses to confirm preliminary results if toxins are detected at levels of concern.

### Management Strategy

So what is a drinking water utility to do? Wait for a bloom to occur that creates a public health concern? Wait until EPA completes the next round of UCMR4 monitoring and eventual regulation, potentially a nine to12-year process? Many state environmental and health agencies, along with more progressive water utilities, are creating their own monitoring protocols in order to more proactively manage their concerns.

Most are focusing on developing an early warning baseline monitoring program that is based on either analytical hits from routine sampling or customer concerns.

The attempt at management should include **Focused Monitoring.** Where is it? What is it? What is the rate of growth? What is the Limnological Status of the water body? And use the historical experience of the resource managers and users of the water body. The following table represents a monitoring framework and discusses the demands on equipment and personnel and who is suited to perform each task.

### Monitorig Type

<table>
<thead>
<tr>
<th>Monitoring Type</th>
<th>Parameters/Variables</th>
<th>Demands on Equipment and Personnel</th>
<th>Who</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic</td>
<td>Site inspection for indicators of cyanobacteria in water body</td>
<td>Secchi disc, regular site inspection by trained staff; basic skill requirement, training easily provided</td>
<td>Operators, practitioners</td>
</tr>
<tr>
<td>Surrogates</td>
<td>Potential for cyanotoxin problems in water body</td>
<td>Boat, depth sampler, Secchi disc, submersible thermometer/oxygen probe; fluorometer; spectrophotometer; basic skills but requires specific training and supervision</td>
<td>Limnologist</td>
</tr>
<tr>
<td>Cyanobacteria</td>
<td>In water body and drinking water</td>
<td>Microscope, photometer is useful; specific training and supervision are required, but skills required can be readily mastered</td>
<td>Phycologist or a technician trained by a phycologist</td>
</tr>
<tr>
<td>Cyanotoxins</td>
<td>In water body and drinking water</td>
<td>Enzyme-linked immune assay (ELISA) kits (moderate); liquid chromatography photodiode array (LC/PDA, moderately high); liquid chromatography mass spectometry (LC/MS, high) specific training and supervision are required, but skills required can be readily mastered</td>
<td>Chemist</td>
</tr>
</tbody>
</table>

### Source

Why the Focus on Harmful Algal Blooms?
In September 2013, the Ohio Environmental Protection Agency placed Toledo under a “Do No Drink” advisory. The incident was driven by a bloom that centered on their water utilities’ intake structure. While the “perfect storm” of events drove the Toledo problem, Lake Erie had for years been the site of significant algal blooms, and when the bloom occurred around the Toledo water intake, their system was quickly overcome by the extent of the bloom. This event brought to the public eye the algal issue that engaged water managers have known for several years, and had been working to address. The Midwest states of Kansas, Iowa, and Nebraska had been combatting algal problems for some time.

Further Research Needed
The occurrence of HABs, particularly those producing toxins or T&O compounds, is not well documented in the United States. Reliable analytical techniques for the analysis of toxins, T&O compounds, and algal identification and enumeration are required. Long-term studies in individual lakes, reservoirs, and rivers are needed to identify the environmental factors driving HAB formation and to document the effect of changing environmental conditions on HAB occurrence. The development of methods for early detection and predictive models would allow resource managers time to respond more effectively to potentially harmful conditions.

Collaboration in Arkansas
On August 31, 2015, a group of interested parties held the inaugural Arkansas Harmful Algal Bloom (HABs) Workgroup meeting at the Arkansas Department of Environmental Quality headquarters in North Little Rock, AR. This group was comprised of members from: Arkansas Department of Environmental Quality, Arkansas Department of Health, US Army Corps of Engineers, Central Arkansas Water, Beaver Water District, US Geological Survey, UofA Little Rock, UofA Fayetteville and Arkansas Game and Fish Commission. The goal of the workgroup is to continue collaborative efforts among the various stakeholders in the state, and develop a standardized method of early detection utilizing predictive models and management strategies.

