Tank Mixing and Aeration: Panacea or Propaganda?

Nichole Sajdak, PE, Meg Roberts, PE and Erik Rosenfeldt, PhD
Hazen and Sawyer

INTRODUCTION

Removal of THMs after formation in water storage tanks can be an attractive solution that targets specific locations with DBP compliance concerns. But is it too good to be true? It’s not pure propaganda: adding aeration systems to tanks can be effective at removing THM and it may be a cost-effective step for compliance. But, the systems are also certainly not a panacea. Piloting of these systems is not required in Ohio. But before a utility commits financial resources and introduces change to the system’s water quality, a holistic approach to distribution system operations and water quality is prudent. This article provides case studies of utilities evaluating the benefits of potential storage tank mixing and aeration strategies. Evaluations of mixing alone or coupled with aeration for THM reduction are included. In addition, discussion about the use of distribution system hydraulic models to trace the water originating from storage tanks provides information about the expected impact of tank aeration/mixing techniques on various compliance sites.

BACKGROUND

Disinfection byproducts (DBPs) are formed when chlorine used for disinfection reacts with organic materials naturally present in surface waters. The United States EPA has regulated several of these chlorination disinfection byproducts for years, primarily Trihalomethanes (THMs) and Haloacetic acids (HAAs). DBP reduction has conventionally been approached by limiting formation during treatment by delaying chlorine addition, improving organic content removal efficiencies or adding treatment at the plant. But because THM formation is time dependent, another way of reducing formation is to reduce formation time, or water age, in the distribution system. Unfortunately, long detention times in distribution system storage tanks and pipes, especially in consecutive systems, are not always avoidable. Use of larger pipes and storage tanks can improve hydraulics and pressures in the distribution system, but because water quality deteriorates with water age, utilities can run into unintended consequences including low disinfectant residuals, nitrification and elevated disinfection byproducts. Specifically, the long detention times can lead to DBP concentrations high enough to violate the maximum contaminant levels. The onset of the Stage 2 Disinfectants / Disinfectant Byproducts Rule (D/DBPR) has found some utilities up against the maximum contaminant limits for a variety of reasons. When options for preventing THM formation at the plant or in the distribution system have been either exhausted or become prohibitively expensive, utilities are turning to water quality improvements by removing THMs from the water in the distribution system. Utilities have recently shown interest in evaluating THM removal by using tank aeration (including mixers) in distribution system storage tanks.

continued on page 5
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Greetings to my fellow members, as of this reading one of the snowiest winter's on record is now a distant memory and we are now onto much bigger and better things such as our new Ohio Section email banner and slogan “A better Ohio through better water”. With all that we do in the water industry, we truly do make a better Ohio. We may be out of sight out of mind to the general public, but should not be taken for granted for as we are the unsung heroes of the water industry.

As we spring into action on April 1-2, representatives of the Ohio Section will be participating in the Water Matters! Fly-In in Washington DC. This premier AWWA event brings water utility professionals from around the country to the United States Capitol, to meet with their elected representatives to discuss issues of pressing concern to the water community. Perennial topics include ways to keep our water safe and affordable. Thank you to Richard Lorenz WUC Chair, Tyler Converse, Dave Weihrauch, Mike Gradoville, Bob Davis & Chris Nielson for participating and providing the voice of the Ohio Section to the United States Capitol.

Another initiative of the Ohio Section that is in the works is to reconfigure some of our Committees and finalize a detailed Operations Manual. The Operations Manual will identify the responsibilities of positions and provide descriptions and objectives of all the committees in our Section. This manual will be an invaluable resource to our current and future volunteers to help them more easily navigate the operations of our Section.

Don't miss our first ever One Water joint conference with Ohio Water Environment Association, OWEA, August 26 – 29 in Columbus. It is quickly approaching and many of our volunteers have been very busy to make it a great conference. If you have not already, please check it out at www.onewater.org. Registration is now open for all attendees, exhibitors, sponsors and golfers. We cannot wait for this conference to get underway and are eagerly waiting with bated breath!

As always, we encourage everyone to get involved with AWWA as it is an experience you will never regret. Remember our Section life blood is our membership, so let’s go out and sell the benefits of AWWA and recruit a new member today! And lastly, we would like to thank all of our members and volunteers for being a part of the Ohio Section AWWA the best Section in our Association!

Kurt Smith, Ohio Section Chair

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Spring at Last! Even though I lived through the ice and snow of the mid-70s, it didn’t prepare me for the coldest / snowiest winter in many years. But let’s not dwell on the past few months, but look to the future – the future of AWWA.

One of my first official duties as your Director was to attend the Winter Board Meeting in January. I spent a few days getting to know my fellow Directors from across the Association, and it reminded me how much knowledge, creativity and dedication we have as a unified AWWA. I’m looking forward to working closely with my fellow New Directors, as well as the current slate of Directors and Officers.

Speaking of Officers, the newest AWWA Officers were elected in January, and will take office in June, at the close of ACE. Two new Director-at-Large Positions were also elected:

- **President-Elect**
  Gene Koontz, Pennsylvania Section

- **Director-at-Large**
  Uma Vempati, Minnesota Section

- **Service Provider Director-at-Large**
  Pete Samson, Ontario Water Works Assoc

- **Vice Presidents**
  Brenda Lennox, Pacific Northwest Section
  Tom Moulton, Ontario Water Works Assoc
  Warner Palermo, Puerto Rico Section
  Lela Perkins, Rocky Mountain Section
  Steve Shoaf, North Carolina Section

Also moving forward were several Association Initiatives, which will broaden AWWA’s involvement at home as well as beyond North America.

- **Value of Water Coalition** – AWWA has been part of five other water/wastewater associations and six private sector firms, discussing how to educate the Water Community and beyond about the Value of Water.

- **Philanthropic Program** – Over the past year, AWWA has been working on a business plan to develop a philanthropic arm of the Association. Strategic initiatives of the Program would include Workforce Advancement, and Education and Outreach via the AWWA Water Fund (education and outreach).

- **AWWA / ASEC / EWB Alliance** – The purpose of the alliance is to engage volunteers in providing support to improve conditions in underserved domestic communities of the United States and the partnership program strongly supports AWWA’s vision of a better world through better water.

- **AWWA-India Initiative** – As part of AWWA’s vision of a better world through better water, increasing knowledge resources for global water professionals and in support of the International Councils strategic plan, AWWA has worked to develop a business plan with the goal of establishing an in-country presence in India.

Regarding the Ohio Section, we will be diligently working on the Realignment of our Section Strategic Plan over the remainder of this year. AWWA approved an Association Strategic Plan last summer, and AWWA Councils and Committees have made changes to their documents. The Section has begun this process, which will ultimately provide additional synergy between Ohio Section and AWWA initiatives.

In closing, I’d like to thank You, for allowing me to represent the Ohio Section on the AWWA Board of Directors. The wheels of AWWA are moving faster than ever, and I look forward to being a part of the Future of AWWA and the Ohio Section.

If you have suggestions about the Ohio Section, or questions about the activities of the Association, please do not hesitate to contact me at cliff.shrive@stantec.com or 513.824.6744.
MIXING, AERATION OR BOTH?

Storage tanks provide hydraulic benefits to the distribution system, including equalizing finished water storage, providing stored water volume to fight fires, and serving as temporary emergency supplies. Because of these benefits, many municipalities have a plethora of water storage and operate their distribution system pumping to keep the storage tanks as full as possible. Tanks with excess volume however, can create water quality problems. A common tank issue includes stratification due to poor mixing. This can be affected by tank geometry, velocities in and out of the tanks, temperature and density of the water column, and tank inlet and outlet configurations. If coupled with distribution system operations that provide poor tank turnover and high water age, the result can include poor water quality including high DBP concentrations.

