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Michael D. Todd, P.E.
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AWWA PIPELINE
ATTN: Harry Gong, Editor
Phone: (601) 576-7518
Fax: (601) 576-7974
P.O. Box 4651
Jackson, MS 39296-4651
Email: Harry.Gong@msdh.state.ms.us
www.almssawwa.org

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Managing Editor: Scott Kelman, scott@kelman.ca
Layout & Design: Kiersten Drysdale
Marketing Manager: Rod Evasion, rod@kelman.ca
Advertising Coordinator: Stefanie Ingram

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Leadership through service

The AL/MS Section of AWWA recently held its second planning meeting January 13-14, in Tunica, Mississippi. It was a very productive meeting full of discussion about strategies and methods for achieving our Section’s goals for this year. As ideas were shared and debated, it became evident that we were dedicated to serving our Section. The theme for this year’s conference is ‘Leadership through Service.’ This is very fitting as it conveys the mission of our Section, which is:

“The Alabama/Mississippi Section of the AWWA serves as the dedicated source of information to promote, support, and improve the provision of sustainable safe water. Through collective leadership, the Section advances innovation in technology, science, education, management, and governmental policies for the betterment of the citizens of Alabama and Mississippi.”

Although not all aspects of the conference were finalized, I feel confident that we are headed in the right direction.

We left Tunica full of enthusiasm and totally committed to the tasks at hand. By the time you read this, we will have held an education seminar and webinar. If you missed out on these, do not worry we have more planned. As customary, we will send out email notifications as dates and locations are finalized. We are also well on our way to achieving our goals of developing an online operator training program and partnering with an education institution to develop a training program for operators and managers. The Section’s Board of Trustees is fully devoted to increasing the value of membership and these endeavors are certain to be a benefit to our members.

We are on track to have a new web page up and running by the end of summer. The new website will include a forum page for networking and discussing issues pertinent to our Section and industry. My hope is that members will take full advantage of this new web page. We are also soliciting nominees for ‘operator and plant of the year.’ If you have nominees, please contact Ben Benvenutti at (228) 822-3905, benvenuttiBB@cdm.com. In regard to scholarships, we are in the process of developing a new scholarship board along with a new scholarship program. We will inform you as things progress.

An update on conference planning activities will be in my next report, but I will say that this year’s conference is shaping up to be an exciting one. As you can see, your planning committee has been working really hard for you. It is going to be challenging to accomplish all of our goals for the year; however, I am sure this year’s committee will continue to meet this challenge with enthusiasm and dedication. When I think of these individuals as the future leaders of our Section; I have no doubts about our future.

I want to take a moment to congratulate our Birmingham Water Works Tapping Team. They will be representing all of North America in this year’s World Water Cup of Drilling and Tapping (WWC). The WWC is an international pipe tapping contest in which the pipe tapping champions of North America, the United Kingdom and the Netherlands compete for the title of World Champion of Drilling and Tapping. This year’s event will take place in Birmingham, England during International Water & Effluent Exhibition (IWEX), April 16-18, 2013.

On a more personal note, I want to take this opportunity to thank everyone who said a kind word or remembered me in their thoughts and prayers as I grieved the loss of my sister. I am truly grateful and I sincerely THANK YOU!
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Moving in the right direction

I believe our Section is moving in the right direction and is growing in ways that can be hard to measure.

Section, we have done great things under the leadership of our Section Chairs the past three years. We continue to have outstanding annual conference events and our spouse program is second to none within AWWA. We have also made great strides in expanding the activities of our Young Professionals (YPs) and with the involvement of our YPs in Section activities as a whole. We continue to expand our learning opportunities and most, if not all, are offerings that are free to Section members. We have listened to the needs of our members and this year we are looking to expand our learning opportunities even further. So, although you may not notice it at times, I believe our Section is moving in the right direction and is growing in ways that can be hard to measure. It is the membership that can help to make this happen through your input and involvement. Please keep it coming!

Note that the AWWA Annual Conference Exposition (ACE) is just a couple months away. If you have not had a chance to attend ACE, I hope you can make plans to get to attend the conference this year in Denver starting June 9. I am confident that you will be glad you did.

Thanks for your support of this great organization, and thank you for your membership in AWWA.
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The MS Delta and H₂O

Many of you are aware that the Mississippi Delta is my home. A far cry from the hills in my State, the Delta is flat, flat, and flat! (If you take the ‘C’ out of Cleveland, it spells ‘levelan!’) When I completed the 1st grade, my family moved to this land and although I had visited kinfolks in the area, actually living here took some getting used to. Mosquitoes, excessive humidity, flooded streets every time it rained, mosquitoes, sinus misery, mosquitoes, etc. Our hill folks warned us that even though Prohibition was still in effect, Deltans actually had establishments for the sale of liquor. BUT, the gumbo (mud) does get between your toes and it was not long before I actually came to love the place. Listening to the old guys with their dancing dogs and amplified guitars howling out the blues on downtown sidewalks Saturdays were a definite treat. In fact, it was not long before I just had to get me one too (the guitar, not the dog).

The alluvial plain, as it is technically called, has been a blessing to the deep soils used to grow our crops.

Over 16,000 ground water permits (for irrigation wells >6-in) in the Delta’s alluvial aquifer plus around 2,500 surface water permits were issued in the Mississippi Delta by 2009*. New conservation techniques, developed for irrigating crops such as rice, have had some positive impact on drawdown rates of the alluvial aquifer. For years, it was thought that our ‘shallow’ and ‘deep’ aquifers were not interconnected. As studies have shown some corresponding drops in both systems, more research is needed to unwind what is still a complicated mystery. In the meantime, we will cautiously boast of our abundance of water for crops and public water supplies; additionally, our surface waters benefit by providing the transportation of those crops and the recreational enjoyment of our citizens and tourists.