Inspired by the creation of this working group on HABs in Arkansas, the Arkansas Water Resource Center is developing this year’s agenda around HABs and water quality. Their annual Water Conference will be held July 26 – 27, 2016 at the Fayetteville Town Center.

The keynote speakers will be Hans Paerl of the University of North Carolina at Chapel Hill, and Alan Wilson of Auburn University. They will deliver presentations about the growing occurrence and increasing threats of HABs in freshwater systems. (Hans and Alan are pictured below, from left).

Other Agenda items for the conference include:
• Nutrient loading
• Water quality trends
• Nutrient criteria development
• HABs in source waters and recreational waters

To learn more about the conference and/or to register, visit: http://arkansas-water-center.uark.edu/annualconferences.php.
Some Available Resources
To learn more about T&O and cyanobacterial toxins, the following is a series of free manuals, documents, and web pages you can review.

Other Environmental Protection Agency Resources:
- [http://www.epa.gov/nutrient-policy-data/cyanobacteria/cyanotoxins](http://www.epa.gov/nutrient-policy-data/cyanobacteria/cyanotoxins)
- [http://www.epa.gov/nutrient-policy-data/cyanohabs](http://www.epa.gov/nutrient-policy-data/cyanohabs)

Drinking Water Health Advisory for the Cyanobacterial Microcystin Toxins

The American Water Works Association (AWWA) believes that the document titled “Recommendations for Public Water Systems to Manage Cyanotoxins in Drinking Water” (hereafter “Recommendations”) constitutes a “Significant Guidance Document” as defined by the Office of Management and Budget January 18, 2007 memo Final Bulletin for Agency Good Guidance Practices. To date, EPA has not classified the Recommendations as a Significant Guidance Document. Furthermore, we also believe that the Recommendations also satisfy the classification criteria for an “Economically Significant Guidance Document”. We believe that EPA should reissue this guidance after completing the necessary procedures associated with an economically significant guidance document.
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Summer 2016 | Pipeline
Giving presentations to the public and a decision-making board such as a council or commission is often the one time you get to make a case, present an idea, or justify a needed expenditure. All too often, there are two things that are overlooked: Knowing the audience and simple preparation.

After making my own list of things that were most important about a presentation, I then went to the all-knowing chalice of info: the internet. Surprisingly, the topics of audience and preparation came up frequently.

A Tale of Two Meetings

Scenario 1. You are seeking a rate increase. You announce it six months ahead of time and send the council your new master plan along with a letter. You make sure to call the local elected officials before the announcement was in the local paper. You schedule a meeting to discuss the details for the master plan and the long-term financial plan. Once the details have been discussed, you schedule a formal hearing before the council and the increase passes by a large majority. Why? Because you knew your audience, and you were prepared with facts and information that was needed to make your case.

Scenario 2. We all have either seen it or been there: the meeting that turns against you, the one question that is asked and there is no answer, the one council member that will never support your cause, or the confrontation. If you are watching, you want to jump out of your seat and help the poor presenter, but you know it is not possible. So you watch the wrestling match and you hope the energy is expended because guess what . . . you are the next one up.

Knowing Your Audience

This all too often can be avoided by knowing your audience and doing some research ahead of time. In the first scenario, communication and preparation obviously got a lot of the tough questions answered in advance without the pressure of some imposed deadline. Look at elected officials’ time in office, usual occupation, education and voting habits. This gives you some indication about that person’s life experience and perhaps their area of expertise. This may help you anticipate questions that may be asked or opposing points of view that may be held.

Preparation

Preparation is not putting together a deck of Power Point slides. Preparation is knowing the background and facts that comprise your bullet points. Try not to crowd you charts, but speak to your audience and send your message. Rehearse in front of a small group of co-workers who are not very familiar with your project and get their feedback. If they understand the subject, then it is likely your audience will too. This is a very simple technique, but is often overlooked in favor of those who are “knowledgeable” about your subject.