TANK MIXING

A system with troubled D/DBP compliance sites may install a tank mixing system to improve water quality by reducing short circuiting and/or stratification in the tank. In tanks exhibiting short circuiting and/or stratification, the addition of mixing can increase the average water age released from a tank. This is caused by unmixed tanks with common inlet/outlet geometry typically draw from the “young” water during daily operation. Periodic excursions into the “old” water will occur when increases in system demands draw water from the upper stratified portion of the tank. These excursions create a short spike into very old water age with elevated DBP concentrations. If the layers consisting of elevated water age are mixed and eliminated, the possibilities of significant water age excursions are reduced and total DBP formation within the tank is reduced. Figure 1 displays

Figure 1: Unmixed vs Mixed Tank Water Age
the modeled water age of water released from a tank over a 24-hour period. For the majority of time, the water flow uses the last-in, first-out assumption and effluent water age is approximately 24 hours. However we also see a spike in water age of greater than 300 hours. Conversely, when completely mixed, the tank consistently provides an effluent flow of more moderate water age, around 90 hours.

The study highlights the key benefit of mixing which is the elimination of pockets of varying water age and quality in portions of the tanks.

AERATION

Chemical contaminant removal via aeration has been used for decades. Packed air towers and draft aeration at many water and waste water treatment plants strip contaminants in the liquid phase into the air phase. Ventilation then evacuates the contaminated air space to prevent reintroduction to the water. Case studies indicate that the relatively volatile nature of THMs make aeration an attractive option for their removal; however, HAA compounds are not amenable to removal by aeration. The effectiveness of aeration processes are fundamentally defined by Henry's Law which describes the equilibrium partitioning of a particular chemical between air and water. Henry's law constants are compound specific and increase for compounds which are more easily removed from water through aeration. Table 1 displays Henry's Law constants for the four THMs regulated under the Stage 2 DBP Rule. Chloroform displays the highest constant (and is therefore the most readily stripped from water). Henry's Law constant decreases with increased bromine substitution. This means that it can be more difficult to remove brominated DBPs by aeration processes than chloroform.

Two methods of aeration are common in water treatment: diffused bubble aeration and spray aeration. Diffused bubble aeration pushes air bubbles up through a water column. The design of a diffused bubble aeration system is highly dependent on the depth of the water column, which presents challenges in a distribution system storage tank with fluctuating levels. Another challenge with diffused bubble aeration is contaminant transfer to the air phase is particularly reliant upon favorable conditions due to the constrained air volume of bubbles. For these reasons, brominated DBP treatment by way of diffused bubble aeration can require greater capital and O&M costs when compared to spray aeration.
While diffused bubble aeration relies on small bubbles surrounded by water for pollutant transfer, spray aeration relies on small water droplets surrounded by air. A portion of the tank flow is pumped up to the top of the tank where nozzles create a fine mist spray and reintroduce the flow into the headspace. The water droplets pass through the air column before landing back in the tank. To realize the benefits of spray aeration throughout the full volume of the tank, however, the top layer must be fully blended to provide consistent water quality. Similar to the discussion about using tank mixing systems to prevent tank stratification and dips in water quality, complete mixing is coupled with spray aeration to realize the water quality benefits of treatment throughout the entire volume of the tank.

BROMIDE CHANGES THINGS

The increased removal efficiency of spray aeration is of particular importance considering recent trends of several utilities in the eastern United States. Utilities, including some in Ohio, have expressed concern about elevating bromide levels in surface waters due to both fracking wastewaters and power plant discharges. The case study described below illustrates a typical trend witnessed for utilities experiencing elevated source water bromide which lead to elevated DBP concentrations. Figure 2 illustrates THM speciation occurring during the summer quarter THM for a utility in Pennsylvania.

Figure 2: Time Series THM Speciation at Stage 2 Compliance Location

The figures clearly indicate the concentration of bromine incorporation increased significantly between 2009 and 2012, with chloroform accounting for 40% of the THM speciation in the summer of 2009, and only 12% in the summer of 2012. Utilities with DBP concentrations historically below the regulated MCL levels find themselves struggling with compliance due to these changes to source water. Why?

Small changes in the source water characteristics can impact THM speciation because the chloride ion is much more abundant in natural water sources than bromide. Therefore, given a constant chloride concentration, very small changes in bromide concentration have a significant impact on the Cl/Br mass ratio. When water enters the treatment plant with elevated bromide concentrations, there are very few viable treatment options for bromine removal. As a result, the elevated concentrations are maintained through the wastewater treatment plant, and remain in the treated drinking water. Upon chlorination, bromide is rapidly incorporated into the THMs, leading to a larger proportion of brominated DBPs.

How does this affect compliance?

Total Trihalomethanes (TTHM) are the regulated parameter in the Stage 2 D/DBP Rule, but the reported mass concentrations are the sum of four different THMs: trichloromethane (chloroform, CHCl₃), dichlorobromomethane (CHCl₂Br), chlorodibromomethane (CHClBr₂) and tribromomethane (bromof orm, CHBr₃). The impacts of bromine incorporation into THMs have practical implications on DBP
reporting because bromine is a heavier atom than chlorine (higher molecular weight). Since the MCL is a mass concentration, when the concentrations of brominated THM species increase, they result in higher TTHM concentrations - even if the number of molecules remains the same. Utilities with greater bromide incorporation have a greater chance to exceed the Stage 2 THM MCL.

When considering installation of an aeration system into a storage tank to remove THMs, utilities experiencing high bromine incorporation must consider that the brominated THM species are not as amenable to removal by aeration as chloroform. Therefore utilities with high bromide THM speciation do not realize benefits from the diffused bubble aeration. But because the volume of air surrounding the water droplets is so much larger than the water droplets themselves, spray aeration overcomes the air volume constraint of diffused bubble aeration and can achieve higher THM removal rates more efficiently. This conclusion was based upon an investigation of the effectiveness of the various processes on highly brominated THMs and was confirmed by several on-site demonstrations of the spray aeration process.

DEFINE THE REQUIRED REMOVALS

Once the effectiveness of the mixing and aeration system is determined, historical DBP records are analyzed to determine the required percent THM reductions at compliance sites. Compliance for Stage 2 is based upon a Locational Running Annual Average (LRAA) rather than the Stage 1 system wide RAA. This effectively results in more stringent regulation, as all individual locations must now remain below the LRAA limits for both THMs and HAAs as opposed to relying on the average of all locations. This case study illustrates the analysis of non-compliance THM data collected by a city in Virginia in preparation for Stage 2 monitoring from 2011 to August 2013. The historical evaluation indicated that the LRAA for most locations in the system do not exceed the MCL. However, another component of setting design guidelines for a THM removal system is identifying a utility’s aversion for risk. Setting LRAA goals at the compliance limit of 80 ppb provides no safety factor for the utility. The EPA recommended compliance design level of 64 ppb (80% of 80 ppb) is typically applied when evaluating strategies for Stage 2 compliance, as it provides risk allowance for ensuring compliance in the event of process and laboratory uncertainties such as treatment upsets, exceptionally difficult water quality, temperature fluctuations, and even laboratory analysis uncertainties.

The utility set an internal goal of maintaining the LRAA at all compliance sites below 64 ppb. The two “new” Stage 2 Compliance locations (orange and blue bars) are notably higher LRAAs and consistently exceeded than 80 ppb limit. Changes already made by the utility to treatment and distribution improved the trend at the Stage 2 compliance sites, however further reductions were required to achieve the 64 ppb design goal.