The Delta (due, in part to our abundance of water) also became home to one of the Southeast's first legal gambling establishments … the legislation finally passed by the State was signed in as law for ‘River Boat’ gambling following, among other requirements, that the establishments sit upon a navigable waterway. Among the first casinos in my area were those around Tunica, Vicksburg and Greenville, MS. The two latter endeavors actually were originally similar to river boats and sat within ports. Tunica investors stayed within the law by constructing channels inland from the Mississippi River, then floating in barges upon which casinos and hotels would be built. As river levels rise and fall, the structures are designed to follow. The State also required a good percentage of casino investment to be made inland (inside the levee) as well. Those who have or will visit Tunica will enjoy much improved roadways, RV sites, shopping and recreation opportunities. Harrah's, for instance has its casino and a large hotel on the riverside; inland, Harrah's boasts two more hotels, a large conference center, an RV park, Cottonwoods Golf Course and Willows Clay-shooting. This is a plus, I believe, for annual meetings for groups such as ours.

Of course, the water that made the casinos possible can shut it down, as was seen during the historic river flooding of 2011. There are no signs present that a flood will spoil our annual event in October. Please make plans to attend as soon as registration is posted; come enjoy what Northwest Mississippi, the Delta and our Section of AWWA has to offer!

*Source: Water Quality-Quantity Issues in Mid-South Rice Production, MS State University (J.H. Massey, PhD)
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The ongoing Lead and Copper Rule revision by the US Environmental Protection Agency and controversy about the US Green Building Council’s (USGBC) LEEDv4 rating system has touched off debate about which plumbing system materials should be selected or avoided to ensure safe and aesthetically pleasing drinking water (Image 1). There is certainly no shortage of choices when it comes to potable water pipe materials. In communities across Alabama and Mississippi, drinking water is transported to customer premises with several different types of utility–owned metal and plastic pipes. These pipes differ in diameter, length, composition, and age. Similarly, the same materials and more can be found at service connections and within buildings. Each of these materials can alter drinking water quality differently. A team of University of South Alabama researchers are investigating these differences.

Today, copper is the most commonly found pipe installed as service connections and inside buildings for potable water. Residential plumbing systems frequently employ Type L copper. Copper, like all metals, is subject to corrosion and more specifically, pinhole leaks. Furthermore, because copper piping is installed behind walls and ceilings, water damage remediation costs can be substantial. Causes of pinhole leak incidents are still being investigated, but Virginia Tech researchers have so far determined that combinations of water chemistry and hydraulics are factors. Galvanized iron, ductile iron, lead, and stainless steel potable water plumbing pipes are used less commonly. Lead pipe is no longer installed for new plumbing systems because of the acute and chronic health issues associated with lead in drinking water. Lead pipes can still be found in older buildings and as service connections.

To aid building construction–, water–, and public health–professionals better understand which plastic potable water pipes are available and how they differ from one another, this article was developed. This article provides an introduction to plastic pipe materials that convey water from the utility water main to the tap: “From Main to Mouth.” Differences between plastic pipe retail cost, properties, and applications are described.

Image 1. Potable water plumbing systems can include more than 10 different types of plastic pipes for cold and hot water conveyance.
The retail cost of plastic pipe

As shown in Table 1, on a material cost basis, plastic pipes are less expensive than metal pipes. Plastic materials are also much lighter and generally more flexible than their metallic counterparts. These advantages enable plastics to be more easily transported and handled.

Table 1. Retail cost comparison for ¾-inch diameter potable water plumbing pipe

<table>
<thead>
<tr>
<th>Material Application and Name</th>
<th>Cost, $ USD per 100 foot</th>
<th>Cost, $ USD per foot</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hot and Cold Use</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copper (Type L)</td>
<td>$255.10</td>
<td>2.55</td>
</tr>
<tr>
<td>Polypropylene (PP)</td>
<td>$94.10</td>
<td>0.94</td>
</tr>
<tr>
<td>Chlorinated PVC (cPVC)</td>
<td>$53.80</td>
<td>0.53</td>
</tr>
<tr>
<td>Crosslinked Polyethylene (PEX)</td>
<td>$48.69</td>
<td>0.48</td>
</tr>
<tr>
<td><strong>Cold Use Only</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Galvanized Iron</td>
<td>$174.20</td>
<td>1.74</td>
</tr>
<tr>
<td>High Density Polyethylene (HDPE)</td>
<td>$23.98</td>
<td>0.23</td>
</tr>
<tr>
<td>Polyvinylchloride (PVC)</td>
<td>$21.80</td>
<td>0.21</td>
</tr>
</tbody>
</table>

*Costs were obtained by visiting local plumbing supply stores in Southern Alabama during Spring 2013. Costs do not include labor for installation.*

The key temperatures, strandiness, and the contractor fence analogy

Why one plastic pipe is stiff and another is flexible can best be understood by visualizing cooked spaghetti. Plastics are comprised of a mixture of ‘polymer chains’ or strands of spaghetti (Image 2). Chemically, spaghetti strands represent a series of small molecules bonded together. Polyethylene chains are strings of many ethylene compounds. Polyvinyl chloride chains are strings of many vinyl chloride compounds. The size and composition of the spaghetti strands (polymer chains) determines the plastic pipe’s physical and chemical characteristics. Long strands of spaghetti versus short strands of spaghetti affect plastic pipe strength, flexibility, and density.