Some Know-Your-Audience Know How

- State the purpose upfront, start with and end with the “ask”
- Know the technical proficiency of the group
- Public Meetings will likely need to have more general information
- Commission or Board Meetings may need to be more technical

- Council meetings may focus more on justification for spending tax dollars or raising rates
- Legislative Committees are even more complex!
- Know the background of the group as much as possible
- Know how much time you may have based on the group
- Know who may be in favor of, neutral, or against
- Present the facts or decision that must be made
- Be prepared for the hard “why” questions
- Remember: boards, councils, commissions, or the public, are not your peers!
Leave the “experts” out for an honest assessment from people who have very little information about your presentation.

**Preparation Pointers**
- Get a group that knows little about the subject and present to them
- Send complex supporting documents in advance
- Keep presentation to a maximum of 10-15 slides and know your time limit
- Think about a detailed briefing then a shorter version for an Official Public Meeting
- Leave time for questions and be prepared to answer them. Also, be prepared for opposition
- Make sure you are on the agenda and the subject presented is correct
- Be on time, call if you are delayed by an act of God

**Execution**
Rehearse once without your experts, however, bring your experts or applicable staff with you. For example: I would never go to a finance presentation without our CFO. If you are not the best presenter, do not be afraid to do an opening introduction then hand things over to some other staff, then be the closer. It gives your staff a chance to shine and hone their skills as well. As I say, even the Lone Ranger had Tonto, so don’t be afraid to bring some back-up or let someone else be the star. The goal is to make your organization look good, informed, and sharp so your audience is receptive to your message. A good presentation to the public or a board is truly a team effort. Make sure to use those very good resources right under your own roof. It will also give others the sense they know what is going on and are a part of the process. You can make a difference with the outcome of your presentation with a little bit of extra work and a little PR thrown in.

The biggest rule of all: Do not lie, do not make up an answer, do not try to avoid the truth. Often the audience can see right through it. The person asking the questions will be persistent and like sharks smelling blood, they start coming after you. I have seen a few people, so eager to please and look smart, give answers when I already knew that the inquisitor had the answer. That poor individual lost their credibility. Their integrity was questioned. Above all, know thyself. Your audience will know you, too. It is ok to say “I don’t know, but I will get an answer for you.” Then make sure you follow up. You can also lose credibility by not following up as promised.

Finally, I have my own rules that are not that exotic, but I remind people they are important. How you carry yourself, the aura you project, and the manner in which you act is important. You need to be aware of your bad habits that you may do unconsciously. Get someone to give you an honest review of your presenting habits or video tape a rehearsal and see for yourself. It is a good exercise. These are a few tips that I have personally worked on and now see as very useful.

**Whatever you do, do not . . .**
- Read the slides
- Say “Um”, “ah,” “and that’s,” or “you know . . . ”
- Provide unessential or confusing info
- Mumble or be the “Water Whisperer”
- Look at the floor or one person
- Present facts that are not supported in some manner
- Give an answer that you are unsure of – big credibility loss
- Be afraid to put your best presenter forward, and support them
- Fidget

**Heath’s Heedful Advice**
- Project confidence, not arrogance (practice this at least once)
- Remember: You usually present to those outside your trade
- It’s ok not to know, but you must follow up with requested info
- You are there to convince, not combat
- Even the Lone Ranger had Tonto
- Someone in opposition may be your ally later – don’t make it personal

**Author Biography**
Heath Ward has been Executive Director of Springdale Water Utilities since 2013. Previously, he spent 18 years in the poultry industry in operations, wastewater and engineering. He served four years as an Army tank officer in Germany, Kuwait, and Macedonia.

Heath is currently AWWMA’s Legislative Committee Chair, AWEA’s Government Affairs Chair, and serves on many local boards including the Rotary Club. He was appointed by Governor Hutchinson to the new Nutrient Trading Advisory Panel via Act 335 of 2015 and serves as Chair. He is a life member of the Veterans of Foreign Wars.