Based on the historical review of DBP concentrations at the Stage 2 sites and a clear definition of the final THM concentration “goals” at the Stage 2 sites, THM reduction requirements could be calculated. These reduction requirements reflect the percentage of THM removal required at the sampling sites to maintain compliance. Based on the maximum observed THM LRAA values THM concentrations would need to be reduced by approximately 35% in samples for each of the four quarters in order to maintain the 64 ppb LRAA design goal.
RELATIONSHIP BETWEEN STORAGE TANK AND COMPLIANCE SITE

Once the appropriate THM reduction system is identified for the tank and the extent of reduction at the compliance sites is established, the relationship between the storage tank and compliance site must be examined. Even if complete THM removal were possible in the tank, DBP compliance may not be achieved if the treated water does not reach compliance sites. Public health is only protected from improved tank water quality if the water from the tank reaches the customers.

Tank operations affect water quality in distribution systems, but the extent depends on many other things related to the distribution system such as pump controls, hydraulic conditions and pressure zones. Changes may be required to provide a greater percentage of the flow routed through the tank prior to reaching the customers service connections. By pushing more of the water delivered to the targeted pressure zones through the tanks, benefits of the THM removal system can be enhanced. Modeling of changes to distribution system operations can maximize the distribution of reduced-TTHM water to the Compliance Sites to maximize water quality improvements.

Distribution systems can be very complicated hydraulically. Each system is highly variable and has its own limitations. Modeling can be used to evaluate the parallels between water quality in the tank and water quality in the tank’s area of influence. Modeling the system can also identify operational changes that could improve the tank influence on the districts. Certain valves could be opened or closed to more directly supply customers through the tank instead of the pump stations. Hydraulic models can also be used to test these changes to operations while ensuring adequate pressure is available for diurnal demand and fire protection.

Figure 4: Strong Correlation between Storage Tank and Compliance Site
To examine the influence of storage tanks in the distribution system’s pressure districts as sources, a source tracing analysis was conducted using the modeling software. The storage tanks were defined as source nodes and the software calculates and reports the percent of water reaching any distribution system location that had its origin at the selected source node over time. Percentages for this analysis are shown as an average over 24 hours to account for diurnal variability in operations and demand.

To estimate impacts of these findings on the expected THM levels at Stage 2 sites influenced by the storage tanks, an analysis of the impact of the THM reduction system on the associated Stage 2 compliance sites was performed. Figure 4 shows the source trace analysis from highlighting the impact of the tank on the nearest Stage 2 compliance location. The area in close proximity to the storage tank is almost entirely supplied directly from the tank, including the troubled compliance site which receives between 75% and 100% of the supplied water from the tank. This strong correlation between storage tank water quality and compliance site water quality makes treatment in the tank a good choice.

Figure 5 shows the percent of water in the distribution system pipes that went through a tank in another pressure district. The model indicates that the distribution system is not currently configured to pump water directly through the storage tank before being distributed to the customers in the district and the compliance site. The compliance site of concern receives a modeled percentage of water originating at the tank of between 50 – 75%. The exact percentage indicated by the model was 59%, although it must be recognized that this is a 24-hour averaged value, and should be understood as such. Assuming that a 35% THM reduction is required at the compliance site, the relationship between the storage tank and compliance site suggests that greater than 47% THM reduction at the storage tank would be required to meet this goal. This is a much more ambitious goal for the spray aeration systems and may require more equipment (and more power consumption) as compared to a system requiring only 35% THM reduction.

Figure 5: Moderate Correlation between Storage Tank and Compliance Site
Finally, Figure 6 shows the percent of water in the distribution system pipes that went through a tank with poor correlation to the compliance site. Similar to the previous model showing moderate correlation (59%) between the tank and compliance site, the piping configuration allows many customers to be supplied directly from the pump station both upstream from the storage tank and, due to bypass piping and other pathways of flow downstream of the tank as well. The troubled Stage 2 compliance sites are shown to only be slightly influenced (<10%) by water from the storage tank and there would be no significant improvement to water quality at the compliance sites from treatment at the tank. Therefore without valving or operational changes in the distribution system, this tank would not be a good candidate for aeration for THM removal.

In summary, the impact of THM reduction within the tanks will not be observed uniformly at locations within the distribution system area serviced by the tanks without changes in those service districts that will result in a greater percentage of the flow routed through the tank prior to reaching the customers service connections. Operational changes that could improve the tank influence on both the moderately impacted and low impacted compliance sites include closing certain valves to more directly supply customers through the tank instead of the pump stations. The hydraulic model can be used to test these operations and ensure adequate pressure is available for diurnal demand and fire protection.

It was therefore recommended that implementation of THM reduction systems in these last two service districts be accompanied with evaluation and implementation of strategies for pushing more of the water delivered to the pressure zones through the tanks to realize increased benefit of the THM removal system.

![Figure 6: Weak Correlation between Storage Tank and Compliance Site](image)

**CONCLUSIONS**

- A holistic approach to distribution system water quality is needed. Adding both mixing and aeration systems to tanks may be effective at removing TTHM. It may be a cost-effective step for compliance. But source water quality, tank turn-over and other operations certainly affect water quality in distribution systems. Each utilities unique water and distribution system pump controls and hydraulic conditions determine the extent.

- Even when distribution system operations are optimized to maximize the distribution of reduced-TTHM water, DBP compliance may not be achieved if the reduced TTHMs do not reach compliance sites. Likewise, public health is not protected from improved tank water quality if the water from the tanks does not reach the customers.

- Distribution systems can be very complicated hydraulically. Each system is highly variable and has its own limitations. Examining and changing distribution system operations can enhance THM removal systems.
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History - How the Joint Conference Came to Be
Ohio's water professionals have long realized that there really is only “One Water.” You may treat it for drinking, home, and industrial use or you may treat it after it has been consumed by people, used in homes, businesses and industry, or run off our streets and buildings, but we are all working with a finite resource.

The membership of the Ohio Water Environment Association and Ohio Section of the American Water Works Association attend many of the same conferences, work for the same utilities or consulting firms, and serve the same public and clients. OAWWA and OWEA have collaborated to attend Government Affairs Fly-Ins to discuss water issues with our country’s legislators. The associations’ sections and committees have worked together to hold meetings, encourage students to consider professions in the water field, and raise money for Water for People. It made complete sense to hold a joint water professionals conference.

In the summer of 2011, the conversation began. After several meetings, a Memorandum of Understanding was signed by the two organizations in early 2012. The sites of the Hilton Columbus Downtown and Greater Columbus Convention Center were selected in the summer of 2012.

And then the planning began. A Conference Committee of nearly 60 volunteers, equally representing both organizations, is working to bring you an educational and memorable conference experience.

You Are Invited to Attend
We hope you will take advantage of this unique opportunity to network with and learn from the best in Ohio's water quality community. An excellent technical program, expansive exhibit expo, and multiple networking events will await you.

@OneWaterOhio

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Operations
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Residuals/Recovery
Stormwater
Utility Management
Wastewater Collections
Wastewater Treatment
Water Distribution
Water Treatment
Workforce Development

The two premier Ohio water associations are teaming up and working together to hold a joint water professionals conference in 2014. The joint conference will be held August 26-29, 2014 at the new Hilton Columbus Downtown and Greater Columbus Convention Center, which are connected by a stunning glass skywalk.