Visiting the plumbing supply aisle in any plumbing supply store, differences between plastic pipes are obvious. Certain plastics are flexible and others are stiff. This material characteristic derives from each material’s glass transition temperature or $T_g$ value. The material’s $T_g$ is the temperature at which its long polymer chains (spaghetti strands) begin to wiggle when the material is subjected to heat. Certain plastics require more heat than others. The $T_g$ is also the temperature at which the plastic turns from a glassy material to a rubbery material. For example, PVC potable water pipe has a glass transition temperature of 177 °F and is a hard, stiff pipe on the store shelves (Table 2). As you heat PVC pipe from 167 °F to 185 °F, it transitions from stiff, soft, to rubbery. Another example is HDPE pipe (commonly found as black coils). HDPE potable water pipe is flexible because it has a $T_g$ value of –184 °F. That means when the temperature is greater than –184 °F, HDPE will act rubbery and be flexible. Therefore, HDPE coils are easy to handle and are flexible. If the outdoor temperature ever reached –184 °F in Alabama and Mississippi, the type of plastic pipe installed in a building would certainly not be the most significant issue.

There are certain plastic pipes that can only be used for cold drinking water transport because they lose their stiffness and deform when exposed to hot water. Heating a plastic pipe close to or above its melting temperature causes the spaghetti strands (polymer chains) to slide away from one another. Once the polymer chains slide away from one another far enough, the plastic deforms, loses material strength, and may begin to ‘flow’ like hot oil in a frying pan. Clearly a plastic pipe that deforms or melts when exposed to hot water would be undesirable in a building. Plastics that can melt are called thermoplastics; plastics that do not melt are called thermosets. PVC and HDPE pipes, for instance, can melt and are thermoplastic materials. For these reasons, knowing the approved plastic pipe temperature range for the material being considered is important.

Table 2. Glass transition and melting properties of a few potable water plumbing pipes, Degrees Fahrenheit (Celsius)

<table>
<thead>
<tr>
<th>Material Name</th>
<th>Glass Transition Temperature, $T_g$ (°F)</th>
<th>Melting Temperature, $T_m$ (°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acrylonitrile Butadiene Styrene (ABS)</td>
<td>221 (105)</td>
<td>430 (221)</td>
</tr>
<tr>
<td>Chlorinated (cPVC)</td>
<td>223 (106)</td>
<td>414 (212)</td>
</tr>
<tr>
<td>Polypropylene (PP)</td>
<td>212 (100)</td>
<td>320 (160)</td>
</tr>
<tr>
<td>Polyvinylchloride (PVC)</td>
<td>177 (81)</td>
<td>360 (182)</td>
</tr>
<tr>
<td>High Density Polyethylene (HDPE)</td>
<td>–184 (–120)</td>
<td>266 (130)</td>
</tr>
</tbody>
</table>

*In practice, $T_g$ values can vary slightly based on chemical structure, pipe manufacture, and its additives.*

*For reference, water typically boils at 212 °F.*
melting temperatures. PEX, however, is a thermoset material. Thermoset materials have short polymer chain ‘bridges’ that connect individual polymer chains to each other. A visual representation of thermoset materials can be seen in Image 3. This image shows orange contractor fencing. Each strand of polymer chain is connected to the ones adjacent to it and cannot be separated without destroying the fence. If that same fence were cut up into separate pieces and piled together, this would represent the molecular structure of a material that's NOT crosslinked. This pile of polymer chains could represent HDPE pipe, which is a thermoplastic material.

What are the plastic pipe options?
Water temperature and cost of installation can largely drive the plumbing pipe selection decision. Several available materials, and their histories, are briefly described below. New plastic pipe formulations are constantly entering the marketplace (Image 4). Testing of existing and new materials by the University of South Alabama is providing a more scientific understanding of how these materials impact water quality and how they degrade once installed.

Poly(1–Butene) (PB). PB pipe, also called ‘polybutylene’ and ‘the grey pipe,’ used to be installed across the US from 1978 to 1995, but widespread premature PB pipe failures resulted in a class action settlement. Millions of dollars of water damage were caused by PB pipe system failures across the US. Thus, this type of pipe system is no longer used.

Acrylonitrile Butadiene Styrene (ABS). Although certain ABS pipes are approved for drinking water use, they are not typically installed for potable water plumbing.

Polyvinyl Chloride (PVC). PVC has been used as a potable water pipe since the 1970s. This material is also commonly used for drain waste vent (DWV) pipe and is commonly found under the kitchen sink drain. PVC potable water pipe systems are typically linked together with glue. The glues involved have been subject for concern. Debate continues within the green building community about whether PVC can be considered a ‘green’ material.

Chlorinated Polyvinyl Chloride (cPVC). cPVC is commonly installed for both hot and cold water plumbing applications. Compared to PVC pipe, cPVC pipe is stiffer and more stable at higher temperatures (Table 2). cPVC pipe has a greater T_g and T_m value than PVC pipe. Like PVC pipe, cPVC pipe is also installed using glue.

High Density Polyethylene (HDPE). In the early 1990s, polyethylene potable water pipe began to gain widespread use. HDPE is a polyethylene material, which is by definition very dense. Polymer chains of HDPE (spaghetti strands) are packed closely together, resulting in an increased plastic pipe strength. PE pipe has been embraced by the green building industry. HDPE pipe is commonly installed using fittings, but can also be ‘fused.’ Fusion is the act of melting two ends of a pipe, pressing them together, and allowing them to cool, thereby creating a joint.

Polypropylene (PP). PP–R, polypropylene random pipes, were invented in Europe in the 1990s and are relatively new to the US building plumbing industry. PP materials have similar characteristics to HDPE, but greater T_g and T_m values. For these reasons, PP pipes can be used as hot water plumbing pipes. PP pipe systems can be installed with fittings or fused similar to HDPE systems.