Heath holds his Grade IV Distribution, Advance Industrial and Class III Wastewater, and holds a BA from the University of Arkansas, Fayetteville (1991).
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Huntsville Utilities
Southeast Water Treatment Plant
As water supply is quickly diminishing due to high seasonal demands, Huntsville Utilities is proactively finding solutions to mitigate water scarcity concerns. The Utility currently operates two surface water treatment plants that treat water from the Tennessee River. In 2007, the Utility decided to begin planning for a third surface water treatment plant. As a trusted consultant to Huntsville Utilities, Tetra Tech was selected to provide site selection, design, permitting, and construction management services for the new $83.8M Huntsville Utilities Southeast Water Treatment Plant.

Brasfield and Gorrie began construction of the new surface water treatment plant in March 2015 on a 266-acre site west of US HWY 431. The new plant will have an initial capacity of 12 million gallons per day (MGD) and 24 MGD after the filters are rerated in accordance with state criteria. The master plan for the treatment plant will allow for a total build-out capacity of 96 MGD.

The new surface water treatment plant includes a raw water intake structure (24 MGD initial; 96MGD buildout) on the Tennessee River, conventional surface water treatment facility with provisions for disinfection byproducts formation control to ensure compliance with the Stage 2 Disinfectants and Disinfection Byproducts (DBP) Rule. Additional features include on-site residuals management facilities, a laboratory and administration building, and chemical feed and storage building. Supporting infrastructure includes (2) flocculation/sedimentation basins, (4) dual-media filters with air/water backwash, a washwater recovery basin, a 1.2 MG elevated backwash storage tank, a 2.0 MG covered clearwell and high service pumping station, a sludge thickener, ten sludge drying beds, and (4) granular activated/biological activated carbon (GAC/BAC) filters. Ancillary utilities include 3.5 miles of parallel 42-inch ductile iron pipe (DIP) raw water transmission mains, and 7.5 miles of parallel 48-inch DIP finished water transmission mains including...
approximately 600 feet of 60-inch jack and bore of US HWY 431 and approximately 580 feet of 60-inch jack and bore of Paint Rock River.

As of July, 2016, the project, scheduled for completion in spring of 2017, is approximately 70-percent complete and projected to finish 9 months ahead of schedule. To date, construction is well underway on all structures, approximately 20,000 cubic yards of concrete have been placed and approximately 80,000 cubic yards of earth excavation and backfill has been completed. Construction of the 42-inch raw water mains and 48-inch finish water mains are currently 85-90% complete.
AWWA Comments on EPA-USGS Hydraulic Alteration Document

June 17, 2016

Today AWWA submitted comments on the document “Draft EPA-USGS Technical Report: Protecting Aquatic Life from Effects of Hydrologic Alteration”. This EPA/USGS document provides guidance on reducing the impact of changes in flow (of rivers, streams, etc.) on aquatic life.

Depending on the contents of the final guidance, this document could prove highly controversial because it prioritizes actions to protect aquatic life under the tools found within the Clean Water Act without addressing or acknowledging the importance and balance of the needs of other water uses. AWWA’s comments focus on helping to address the issues within the document to create a more balanced document that takes all important facets of water resources into account, instead of prioritizing one important issue (biodiversity) while not addressing other important issues (like provision of drinking water).

Because of the importance of this document and the potential to have a large impact on the water sector and others, AWWA is requesting that EPA designate this document as a significant guidance document to allow for thorough public review and require high standards of scientific information and analysis before finalizing the document.

YP Social

AL/MS AWWA YP Social – May 12, 2016 – Regions Park, Birmingham, AL

AWWA/ASCE YP Social – April 21, 2016 – Trustmark Park, Pearl, MS

Edwin K. Dedeaux, PE
Principal

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Corrosion Education Session

YP Summit

In February of 2016, LaQuoyah McDaniel, Austin Moore, and Jaquice Boyd attended the AWWA’s YP Summit in San Diego, CA. They participated in workshops on ideas to strengthen the sections young professionals program.
COMING BACK TO ALABAMA

The City of Athens, Alabama City Council has unanimously voted to hire Frank Eskridge as the new water and wastewater services manager that has been vacant after longtime manager John Stockton announced his retirement back in September.