Information and registration at www.onewaterohio.org
### TUESDAY, AUGUST 26
- 8:30 a - 5:00 p  Golf Outing - Foxfire Golf Club
- 7:00 a - 10:00 p  Registration - Hilton sponsored by ARCADIS
- 10:00 a - 4:00 p  Management Development Seminar
- 10:00 a - 4:00 p  Emerging Issues for Source Water Workshop
- 10:00 a - 4:00 p  One Water Facilities Tours - Water & Wastewater
- 10:00 a - 4:00 p  One Water Maintenance Tour
- 6:00 p - 9:00 p  Exhibitor Setup - Conv Center Hall C
- 6:00 p - 10:00 p  Welcome Gathering - Barley’s

### WEDNESDAY, AUGUST 27
- 6:00 a - 7:00 p  Registration - Hilton sponsored by ARCADIS
- 7:00 a - 9:00 a  Exhibit Setup - Conv Center Hall C
- 7:00 a - 9:00 a  Kick-Off Breakfast & Awards - Hilton
- 9:00 a - 4:30 p  Technical Sessions - Two Tracks in C-Pod
- 9:00 a - 5:00 p  Exhibit Exposition Open - Conv Center Hall C
- 9:00 a - 5:00 p  OWEA Ops Challenge sponsored by ONVIO
- 9:00 a - 4:30 p  Spouse/Guest Program
- 12:30 p - 2:00 p  Box Lunch in Expo Hall - Conv Center Hall C
- 5:00 p - 7:00 p  Expo Social & Awards sponsored by Brown and Caldwell
- 5:00 p - 7:00 p  OAWWA Meter Madness
- 7:00 p - 11:00 p  Meet & Greet - Brothers sponsored by CT Consultants

### THURSDAY, AUGUST 28
- 7:30 a - 6:30 p  Registration - Hilton sponsored by Hazen and Sawyer
- 7:00 a - 8:30 a  Continental Breakfast sponsored by Stantec
- 8:00 a - 11:45 a  Technical Sessions (6 Concurrent Sessions) - Hilton
- 9:00 a - 4:30 p  Spouse/Guest Program
- 11:30 a - 1:30 p  Lunch - Conv Center Hall C
- 1:30 p - 4:30 p  Technical Sessions (6 Concurrent Sessions) - Hilton
- 4:30 p - 6:00 p  OWEA Business Meeting & Awards - Hilton
- 4:30 p - 6:00 p  OWEA Membership Meeting & Awards - Hilton
- 6:30 p - 10:00 p  One Water Gala, Awards, & Entertainment - Hilton

### FRIDAY, AUGUST 29
- 7:00 a - 12:00 p  Registration - Hilton sponsored by Hazen and Sawyer
- 7:00 a - 8:30 a  Continental Breakfast sponsored by Stantec
- 7:00 a - 8:30 a  OWEA 5S Breakfast sponsored by Jones & Henry
- 7:00 a - 8:30 a  OAWWA Award Winners & Past Presidents Breakfast
- 8:00 a - 11:45 a  Tech Sessions (3 Concurrent Sessions) - Hilton
- 10:00 a - 12:00 p  OAWWA Governing Board Meeting - Hilton
- 10:00 a - 12:00 p  OWEA Executive Committee Meeting - Hilton
- 12:00 p - 1:00 p  Joint Board Meeting Lunch - Hilton

### Attendee Registration Fees

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### Sponsorship Levels
- Sapphire Sponsor: $100.00
- Ruby Sponsor: $200.00
- Diamond Sponsor: $300.00
- President’s Sponsor: $1,000.00
- Bronze Sponsor: $2,000.00
- Silver Sponsor: $3,000.00

### Hotel Information
**Hilton Columbus Downtown**
401 North High Street
Columbus, Ohio 43215
614.384.8600

Rates from $142/night + tax
Make your reservations via the link at www.onewaterohio.org
or Contact the Hilton Columbus Downtown directly
Cutoff date for reservations is Monday, August 11th.
Calling all Water & Wastewater Operators!

Don’t Miss the First Ever Joint OWEA & OAWWA Conference
August 2014 - Columbus, Ohio
Register online at www.onewaterohio.org

Over 18 Water & Wastewater Hours Available

<table>
<thead>
<tr>
<th>Tuesday, 8/26</th>
<th>Wednesday, 8/27</th>
<th>Thursday, 8/28</th>
<th>Friday, 8/29</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preconference</td>
<td>Expo - 150+ Exhibitors</td>
<td>Expo - 150+ Exhibitors</td>
<td>Technical Sessions</td>
</tr>
<tr>
<td>Workshops and Tours</td>
<td>Technical Tours</td>
<td>Technical Sessions</td>
<td>3 Concurrent Tracks</td>
</tr>
<tr>
<td>One Water Facilities Tours - W &amp; WW</td>
<td>Technical Sessions</td>
<td>6 Concurrent Tracks</td>
<td>Water, Wastewater &amp; Both</td>
</tr>
<tr>
<td>One Water Maintenance Tour</td>
<td>WW Operations Challenge</td>
<td>Water, Wastewater &amp; Both</td>
<td>Contact Hours/PDH’s available</td>
</tr>
<tr>
<td>Management Development Seminar</td>
<td>Water Competitions</td>
<td>Contact Hours/PDH’s available</td>
<td></td>
</tr>
<tr>
<td>Emerging Issues for Source Water</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Possible CH/PDH: 5 hrs Possible CH/PDH: 5 hrs Possible CH/PDH: 5.5 hrs Possible CH/PDH: 3 hrs

Registration options are available to fit any training or continuing education need, from full conference, preconference workshops, or single day technical sessions.

Register online at www.onewaterohio.org

More training and continuing education opportunities than ever!

OVER 18 HOURS AVAILABLE

Attendee Registration Fees

<table>
<thead>
<tr>
<th>Attendee Registration Fees</th>
<th>Early Rates</th>
<th>Late Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuesday Preconference Workshops (includes Lunch)</td>
<td>$85.00</td>
<td>$110.00</td>
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<tr>
<td>Tuesday Preconference Tours (includes Lunch)</td>
<td>$85.00</td>
<td>$110.00</td>
</tr>
<tr>
<td>Preconference Workshop Student</td>
<td>$30.00</td>
<td>$55.00</td>
</tr>
<tr>
<td>Full Conference Member</td>
<td>$295.00</td>
<td>$345.00</td>
</tr>
<tr>
<td>Full Conference Nonmember</td>
<td>$395.00</td>
<td>$445.00</td>
</tr>
<tr>
<td>Full Conference Member Retired (not working)</td>
<td>$200.00</td>
<td>$235.00</td>
</tr>
<tr>
<td>Full Conference Student (ID required)</td>
<td>$50.00</td>
<td>$75.00</td>
</tr>
<tr>
<td>Wednesday Only Member</td>
<td>$170.00</td>
<td>$195.00</td>
</tr>
<tr>
<td>Wednesday Only Nonmember</td>
<td>$220.00</td>
<td>$245.00</td>
</tr>
<tr>
<td>Thursday Only Member</td>
<td>$170.00</td>
<td>$195.00</td>
</tr>
<tr>
<td>Thursday Only Nonmember</td>
<td>$220.00</td>
<td>$245.00</td>
</tr>
<tr>
<td>Wednesday Technical Program/Expo Only</td>
<td>$75.00</td>
<td>$100.00</td>
</tr>
<tr>
<td>Thursday Technical Program/Expo Only</td>
<td>$75.00</td>
<td>$100.00</td>
</tr>
<tr>
<td>Friday Half Day Technical Program</td>
<td>$50.00</td>
<td>$75.00</td>
</tr>
<tr>
<td>Full Technical Program Only</td>
<td>$200.00</td>
<td>$275.00</td>
</tr>
</tbody>
</table>

Contact One Water Ohio if you need assistance or information 614.488.5800 or info@onewaterohio.org

One Water | Ohio WEA-AWWA 2014 Technical Conference & Expo
GOLF OUTING  |  Tuesday, August 26th - 10 a.m. Shotgun Start at Foxfire Golf Club
Where: The Foxfire Golf Club  
10799 Ste Rt 104  
Lockbourne, OH 43137  
614.224.3694  
Times: 8:30 a.m. Registration Open  
8:30 a.m. Driving Range Open  
10:00 a.m. Shotgun Start  
Keg sponsored by Thermal Process Systems  
Lunch sponsored by CH2M Hill  
$300 Foursome/$75 Individual includes: Coffee/Pastries/Lunch/Beverages, Green Fees and Cart, Driving Range, Awards Ceremony/Appetizers  
Register online at www.onewaterohio.org  
Foxfire Golf Club boasts 36 holes of championship golf, the Foxfire and the Players Club. The layout is a deft combination of traditional American golf and traditional British links design that provides the perfect complement to the original.