Crosslinked Polyethylene (PEX). Unlike other pipe systems previously described, PEX pipe systems involve a
single manifold where individual pipes are run to each faucet in the building (Image 5). PEX material is typically created by further processing HDPE polymers. PEX (Type B) pipe is one of the most common types of PEX available for potable water plumbing pipe installation in the US. Two other types of PEX pipes are available (PEX Type A and PEX Type C), but those are more commonly installed in Europe.

Polyethylene Raised Temperature (PERT). PERT pipe is new to the marketplace and has been advertised as being another polyethylene pipe alternative that is capable of transporting hot water. PERT has not yet widely been applied in building plumbing systems.

Multilayered Pipes. Until recently, plastic pipe for potable water plumbing systems did not contain metal. Today, ‘multilayered’ piping is available in which the metal (typically aluminum) is sandwiched between two layers of plastic that may or may not be of the same type (Image 6). As Table 3 shows, there are a number of different types of multilayered pipes on the market. The advantage of a multilayered pipe compared to other plastics described is that they capitalize on the benefits of both polymeric and metallic materials, while overcoming the drawbacks of each. These plastic–metal hybrids allow for greater stiffness than plastic only pipes. The plastic–metal combination enhances their compatibility with brass fittings already installed in copper plumbing systems. Multilayered pipes also hold their shape after being bent and reduce the elasticity associated with the heating of certain plastic pipes.

Conclusion
Homeowners, builders, and water professionals have many potable water plumbing pipe options. Because plastic pipes are less expensive than metal pipes and easy to install, their use in building plumbing is expected to continue. Stiffness and flexibility differences between plastic piping derive from chemical and manufacturing differences between the materials. Understanding the allowable operating temperatures of plastic pipes is important because certain pipes also can only be used for cold water conveyance as they will deform and melt at hot water temperatures. With more than 10 different types of plastic potable water pipes available and roughly 5 to 10 brands (formulations) per pipe type, no shortage of plumbing pipe options exist. This number is expected to increase as innovative, more sustainable, materials are developed to meet the emerging needs of the green building industry.

In addition to the information presented above, there are many unknowns about plastic potable water pipe plumbing systems. One unknown is the degree to which new and aged plastic pipes alter drinking water quality. Results from our laboratory testing have revealed that several ‘approved’ plastic pipes being sold at plumbing supply stores can alter drinking water chemical and odor quality once installed. Furthermore, our team has detected several chemicals of interest that leached into the drinking water from a newly installed green building plastic piping system. As summarized in our 2013 published review of chemical leaching data from plastic water pipe tested in 16 countries, little information is available for plastic piping systems sold in the US. To aid homeowners, builders, and water professionals in their desire to select plumbing pipe that ensures safe and aesthetically pleasing drinking water, more data are needed.

This article is part of a larger plastic pipe project funded by US National Science Foundation grant CBET–1228615. The purpose of the larger project is to better understand the chemicals released from plastic pipe into building drinking water. The project will also identify better methods for plastic pipe design and installation to limit chemical exposures.

Table 3. Several different multilayered pipes are available for potable water transport

<table>
<thead>
<tr>
<th>Name of Multilayered Pipe</th>
<th>Pipe Composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEX / AL / PEX</td>
<td>PEX – Aluminum Barrier – PEX</td>
</tr>
<tr>
<td>PEX / EVOH / PEX</td>
<td>PEX – Ethylvinylalcohol Barrier – PEX</td>
</tr>
<tr>
<td>PE / AL / PE</td>
<td>Polyethylene – Aluminum Barrier – Polyethylene</td>
</tr>
<tr>
<td>cPVC / AL / cPVC</td>
<td>cPVC – Aluminum Barrier – cPVC</td>
</tr>
</tbody>
</table>

About the Authors
Matt Connell is a graduate student in the University of South Alabama Environmental Toxicology Program, Dr. Sandra Stenson is an Associate Professor of Chemistry, and Dr. Andrew Whelton is an Assistant Professor of Environmental Engineering in the Civil Engineering Department. Additional information can be obtained by contacting Dr. Whelton at ajwhelton@southalabama.edu, (251) 460–6174, and by visiting the project website: http://www.usacoegrading.org/ajwhelton.
Where water leaders gather.

ACE13 registration opens in January of 2013.
FOR DECADES, Mississippians enjoyed a plentiful groundwater supply, but the time has long since past when each individual home had its own well or cistern. Today, most Mississippians receive their drinking water from public water supplies, which are tested each month for contaminants. If contaminants are found, the public is notified immediately and corrective action is taken. While this activity is vital to a continuous, safe water supply we have come to expect, there is still a significant number of Mississippians who depend on private wells for their water.

The Mississippi State Department of Health’s (MSDH) Bureau of Public Water Supply, on authority from the U.S. Environmental Protection Agency, serves as the regulatory body for the Safe Drinking Water Act in Mississippi. To carry out its role, MSDH collects data on the percentage of the population of each Mississippi county on a public water supply.

DATA COLLECTION AND METHODS
The data used is second hand data. The United States Census Bureau’s 2010 data collected for all Mississippi counties was used in order to determine county populations. The MSDH performs a Capacity Development Assessment annually for every community public water supply (water system) in Mississippi. Dependent on the number of connections for a particular water system, MSDH uses a factor of 2.6 people per connection to determine the number of people being served by that water system. Each water system is designated as being in a particular county. This allows a list of water systems to be generated for each county. Once this list is generated and the population of each water system calculated, a total population served by water systems in each county can be determined.

To determine accurate population numbers served by water systems, the MSDH data was manipulated. All water systems classified as inactive (I) were removed from their county’s total population served because inactive water systems may still have an identification number, but are being served by another water system and are being calculated in that water system’s population. A margin of error accounts for water systems that overlap into adjoining counties. Even though a water system population is correct, it may not accurately reflect the population recorded as living in that county.