Frank first came to Alabama in 2011 when he was hired by the Gadsden Water Works and Sewer Board as their new General Manager. He left Alabama in 2015 to return to his home state of South Carolina when he was hired by the Beaufort-Jasper Water & Sewer Authority in Beaufort, South Carolina.

During Frank’s time in Alabama he served the Alabama/ Mississippi Section as the Alabama Governmental Affairs Chair and represented the Section in not only the Annual AWWA Fly-Ins but also as a representative on AWWA’s Water Utility Council.

The Section welcomes Frank back and is looking forward towards his return in his involvement back with the Section.

Welcome Back, Frank Eskridge!

NEW MEMBERS

Lori Ditoro – Water Technology
Curtis Evans – Moss Point, MS
Hisham Abdelrahman – Auburn, AL
Russ Huggins – U.S. Pipe & Foundry Company
Kevin Baas – Forterra
Ora Gordon – Lowndes County Water Authority
Robert Chandler – Parrish Water Works and Sewer Board
Tyler Stargel – Neptune Technology Group Inc.
Parker Capps – Jackson, MS
Scott Gorman – Gardendale, AL
Terry Kemp – Starkville Utilities
Dan Graham – United Systems & Software
Brian Henry – American Society of Plumbing Engineers
Robyn Tucker – Water Technology
Chuck Faulkner – Madison County Water Department
Luke Peters – Auburn, AL
James Templeton – Bessemer, AL
Richard Peterson – Goodwyn, Mills and Cawood, Inc.
Gary Akins – Arley Water
Barry Renfrow – Vicksburg Water Plant
G. French – Fuston, Petway & French, LLP

Our concern for the environment

is more than just talk

As we continue to deliver valuable information through the pages of this magazine, in a printed format that is appealing, reader-friendly and not lost in the proliferation of electronic messages that are bombarding our senses, we are also well aware of the need to be respectful of our environment. That is why we are committed to publishing the magazine in the most environmentally-friendly process possible, here is what we mean:

- We use lighter publication stock that consists of recycled paper. The paper has been certified to meet the environmental and social standards of the Forest Stewardship Council (FSC) and comes from responsibly managed forests, and certified recycled sources. We’re taking this step to make ourselves more sustainable.

- Our computer-to-plate technology reduces the amount of chemistry required to create plates for the printing process. The resulting chemistry is substantially reduced so that it can be safely discharged to the drain.

- We use vegetable oil based inks to print the magazine. This means that we are not using harmful petroleum-based products, and that the solvent-based recycling of the paper in this magazine is much more environmentally friendly.

- During the printing process, we are a certified recycling system that separates the waste from the recovered materials, and leaves only about 5% residues. This results in reduced solvent usage, handling and hazardous waste.

- We ensure that an efficient recycling program is used for all printing papers and all waste paper.

- Within the pages of each issue, we actively introduce our readers to WATER and RECYCLED by highlighting the benefits of sustainable practices.

- In order to reduce our carbon footprint on the planet, we utilize a carbon offset program in conjunction with all of these undertakings related to our publishing responsibilities for the magazine.

So enjoy this magazine...and KEEP THINKING GREEN.
**MEMBER UPDATE**

**NEWSMAKERS NOTICE**
If you have recently been promoted, passed an exam, become certified, retired, become a parent, etc..., the Pipeline would like you to submit a small write-up and a profile picture for consideration in our Newsmakers Section. Please send the information to Harry.Gong@msdh.state.ms.us or call Harry Gong at (601) 576-7527. You can also send information to hercy.golson@hsvutil.org

**COMMUNICATIONS COMMITTEE NOTICE**
Volunteers are needed to serve on the Communications Committee for the Alabama/Mississippi Section of AWWA. If you are interested in working on the Section Website or the Section’s Pipeline magazine, please contact the Communication’s Co-Chair Harry Gong at Harry.Gong@msdh.state.ms.us or at (601) 576-7527 and Hercy Golson, the Communications Chair at hercy.golson@hsvutil.org or at (256) 535-1457.

Members now have access to an Online Training Site for Continuing Education and Professional Development Hours with 360Water.

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