WELCOME GATHERING  |  Tuesday, August 26, 6 to 10 pm at Barley’s/Lower Level  
Meet up with your fellow water professional colleagues from around the state and plan your conference experience. Appetizers provided. Beverages on your own.

KICK-OFF BREAKFAST  |  Wednesday, August 27, 7 to 9 am at the Hilton  
Bring your appetite and your appreciation for the first set of 2014 OAWWA & OWEA award winners to the Kick-Off Breakfast. You will be welcomed to the City of Columbus for this first ever joint water professionals conference.

EXPO SOCIAL  |  Wednesday, August 27th - 5 to 7 pm Convention Center C-Hall  
Take time to visit with more exhibitors, show your appreciation for the second set of 2014 OWEA & OAWWA award winners and find out who won the day’s competitions. sponsored by Brown and Caldwell

MEET & GREET  |  Wednesday, August 27th, 7 to 11 pm at Brothers  
Live music by “The Slang”, plenty of delicious “made from scratch” specialties and beverages, all in the fun environment provided by Brothers. Connect with new friends in the water industry or rekindle old friendships. Any late scoring results from the day’s competitions will be announced at the Meet & Greet. sponsored by CT Consultants

ASSOCIATION MEETINGS  |  Thursday, August 28th, 4:30 to 6 pm at the Hilton  
One of the few times the conference crowd will divide up as OWEA & OAWWA meet with their association members and hand out additional awards.

ONE WATER GALA  |  Thursday, August 28th, 6:30 to 10:00 pm at the Hilton  
Enter the grand Hilton Ballroom for a fine evening of entertainment, food, and festivities. The Hilton Chefs will create a sumptuous sampling to please every palate. The final slate of OAWWA & OWEA award winners will be acknowledged for their excellence in the water quality field. Watch for an update from the Conference Committee on the evening’s live entertainment!

@OneWaterOhio
One Water | Ohio WEA-AWWA 2014 Technical Conference & Expo

**GOLF OUTING REGISTRATION**

Calling all golfers  
Get your teams together soon!  
**TWO COURSES**  
**FOUR PERSON SCRAMBLE**

**Where:** The Foxfire Golf Club  
10799 Ste Rt 104  
Lockbourne, OH 43137  
614.224.3694

**Date:** Tuesday, August 26, 2014  
**Times:**  
8:00 a.m. Shotgun Start

**Format:**  
256 Golfers  
32 Teams per Course  
Four Person Scramble

**Cost:**  
$300 Foursome  
$75 Individual  
$250 Hole Sponsor Sign

**Includes:**  
Coffee/Pastries/Lunch/Beverages  
Green Fees and Cart  
Driving Range  
Awards Ceremony/Appetizers

**Register Online** at onewaterohio.org

**Cost:**  
$300 Foursome  
$75 Individual  
$250 Hole Sponsor Sign

**Includes:**  
Coffee/Pastries/Lunch/Beverages  
Green Fees and Cart  
Driving Range  
Awards Ceremony/Appetizers

**Prizes:**  
Long Drive  
Closest to the Pin  
Course Winners

<table>
<thead>
<tr>
<th>Golf Team Contact First Name</th>
<th>Contact Last Name</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company Name</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Address</td>
<td></td>
<td></td>
</tr>
<tr>
<td>City</td>
<td>State</td>
<td>Zip</td>
</tr>
<tr>
<td>Email</td>
<td>Tel #</td>
<td></td>
</tr>
</tbody>
</table>

**One Water Golf Outing Tuesday, August 26, 2014 at Foxfire Golf Club**

<table>
<thead>
<tr>
<th># Team(s) of four golfers</th>
<th>___ x $300 each</th>
</tr>
</thead>
<tbody>
<tr>
<td># Individual Golfers</td>
<td>___ x $75 each</td>
</tr>
<tr>
<td>Hole Sponsor Sign</td>
<td>___ x $250 each</td>
</tr>
</tbody>
</table>

Print golfers names below:

1.  
2.  
3.  
4.  

**TOTAL AMOUNT DUE**

<table>
<thead>
<tr>
<th>Course Preference (subject to availability):</th>
<th>Players Club</th>
<th>Foxfire</th>
<th>No Preference</th>
</tr>
</thead>
</table>

**FORM OF PAYMENT**

- Check #
- Credit Card - you will be emailed a secure link to enter your credit card payment. Or you may call 614.488.5800 with your credit card number.

Make checks payable to Ohio WEA/AWWA 2014 and mail to:

Ohio WEA/AWWA 2014 Conference  
1890 Northwest Blvd, Suite 210  
Columbus, OH 43212-1671  
T: 614.488.5800 F: 614.488.5801  
E: info@onewaterohio.org

**2014 Golf Chairs**

Craig Charleston, craig@360water.com  
Todd Pulsifer, tfpulsifer@columbus.gov

**Don’t Miss Ohio’s Largest Water Quality Professionals Event in 2014!**
## Register Online at onewaterohio.org

<table>
<thead>
<tr>
<th>First Name (for name badge)</th>
<th>Last Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company Name</td>
<td>Title</td>
</tr>
<tr>
<td>Address</td>
<td></td>
</tr>
<tr>
<td>City</td>
<td>State</td>
</tr>
<tr>
<td>Email</td>
<td>Tel #:</td>
</tr>
<tr>
<td>Member?</td>
<td></td>
</tr>
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</table>

### Conference Registration

<table>
<thead>
<tr>
<th>Conference Registration</th>
<th>Registration Type</th>
<th>by Aug 11 ($)</th>
<th>Begin Aug 12 ($)</th>
<th>Row Total ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Conference includes: Technical Sessions, Expo Events, Kick-Off Breakfast, Wed/Thu Lunches, and Evening Networking Events</td>
<td>Full Conference Member</td>
<td>$295 □</td>
<td>$345 □</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Full Conference Nonmember</td>
<td>$395 □</td>
<td>$445 □</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Full Conf Member Retired (not working)</td>
<td>$200 □</td>
<td>$235 □</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Full Conference Student (ID Req’d)</td>
<td>$50 □</td>
<td>$75 □</td>
<td></td>
</tr>
<tr>
<td>Wed Only includes: Technical Sessions, Expo Events, Kick-Off Breakfast, Lunch, and Evening Networking Meet &amp; Greet at Brothers</td>
<td>Wednesday Only Member</td>
<td>$170 □</td>
<td>$195 □</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wednesday Only Nonmember</td>
<td>$220 □</td>
<td>$245 □</td>
<td></td>
</tr>
<tr>
<td>Thur Only includes: Technical Sessions, Expo, Continental Breakfast, Lunch, and One Water Gala at Hilton</td>
<td>Thursday Only Member</td>
<td>$170 □</td>
<td>$195 □</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thursday Only Nonmember</td>
<td>$220 □</td>
<td>$245 □</td>
<td></td>
</tr>
<tr>
<td>Includes: Program Activities, Kick-Off Breakfast, Brothers, Hilton One Water Gala Events</td>
<td>Spouse/Guest Program + 3 Events</td>
<td>$195 □</td>
<td>$245 □</td>
<td></td>
</tr>
<tr>
<td>Includes: Program Activities Only</td>
<td>Spouse/Guest Program Limited</td>
<td>$140 □</td>
<td>$190 □</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Extra Wed Kick-Off Breakfast Ticket</td>
<td>□ x $35 each</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Extra Wed Brothers Meet &amp; Greet Ticket</td>
<td>□ x $60 each</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Extra Thu Hilton One Water Gala Ticket</td>
<td>□ x $65 each</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Preconference Workshops & Tours (select one if attending)