The Mississippi county populations from the census data are compared to the water system populations from the MSDH Capacity Development Assessment. This comparison determines the difference in people in the county served by a water system and people in the county likely to be on private wells.

RESULTS AND DISCUSSION
There are 19 counties that recorded a population percentage amount that is not being served by a water system. The 19 counties are divided into three groups based on the percentage of that county’s population not being served by a water system. Nine counties have a population of .01% to 10% not being served by a water system. Five counties have a population of 10.01% to 25% not being served by a water system and five counties have a population of 25.01% to 50% not being served by a water system.

Considering that not all counties have the same population, it is important to note there are different actual population amounts not being served by a water system that register in different county population percentages. Table 1 delineates the actual populations that make up the percentages.

Figure 1 shows each county that has a population of residents served by private wells and each county is colored according to that percentage range. It is noticeable that North Mississippi has a significant population being served by private wells. Tate, Marshall, and Benton counties all have between 25.01% and 50% of their population being served by private wells. Panola, Union, and Itawamba counties all have between .01% and 10% of their population being served by private wells. These six counties in North Mississippi should be a point of interest for local communities, municipalities, and rural water associations.
Table 1. County and Water System Population Comparison

<table>
<thead>
<tr>
<th>County Name</th>
<th>County Population*</th>
<th>MSDH Pop**</th>
<th>Diff (+/-)</th>
<th>% on Private Well</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benton</td>
<td>8729</td>
<td>4588</td>
<td>4141</td>
<td>47.44%</td>
</tr>
<tr>
<td>Marshall</td>
<td>37144</td>
<td>21476</td>
<td>15668</td>
<td>42.18%</td>
</tr>
<tr>
<td>George</td>
<td>22578</td>
<td>13211</td>
<td>9367</td>
<td>41.49%</td>
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<tr>
<td>Tate</td>
<td>28886</td>
<td>16913</td>
<td>11973</td>
<td>41.45%</td>
</tr>
<tr>
<td>Stone</td>
<td>17786</td>
<td>13023</td>
<td>4763</td>
<td>26.78%</td>
</tr>
<tr>
<td>Smith</td>
<td>16491</td>
<td>12416</td>
<td>4075</td>
<td>24.71%</td>
</tr>
<tr>
<td>Amite</td>
<td>13131</td>
<td>10149</td>
<td>2982</td>
<td>22.71%</td>
</tr>
<tr>
<td>Covington</td>
<td>19568</td>
<td>15583</td>
<td>3985</td>
<td>20.36%</td>
</tr>
<tr>
<td>Greene</td>
<td>14400</td>
<td>12020</td>
<td>2380</td>
<td>16.53%</td>
</tr>
<tr>
<td>Pearl River</td>
<td>55834</td>
<td>48508</td>
<td>7326</td>
<td>13.12%</td>
</tr>
<tr>
<td>Noxubee</td>
<td>11545</td>
<td>10590</td>
<td>955</td>
<td>8.27%</td>
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<tr>
<td>Sharkey</td>
<td>4916</td>
<td>4544</td>
<td>372</td>
<td>7.57%</td>
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<tr>
<td>Itawamba</td>
<td>23401</td>
<td>21884</td>
<td>1517</td>
<td>6.48%</td>
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<tr>
<td>Perry</td>
<td>12250</td>
<td>11504</td>
<td>746</td>
<td>6.09%</td>
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<td>Carroll</td>
<td>10597</td>
<td>10000</td>
<td>597</td>
<td>5.63%</td>
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<td>Marion</td>
<td>27088</td>
<td>25592</td>
<td>1496</td>
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<tr>
<td>Union</td>
<td>27134</td>
<td>25814</td>
<td>1320</td>
<td>4.86%</td>
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<tr>
<td>Neshoba</td>
<td>29676</td>
<td>28440</td>
<td>1236</td>
<td>4.16%</td>
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<tr>
<td>Jackson</td>
<td>139668</td>
<td>136954</td>
<td>2714</td>
<td>1.94%</td>
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<tr>
<td>Harrison</td>
<td>187105</td>
<td>183648</td>
<td>3457</td>
<td>1.85%</td>
</tr>
<tr>
<td>Panola</td>
<td>34707</td>
<td>34430</td>
<td>277</td>
<td>0.80%</td>
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<tr>
<td>Copiah</td>
<td>29449</td>
<td>29357</td>
<td>92</td>
<td>0.31%</td>
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</tbody>
</table>

*United States Census Data 2010
**Mississippi State Department of Health-Bureau of Public Water Supply Capacity Development Assessment (Fiscal Year 2012)

South Mississippi also has a target area of counties with large populations being served by private wells. George and Stone counties have between 25.01% and 50% of their populations being served by private wells. Greene and Pearl River counties have between 10.01% and 25% of their populations being served by private wells. Perry and Marion counties have between .01% and 10% of their populations being served by private wells. Both South Mississippi and North Mississippi have counties that should be points of interest to local municipal water systems and rural water associations for potential expansion of their systems.

For more information on private well populations in Mississippi and/or public water supplies, contact one of the following agencies:

Center for Government and Community Development
Mississippi State University Extension Service
P.O. Box 9643
Miss. State, MS 39762
(662) 325-3141

Bureau of Public Water Supply
Mississippi State Department of Health
P.O. Box 1700
Jackson, MS 39215-1700
(601) 576-7518
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Call for Abstracts
AL/MS Section – AWWA Annual Conference
Harrah’s Tunica Hotel, Tunica, MS • October 13 – 15 2013
“Leadership Through Service”

The AL/MS Section of the American Water Works Association is preparing the 2013 Annual Conference technical program. Interested participants should submit an abstract for either presentation or poster. Space is limited for this year’s poster program, with a maximum of ten participants. The first five accepted poster program abstracts, by a young professional or student, will include a free conference registration. In addition, each poster by a young professional or student will be entered into the poster competition with the first place winner receiving a chance for a free registration to the 2014 AWWA Annual Conference and Exposition in Boston, Ma.

Abstracts should include the title, a detailed description of the topic, authors’ names, and short bio for the primary contact. General categories for the technical program include:
• Regulatory Compliance,
• Finance and Administration,
• Billing and Customer Service,
• Water Resources,
• Water System Security and Disaster Recovery,
• Water System Construction,
• Operations/Management,
• Surface Water,
• Groundwater,
• Distribution System,
• Research from Universities, and
• Emerging/New Technologies
• Asset and Data Management Systems

Submission Timeline:

<table>
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</thead>
<tbody>
<tr>
<td>Abstract Deadline</td>
<td>Presenter Notification</td>
<td>Submit Materials Digitally</td>
</tr>
</tbody>
</table>

Please submit abstracts and questions to Drusilla Hudson or Anton Jones at drusilla.hudson@bwwb.org, 205-244-4466, anton.jones@bwwb.org, or (205) 244-4464. Materials may also be mailed to Birmingham Water Works 3600 Second Avenue North, Birmingham, Alabama 35222 ATTN: Drusilla Hudson or faxed to (205) 244-4966.

Defend your rate structure

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American Water Works Association

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### Mitigation of Hazards, Disasters and System Failures Bundle
- Colorado Wildfires Along the Front Range - Emergency Preparedness and Lessons Learned
  - January 23
- Water Main Condition Assessment
  - March 6
- Cross Connection Control and Hazard Assessment
  - May 15

### Regulatory Bundle
- What Revisions to TCR Will Mean for Water Systems
  - January 30
- Electronic Consumer Confidence Reports - What You Need to Know
  - February 20
- Regulatory Update
  - December 12
- Two more included: topics to be determined

### Water Treatment and Operations Bundle
- Maximize Your Hydraulic Model: Improve Water Quality and Water System Functionality
  - February 6
- Continual Quality Improvement in the Laboratory
  - April 3
- New Developments in Sodium Hypochlorite On-Site Generation Technology
  - October 23
- Finding Hidden Dollars in your O&M Budget
  - November 6

### Distribution Bundle
- Biofilm Control Strategies
  - August 21
- Well Rehabilitation and Asset Management
  - September 11
- Leak Detection: New Technologies and Approaches
  - October 9

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Register online at www.awwa.org/2013webinars
REGISTRATION FORM

Please complete and return to AL/MS AWWA, c/o Chris Griffin, 4121 Carmichael Rd; STE 400; Montgomery, AL 36106
Make Check Payable To: “AL/MS Section AWWA”

Name: _____________________________________________ Name/Nickname for Badge: ______________________________________
Spouse’s Name: _____________________________________ Name/Nickname for Badge: ______________________________________
Firm/Municipality/Organization: ___________________________ Address: __________________________________________
City: ___________________________ State: __________________ Zip: ___________ Phone: ______________________________
Date: __________________ AWWA Membership Number: _____________ E-mail Address: __________________________
Is this your first time attending the Alabama-Mississippi Section AWWA conference? _________________ Spouse’s? _________________
Are you a Young Professional (age 35 or younger)? _____________ Spouse’s E-mail Address (If registered): __________________
Are You/Spouse planning to attend Sunday’s dinner? _________________ Are You/Spouse planning to attend Tuesday’s dinner? _________________
Spouse ONLY, will you ride the bus to the Tunica RiverPark on Monday? ______ Will you eat lunch at the Tunica RiverPark on Monday? ______
For Exhibitors: 1st Choice Booth Space _______ 2nd Choice _______ 3rd Choice _______

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<tr>
<th>Registration Item</th>
<th>Quantity Before Sept. 1, 2013</th>
<th>After Sept. 1, 2013</th>
<th>Total Amount</th>
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<tr>
<td>Lifetime Member, Retiree (Includes Spouse)</td>
<td>$ 175.00</td>
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<tr>
<td>AWWA Member (Utility, Government)</td>
<td>$ 275.00</td>
<td>$ 325.00</td>
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<tr>
<td>AWWA Member (Manufacturer, Supplier, Consultant, Contractor)</td>
<td>$ 325.00</td>
<td>$ 375.00</td>
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<td>Non-member (Does not include a 1 year membership to AWWA national)</td>
<td>$ 400.00</td>
<td>$ 450.00</td>
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<td>Non-member (Includes a 1 year membership to AWWA national)</td>
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<tr>
<td>Member’s Spouse</td>
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<tr>
<td>Golf Tournament Registration (1 player)</td>
<td>$ 100.00</td>
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<tr>
<td>Golf Tournament Hole Sponsorship (includes Hole Signage)</td>
<td>$ 200.00</td>
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<tr>
<td>Golf Tournament Sponsor (includes 1 Team of 4, 4 Mulligan’s, 1 Hole Sign, Plaque, Sponsor Name/Logo on board)</td>
<td>$ 800.00</td>
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<tr>
<td>Golf Tournament Lunch Sponsor (includes 1 Hole Sign, Plaque, Sponsor Name/Logo on sponsorship board)</td>
<td>$ 400.00</td>
<td>$ 400.00</td>
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<tr>
<td>Sporting Clays Competition at Willows, Sunday at 1:30 p.m. (Cart Provided)</td>
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<tr>
<td>Willows’ Provided Shotgun and Ammunition</td>
<td>$ 80.00</td>
<td>$ 90.00</td>
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<tr>
<td>Participant Provided Shotgun and Ammunition</td>
<td>$ 60.00</td>
<td>$ 70.00</td>
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<tr>
<td>Exhibitors Registration (Includes ONLY one registration and 10’ x 10’ booth)</td>
<td>$ 750.00</td>
<td>$ 800.00</td>
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<td><strong>Additional exhibitor must register separately</strong></td>
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<tr>
<td>Additional Exhibitor Registrant (to be used in conjunction with Exhibitor Registration)</td>
<td>$ 275.00</td>
<td>$ 325.00</td>
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<tr>
<td>First Time Young Professional (age 35 or younger only)</td>
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<tr>
<td>Includes Monday only Pass for all activities</td>
<td>$ 40.00</td>
<td>$ 65.00</td>
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<tr>
<td>Conference Sponsorship Donation (Platinum $2,500, Gold $1,500, Silver $750, Bronze $250)</td>
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<td></td>
<td>$ 750.00</td>
<td>$ 800.00</td>
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Total Amount Enclosed