| Includes: Technical Session &/or Tours, Lunch, and Transportation if part of program. (10 am - 4 pm, 5 Contact Hours/PDH) | Emerging Issues for Source Water | $85 □ | $110 □ |
|______________________________________________________________________________________________________________________| Management Development Seminar | $85 □ | $110 □ |
|______________________________________________________________________________________________________________________| One Water Facilities Tour | $85 □ | $110 □ |
|______________________________________________________________________________________________________________________| Water ☐ Wastewater ☐ |
|______________________________________________________________________________________________________________________| One Water Maintenance Tour | $85 □ | $110 □ |

### Budget Options - No Food, Beverage, or Events Included

| Includes: Technical Sessions and Exhibit Expo Access Only | Wed Technical Program/Expo Only | $75 □ | $100 □ |
|______________________________________________________________________________________________________________________| Thurs Technical Program/Expo Only | $75 □ | $100 □ |
|______________________________________________________________________________________________________________________| Fri Half Day Technical Program | $50 □ | $75 □ |
|______________________________________________________________________________________________________________________| Full Technical Program Only | $200 □ | $278 □ |

## TOTAL AMOUNT DUE

Tickets will be taken for the events below.
Please check which events you plan to attend.

### FORM OF PAYMENT

- [ ] Check #
- [ ] P. O. #
- [ ] Credit Card - you will be emailed a secure link to enter your credit card payment. You or may call the One Water Conference office with your credit card number.
- [ ] I have read & agree to the One Water refund policy

Make checks payable to: Ohio WEA/AWWA 2014 and mail to:

Ohio WEA/AWWA 2014 Conference
1890 Northwest Blvd, Suite 210
Columbus, OH 43212-1671
T: 614.488.5800 F: 614.488.5801
E: info@onewaterohio.org

Ohio WEA-AWWA 2014 Technical Conference & Expo Attendee Notice of Cancellation and Refund Policy

Within 72 hours of the conference or no-shows the day of the conference will be billed in full and will not receive a refund. 72 or more hours prior to the conference will receive a 65% refund minus any credit card processing fees. 7 days or more prior to the conference will receive a full refund minus any credit card processing fees.

www.onewaterohio.org
One Water Sponsorship Levels:

Diamond ........................................ $3000
Emerald .......................................... $1500
Ruby ............................................... $1000
Sapphire ......................................... $500
Golf Hole .......................................... $250

Sign-Up options:
Online: www.onewaterohio.org
Phone: 614.488.5800
If you prefer to mail or fax a form, printable sign-up forms are available online.
Email: info@onewaterohio.org
Fax: 614.488.5801

We Invite Your Company to Join Us in Supporting the First Ever Joint Ohio Water Professionals Technical Conference and Expo
Sign Up Online at www.onewaterohio.org or call 614.488.5800

Sponsorship Recognition
❖ Event Signage
❖ Conference Program
❖ Conference Web Site
❖ OWEA & OAWWA pre- and post-Conference Magazines
❖ One Water Social Media

* Sponsors Committed as of 2/17/14
**EXHIBITOR REGISTRATION**

Register Online at [onewaterohio.org](http://onewaterohio.org)

<table>
<thead>
<tr>
<th>Company Name (as you would like listed in program)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
</tr>
<tr>
<td>City</td>
</tr>
<tr>
<td>Primary Exhibitor Responsible for Exhibit:</td>
</tr>
<tr>
<td>Email:</td>
</tr>
<tr>
<td>Company Web Site:</td>
</tr>
<tr>
<td>Signature</td>
</tr>
</tbody>
</table>

(by signing you agree to the Exhibitor Terms & Conditions and Cancellation Policy posted at [www.onewaterohio.org](http://www.onewaterohio.org))

<table>
<thead>
<tr>
<th>Exhibitor Registration</th>
<th>Registration Type</th>
<th>Cost</th>
<th>Row Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Includes One Full Conference Registration</td>
<td>Technical Conference Sessions, Expo Events, Kick-Off Breakfast, Wed/Thu Lunches, and Evening Networking Events, for primary exhibitor:</td>
<td>Exhibit Booth</td>
<td>$875</td>
</tr>
</tbody>
</table>

Add extra Booth Attendants - Max 2 Booth Attendant ($85) includes lunch on Wed & Thur, plus the Expo Social on Wed. Booth Attendant Limited ($30) allows participation in booth activities only NO FOOD OR BEVERAGE.

<table>
<thead>
<tr>
<th>Booth Attendant #1 Name:</th>
<th>Booth Attendant</th>
<th>$85</th>
<th>Booth Attendant Ltd (No F&amp;B)</th>
<th>$30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Booth Attendant #2 Name:</td>
<td>Booth Attendant</td>
<td>$85</td>
<td>Booth Attendant Ltd (No F&amp;B)</td>
<td>$30</td>
</tr>
</tbody>
</table>

One Wi-Fi Access Point avail per booth (one device). Please only select this option if you NEED onsite Wi-Fi.

Note Special Requests (subject to avail)

**Exhibitor Tour:** If you would be interested in giving a 15 minute presentation at your booth, check here: □

<table>
<thead>
<tr>
<th>Extra Wed Kick-Off Breakfast Ticket(s)</th>
<th>$35 each</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extra Wed Brother’s Meet &amp; Greet Ticket(s)</td>
<td>$60 each</td>
</tr>
<tr>
<td>Extra Thu Hilton One Water Gala Ticket(s)</td>
<td>$65 each</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ad in Conference Pocket Brochure</th>
<th>Business Card Size Ad</th>
<th>3.5 in w x 2 in h</th>
<th>$250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ad in Conference Pocket Brochure</td>
<td>Double Business Card Ad</td>
<td>3.5 in w x 4 in h</td>
<td>$500</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Add a Sponsorship to Your Registration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diamond Sponsor</td>
</tr>
<tr>
<td>Emerald Sponsor</td>
</tr>
<tr>
<td>Ruby Sponsor</td>
</tr>
<tr>
<td>Sapphire Sponsor</td>
</tr>
<tr>
<td>Golf Hole Sponsor</td>
</tr>
</tbody>
</table>

**TOTAL AMOUNT DUE**

**FORM OF PAYMENT**

□ Check #

□ Credit Card - you will be emailed a secure link to enter your credit card payment. Or you may call 614.488.5800 with your credit card number.