Conference registration cancellations after September 1, 2013 are not refundable, but substitutions are accepted.

If paying by credit card, please fill out the following Information: □ Master Card □ Visa □ American Express
Credit Card Number: ___________________________ CVV# _____________ Expiration Date: _____________
Signature: ___________________________________ Billing Address __________________________________________

If you have any questions, please contact Becky Parker at 601-485-1948, 601-484-7177 (Fax) or beckyparker@meridianms.org. To register online, go to http://www.almsawwa.org and click on 2013 Annual Conference for links for online registration and online hotel reservation. Hotel rooms can also be obtained by calling 866-635-7095 and referencing Conference CODE S10AMS3.
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REGISTRATION for WFP TOURNAMENT ONLY*

Where: The Links at Cottonwoods Golf Course
Tunica (Robinsonville), Mississippi

When: Shotgun start at 11:00 a.m. on 10/13/2013
Registration/Practice begins at 9:00 am
Lunch will be served on the turn around
Awards program following at the Joint Sponsor Luncheon on Tuesday

Format: Four-person scramble

Entry Fees: $100 per person
Includes 18 holes of golf, golf cart, range balls, lunch, participation gift
Mulligan Packages can be purchased at the tournament for $20 each (Limit 1 per golfer)

Contact Information for Individual & Team Players, and/or Sponsors

Name: _________________________________________________________________________________ Handicap:___________________
Company: ______________________________________________________________________________________________________
Address: ________________________________________________________________________________________________________
City, State, Zip: ___________________________________________________________________________________________________
Phone: __________________________ Fax: _____________________ Email: ________________________________________________

TEAM

Player __________________________________________ Email _____________________________________ Handicap _____________
Player __________________________________________ Email _____________________________________ Handicap _____________
Player __________________________________________ Email _____________________________________ Handicap _____________

Sponsorship Opportunities
Please indicate if you would like to sponsor the golf tournament through one (or more) of the options listed.
In addition to the various course and conference signage, your company will also be recognized throughout the conference,
AL-MS AWWA website (www.almsawwa.org) and in the quarterly magazine, Pipeline.
For sponsorship opportunities, please contact Mike Todd at mtodd@Etec-sales.com or Rob Coleman at roboleman@carterverplanck.com.
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☐ Tournament Sponsor ($800) - includes 1 team, 4 mulligans, hole signage, plaque, name/logo on board
☐ Tournament Lunch Sponsor ($400) - 4 mulligans, hole signage, plaque, name/logo on board
☐ Hole Sponsor ($200) - includes recognition sign at tee box or green
☐ Door Prize (Misc Value) - donations Item ______________________________

PAYMENT INFORMATION
*You can register online for the Conference and the tournament on one form using a credit card at www.almsawwa.org
If registering through the mail, complete & return form to:
AL-MS AWWA Golf Tournament | Attn: Mike Todd | 7732 Office Park Blvd | Baton Rouge, LA 70809
WAGGONER ENGINEERS TAKE PRESTIGIOUS AWARDS FROM MISSISSIPPI ENGINEERING SOCIETY

Hunter T. Arnold named Engineer of the Year & Jim White receives Philip C. Gee Fellow Designation

JACKSON, Miss. – March 15, 2013 – Two Waggoner Engineers – Hunter T. Arnold, PE, and James R. White, PE, PLS – received prestigious awards recently at the Mississippi Engineering Society winter meeting.

Arnold, vice president of client services for Waggoner, was named Engineer of the Year for outstanding and sustained contributions to the public welfare and advancement of the profession, while exhibiting the highest professional integrity throughout – and beyond the industry.

White, a project manager with Waggoner, was the first to receive the society’s new Philip C. Gee Fellow designation for exemplary service and dedication to the profession. This fellowship is given annually to members who reflect the dedication, commitment and ethical discipline embodied by Gee, who was instrumental in shaping the MES. Phil Gee, PE, now retired and living in Vicksburg, attended the award presentation.

“We are thrilled and honored that two of our firm’s leaders were chosen for these distinguished awards,” said Joe Waggoner, PE, PLS, founder of Waggoner. “Both Hunter and Jim are visionaries in our industry and their innovative approach is raising the bar in our profession across Mississippi and the Southeast.”

Arnold has worked for Waggoner since 1990. He is a past president of MES, and served as treasurer and board member for the society from 1998 to 2002. Arnold was 2011 chair of the American Water Works Association, Alabama-Mississippi Section; is a member of the American Society of Civil Engineers; and the American Public Works Association. He received the MES Young Engineer of the Year award in 1997. Arnold is vice president of the Ridgeland, Miss. Chamber of Commerce.

White, also past president of MES, has been with Waggoner since 2007. He has overseen some of Waggoner’s major projects – including the Federal Emergency Management Association’s storm water removal and replacement project in Gulfport, Miss.; the storm drainage replacement project at Jackson, Miss., Evers International Airport; and assessment of structural problems for the Mississippi Military Department’s Forest Readiness Center. White is a past president of the Consulting Engineers Council of Mississippi, former director of the Professional Engineers in Private Practice and vice president of the National Guard Association of Mississippi. He has received the Armed Forces of the U.S. Legion of Merit award.

About Waggoner Engineering

Waggoner Engineering, Inc. is a full-service engineering firm based in Jackson, Miss, and serves public agencies and private corporations across the Southeast – discovering innovative infrastructure solutions in the fields of civil engineering, emergency management services, coastal restoration, transportation, mapping, environmental, water resources, land development, flood control, surveying, and economic development. With more than 35 years of experience, Waggoner advances leading-edge strategies from a broad array of disciplines, striving for excellence in every project and client engagement. Waggoner has been recognized as the No. 1 Top Design Firm in Mississippi, and as one of the Top 25 Design Firms in the Southeast. For more information, visit www.waggonereng.com.

NEWSMAKERS NOTICE

If you have recently been promoted, passed an exam, become certified, retired, become a parent, etc..., the PIPELINE would like for you to submit a small write-up and a profile picture for consideration for the Newsmakers Section. Please send the information to Harry.Gong@msdh.state.ms.us or call Harry Gong at (601) 576-7527.
## NEW MEMBERS

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linda Berridge</td>
<td>American Water Works Association</td>
</tr>
<tr>
<td>Belforest Water System</td>
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</tr>
<tr>
<td>Kim Bonner</td>
<td>Beulah Utilities District</td>
</tr>
<tr>
<td>Jimmy Gill</td>
<td>City of Athens</td>
</tr>
<tr>
<td>Glen Partlow</td>
<td>Hartselle Utilities</td>
</tr>
<tr>
<td>Steve Hargrove</td>
<td>Sheffield Utilities</td>
</tr>
<tr>
<td>Jimmy Stewart</td>
<td>Lafayette, AL</td>
</tr>
<tr>
<td>Corley Lauderdale</td>
<td>Riviera Utilities</td>
</tr>
<tr>
<td>Johnny Smith</td>
<td>Jacksonville Water Works</td>
</tr>
<tr>
<td>Benjamin White</td>
<td>Civil Engineering Services, Inc.</td>
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<tr>
<td>Jarrod Milligan</td>
<td>Berry, AL</td>
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<tr>
<td>Bryan Peacock</td>
<td>Volkert, Inc.</td>
</tr>
<tr>
<td>Mickey Haddock</td>
<td>City of Florence Gas &amp; Water</td>
</tr>
<tr>
<td>Joey Adams</td>
<td>B.L. Harbert L.L.C.</td>
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<tr>
<td>Jason Stoneback</td>
<td>Neptune Technology Group Inc.</td>
</tr>
<tr>
<td>Jim Banker</td>
<td>North Lee County Water</td>
</tr>
<tr>
<td>Andy Morris</td>
<td>Smiths Water &amp; Sewer Authority</td>
</tr>
<tr>
<td>Michael Taylor</td>
<td>Eufaula Waterworks &amp; Sewer Board</td>
</tr>
<tr>
<td>Bobby Harris</td>
<td>Alabaster, AL</td>
</tr>
<tr>
<td>Matthew Pritchett</td>
<td>Birmingham Water Works Board</td>
</tr>
<tr>
<td>Gary Denley</td>
<td>Alabaster Water Board</td>
</tr>
<tr>
<td>Bradley Manning</td>
<td>New Albany, MS</td>
</tr>
<tr>
<td>Tim Boyne</td>
<td>Pelham, AL</td>
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</table>

## 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 Newsletter, please contact the Communication’s Chair Harry Gong at Harry.Gong@msdh.state.ms.us or at (601) 576-7527.
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**Eligibility Requirements:**
- The Utility must be a member or employ a member of the AL/MS Section of AWWA
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**Submission Deadline**
- May 15, 2013

**Water Operator of the Year Award**

**Eligibility Requirements:**
- The Operator must be employed by a Utility who is a member or employs a member of the AL/MS Section of AWWA

**Submission Deadline**
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**Young Professional of the Year Award**

**Eligibility Requirements:**
- The nominee must be under 35 years of age or have less than 10 years of experience in the field.
- The Nominee must be a member or employed by a member system

**Submission Deadline**
- July 15, 2013

Nomination and Application Forms may be downloaded on the AL/MS Section website at [http://www.almsawwa.org/](http://www.almsawwa.org/)

All submissions and questions shall be directed to:

John A. Hall  
Phone: (256) 241-2268  
Email: jhall@awwsb.org

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Phone: (228) 822-3900  
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**Education session announcement**

- Roger Shields with Neel-Schaffer, Inc speaking on General Job Site Safety and Hazard Mitigation Planning
- Courtney Bohannon with U.S. Department of Labor speaking on OSHA Trench Excavation Safety Program
- Wesley Mathes with Mathes Waterworks speaking on Chlorine Gas Safety
- Scott Hammack and Tony Strowd with Baptist Medical Center to speak on Sodium Hypochlorite and Ammonia Safety
- A guided tour of the new state-of-the-art Baptist Medical Center water treatment plant in Jackson, MS. The water plant is the state's first ground water system using chloramination disinfection process and THM analyzer equipment.

**Tuesday May 7, 9:00 am – 4:00 pm (CST)**  
**125 South Congress Street, Suite 1100**  
**Jackson, MS**

- Training will also be broadcast via webinar
- Onsite registration begins at 8:30
- Training has been approved by MSDH for 6 hours (1 reg)
- Training is free for all members; $10 for non-members
- Certificates will be mailed after the session
- Lunch will be provided

Please contact Mr. Mauricka McKenzie to register for the session  
Mauricka.McKenzie@neel-schaffer.com or (601) 948-3071

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