□ I have read & agree to the One Water refund policy

Make checks payable to Ohio WEA/AWWA 2014 and mail to: Ohio WEA/AWWA 2014 Conference 1890 Northwest Blvd, Suite 210 Columbus, OH 43212-1671 T: 614.488.5800 F: 614.488.5801 E: info@onewaterohio.org

Ohio WEA-AWWA 2014 Technical Conference & Expo Exhibitor Refund Policy

Booth Cancellations received after June 1, 2014 or no-shows the day of the Exposition will not receive a refund.

www.onewaterohio.org
EXHIBITOR CONTRACT - TERMS AND CONDITIONS

1. We hereby contract to participate in the Exhibition on Wednesday and Thursday, August 27 & 28, 2014, at the Ohio WEA-AWWA 2014 Technical Conference & Expo and agree to pay the selected registration package fee:

   Exhibit Booth Early Bird $875 (through June 26, 2014)
   Exhibit Booth Late $975 (June 27, 2014 and after)
   Booth Attendant $85 (includes lunch on Wed & Thur, plus the Expo Social on Wed)
   Booth Attendant Limited $30 (allows participation in booth activities only and NO FOOD OR BEVERAGE)

   for an 10' deep x 10' wide booth, with a draped and skirted table (6’), two chairs, carpet, wastebasket, and standard electric. Wi-Fi access (for one device) available upon request. The registration fee includes one full conference registration and admission to conference activities included in full registration for the primary booth registrant. Payment is due prior to booth assignment.

2. You may add up to two (2) additional people to work at the exhibit booth. Booth Attendant or Booth Attendant Limited must be added prior to the conference so name badges are available. Additional personnel interested in attending the social events and/or meals other than noted above must purchase tickets in advance (or at the Conference Registration Desk at the Hilton, subject to availability.) To preregister additional personnel for the full conference, register online at www.onewaterohio.org or use an “Attendee Registration Form”, available at www.onewaterohio.org, (Attendee Registration scheduled to open February 2014.)

3. We agree to all the terms of the “Liability & Responsibility Clause”, which is part of this contract.

LIABILITY AND RESPONSIBILITY CLAUSE

1. In signing this Exhibitor’s Contract, the exhibitor agrees to assume the entire responsibility and liability for losses, damages, injuries, expenses, and claims arising out of loss or damage to the exhibitor’s displays, equipment, and all other property brought upon the premises of and shall indemnify and hold harmless the OWEA, the OAWWA, the Greater Columbus Convention Center, the Columbus Hilton, and the agents, servants, and employees of each organization for any and all such losses, damages, and claims.

2. The exhibitor also agrees that the OWEA, the OAWWA, the Greater Columbus Convention Center, and the Columbus Hilton will not be responsible for any injury, loss or damage that may occur to the exhibitor, the exhibitor’s employees or property, or to any other person prior, during, and subsequent to the period covered by the Exhibitor Contract; provided said injury, loss or damage is not caused by the willful negligence or wrongful act of an employee of the OWEA, the OAWWA, the Greater Columbus Convention Center, and the Columbus Hilton and agrees to expressly release the the OWEA, the OAWWA, the Greater Columbus Convention Center, and the Columbus Hilton against any and all claims for such injury, loss or damage.

3. It is mutually agreed that it is the duty of each exhibitor to install exhibit in the assigned exhibit booth prior to 9:00 am on Wednesday, August 27, 2014 (set up times 6:00-9:00 pm on Tuesday, August 26 and 7:00-9:00 am on Wednesday, August 27, 2014); and to dismantle the exhibit no later than 4:00 pm Thursday, August 28, 2014 (tear down time 2:00-4:00 pm on Thursday, August 28, 2014).

### Exhibitor Information

| Place: | The Greater Columbus Convention Center  
400 N High St.  
Columbus, OH 43215  
(614) 827-2500 |
|---|---|
| Hours of Operation: | Expo, Wednesday, August 27, 2014: 9 am - 5 pm  
Exhibitor Social, August 27, 2014: 5 - 7 pm  
Expo, Thursday, August 28, 2014: 8 am - 2 pm |
| Shipping: |  |
| Set-up Hours: | Tuesday, August 26, 2014: 6 - 9 pm  
Wednesday, August 27, 2014: 7 - 9 am |
| Exhibit Removal: | Thursday, August 28, 2014: 2 - 4 pm |
| Booth: | 10’ deep x 10’ wide booth, with a draped and skirted table (6’), two chairs, carpet, wastebasket, and standard electric. Wi-Fi access (one device) available upon advance request. |
| Exhibitor Fees: | $875 by June 26, 2014  
$975 June 27, 2014 and later |
| You may add up to two additional people to work at the exhibit booth. |  |
| Booth Attendant: | $85 includes lunch on Wed & Thur, plus the Expo Social on Wed  
Booth Attendant Limited: $30 allows participation in booth activities only and NO FOOD OR BEVERAGE. |

Make checks payable to **Ohio WEA/AWWA 2014** and mail check with signed contract to:  
Ohio WEA/WWA 2014 Conference  
1890 Northwest Blvd, Suite 210  
Columbus, OH 43212-1671  
T: 614.488.5800  F: 614.488.5801  
E: info@onewaterohio.org

**Deadline to Register:**  
August 15, 2014

**For More Information Contact:**  
Ohio WEA-WWA 2014 Technical Conference & Expo  
1890 Northwest Blvd, Suite 210  
Columbus, OH 43212  
T: 614.488.5800  F: 614.488.5801  
info@onewaterohio.org

2014 Expo Coordinator  
Jamie Frisbey  
jamie.frisbey@dntanks.com
150+ Exhibitors, Contact Hour Tours, Lunch Wed & Thur, Wed Expo Social, OWEA & OAWWA Competitions

Exhibitor Registration
Expo: August 27 & 28, 2014
Register Online at www.onewaterohio.org

EXHIBITOR REGISTRATION
.includes Full Conference Registration for Primary Exhibitor

Exhibitor (until June 26) $875
Exhibitor (beginning June 27) $975

Extra Booth Attendant $85
Extra Booth Attendant Limited no Food/Bev $30

Registered Exhibitors as of 2/17/14

ACIARA
AllMax Software, Inc.
Alloway
American Cast Iron Pipe Company
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Jacobs Associates
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Mississippi Lime Company
Nelson Environmental Inc.
Odsie Inc. Coating & Painting
Ohio RCAP
OHWARN
Parkison
Process Control Services
Pure Technologies
Reed Manufacturing Company
REXA KOFO America
Rockwell Automation
Spectrashield Liner Systems
Sullivan Environmental Technologies, Inc.
T&M Associates
Tank Industry Consultants
The Bergren Associates, Inc.
The Henry P. Thompson Co
Trojan Technologies
UGSI ChemFeed, Inc.
Waterworks Systems & Equipment, Inc.
Wilo USA & Netzsch Pumps
Zenner USA

Exhibit Expo
Wednesday, Aug 27, 2014
- Open 9 am - 5 pm
- Lunch in Expo Hall
- Expo Social/Awards 5 - 7 pm

Thursday, Aug 28, 2014
- Open 9 am - 2 pm
- Lunch in Expo Hall

Exhibitor Recognition
- Conference Program
- onewaterohio.org
- OWEA & OAWWA Publications

Exhibitor Registration: Ohio WEA-AWWA 2014 Technical Conference & Expo
**COMPETITIONS & CHALLENGES**

**Water and Wastewater Competitions and Challenges**

- **OAWWA Water Competitions**
  - Water Tapping Contest
  - Water Taste Test Competition
  - Tops Ops Contest
  - Meter Madness

- **OWEA Operations Challenge**
  - Process Control (Tuesday)
  - Laboratory
  - Safety
  - Collections
  - Maintenance

---

**See Teams in Action Wednesday, Aug 27!**

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**OAWWA Water Competitions**

**Pipe Tapping** contest is a competition of skill in which three workers and a coach from each participating utility work against the clock to mount a tapping machine on a pressurized ductile iron pipe, tap a hole, insert a corporation stop, and attach a length of copper to a meter setting with a curb stop set at the correct angle in the middle. Each team will have 2 chances. One team from each Men’s and Women’s division with the best time overall with or without penalties wins.

**Top-Ops** is a fast-paced contest that pits teams of operators from different utilities against each other with questions in the area of water treatment. The winning team in each round will advance to the next level until a champion is determined.

**Meter Madness** challenges contestants to put together a completely disassembled meter against the clock. To make the contest more interesting, three to six miscellaneous parts are included in the bucket of meter components. Once the meter is assembled, it must operate correctly and not leak.

---

**OWEA Operations Challenge**

All teams will compete in all events. Each event will be judged and scored separately against established criteria.

**Maintenance.** Teams will be required to perform a variety of maintenance functions on a pump. There is a new pump this year and this will be the first time many of the teams will be competing on this pump.

**Collection Systems.** Teams will cut out a “cracked” section of gravity PVC sewer pipe with water circulating through it. Drill a hole in a piece of PVC pipe on a separate stand. Install a saddle connection with gaskets and two straps to represent a house connection. Cut and install the section with saddle and install the section with “flexible” repair couplings. The water tightness of the repair will be evaluated.

**Safety.** Teams will respond to an unconscious worker overcome by an unknown chemical in a manhole requiring rescue.

**Process Control.** Teams will solve problems including process control "story" problems and multiple choice theory and math.

**Laboratory.** The lab event will be a performance based seeded BOD set up. The proper steps for pH, seeding, labeling, DO on and results calculations of a seeded set will be judged on performance and speed. The steps will need to be performed from memory. Each event will be timed separately and all team members are expected to participate.

---

**Spouse/Guest Program**

**Significant Others** travelling to the 2014 One Water Technical Conference & Expo are invited to participate in our fun-intensive One Water Spouse/Guest Program! We are planning an excursion to the world-class Easton Town Center for a fulfilling day of unlimited quality shopping. Also planned is a wonderfully relaxing day at a Spa, complete with an exquisite selection of delightful pampering to choose from! Transportation provided to and from these excellent destinations and more exciting events that we have planned.

Come along with us to One Water to join the adventures. Experience Columbus in all of its glory!
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Maximizing Recycle from the New Solids Processing Facility at the Massillon Water Treatment Plant

Mike Fritz, P.E. - Aqua Ohio, Inc.
Jill Marie, P.E., Chad Roby, P.E. and Rich Atoulikian, PMP, P.E. - HDR Engineering, Inc.
Brian Bisson, P.E. - recently retired from Aqua Ohio.

INTRODUCTION

The Massillon Water Treatment Plant (WTP), owned and operated by Aqua Ohio, is a groundwater treatment facility located in Massillon Ohio, Stark County. The ultimate capacity of this WTP is 15 MGD, with an average production rate of approximately 10 MGD. The WTP is supplied by 10 wells and uses lime to remove hardness and arsenic from the groundwater. The process includes solids contact units and settling basins operating in parallel, as well as recarbonation basins, filters, and clearwells. Currently, all of the lime sludge generated is sent to a waste sludge pump station, at about 5% solids concentration, and pumped to a quarry lagoon for final sludge disposal, where the sludge dewatered and dried over time. The existing quarry lagoon is nearing capacity and cannot be expanded for future use. At the time this project was started, the lagoon had been projected to be able to continue accepting lime sludge from the WTP until late 2013/early 2014.

As a result, this project required an accelerated schedule for design and construction. In order to solve this problem and provide a reliable path forward into the future, Aqua Ohio evaluated three options:

- creating another dewatering/drying lagoon,
- utilizing belt filter presses, and
- utilizing plate and frame filter presses.

The plate and frame system was selected since it provides Aqua Ohio with a cost-effective solution for their solids disposal, and provides a cake of sufficient dryness so that it can be marketed as an agricultural supplement. Therefore, on a lifecycle basis, the plate and frame presses had the lowest cost.

Aqua Ohio then contracted HDR Engineering to design and permit its new Solids Processing Facility. Figure 1 is a process schematic which illustrates the various components of this facility and their spatial orientation with respect to each.

The new facility consists of sludge holding tanks to decant and thicken the sludge to approximately 10% followed by two plate and frame filter presses that will produce a final solids concentration of approximately 63%. The sludge holding tanks are also mixed, enabling them to provide a more consistent feed sludge to the presses. The lime solids from the presses will be conveyed to a storage facility before final commercial sale to local farmers.
PROJECT CHALLENGES AND GOALS

As noted above, since the current lagoons were reaching capacity and approaching the end of their useful life, this new sludge dewatering facility project required an accelerated schedule for design and construction. The project went into detailed design in January 2013 with the goal of bringing the new facility on line in late 2013. This compressed timeframe also presented a challenge in obtaining all the necessary permits and approvals before start of construction. Regular communications and coordination with the Ohio EPA and other regulatory agencies was necessary to permit the three new residual streams generated as a result of this project:

- decant flows from the holding tank,
- filtrate from the filter presses, and
- the final product, lime solids cake.

The following major project goals were set by Aqua Ohio:

- Provide for collection, dewatering, and disposal of all process solids generated in the water treatment facility before the existing disposal method reached capacity.
- Manage the three new residual streams, and strive to maximize the amount of water which can be safely recycled from the sludge processing facility for reuse.

RESIDUAL MANAGEMENT

As noted above, the new facility will produce three new residual streams: decant from the sludge holding tanks, filtrate from the plate and frame presses, and lime cake solids. After some initial discussions, decant from the sludge holding tanks was approved by Ohio EPA for recycle to the head of the plant, since this is a closed system.

However, handling of the filtrate from the filter presses required further investigation. The three options for the filtrate stream which were evaluated were:

- sending the press filtrate to the local sewer and Publicly Owned Treatment Works (POTW),
- discharging to a local watercourse, which could have required an NPDES permit and would have also required penetrating an existing flood protection levee, and
- recycling to the head of the plant.

The preferred option from a cost and schedule standpoint was recycling to the head of the plant so long as it met the approval of Ohio EPA. However, it is important to note that, at the time this project was being designed, there were no water treatment plants in Ohio designated as a groundwater plant which recycled press filtrate.

Pursuing the option of filtrate recycling required working closely with the Ohio EPA early in the design phase, to seek their approval and provide a rational technical basis to demonstrate this would not compromise finished water quality. The Ohio EPA’s concerns were predominantly related to how the filtrate recycle stream would affect the plant’s current source water designation and what types of materials the press would be constructed of and how it was configured. All source water must meet the guidelines in the Ohio Revised Code 3745-81-76 “Water Source Designation”. Designation of filtrate as anything other than groundwater would require the plant to meet surface water treatment rules. The issue is further complicated by the fact that plate and frame filter press manufacturers do not commonly obtain National Sanitation Foundation (NSF) approval for its materials. The Ohio Administrative Code 3745-83-01 “Operational Requirements” requires materials to have NSF approval but provides provisions for exceptions.

continued on page 34
Plate and frame filter presses are widely used in the food industry and in those instances must follow Food and Drug Administration (FDA) standards, which are comparable to the NSF 61 requirements in many respects in that both set minimum requirements for contact materials in order to control potential adverse human health effects. Aqua Ohio and HDR technical experts met with the Ohio EPA to look closely at these issues and provided detailed information on the operation of these units. After a thorough review, Ohio EPA determined that the filter press represented a closed system and would not require designation as surface water. It was also decided that meeting the FDA standard for materials was acceptable. Ohio EPA then approved recycle of press filtrate to the head of the plant. This decision resulted in life cycle cost savings to Aqua Ohio and reduced rate impacts to its customers. It also provided Aqua Ohio with a greater assurance that they could get this project commissioned within their required completion timeframe, as compared to the other two options of discharging to a local sewer or a local stream.

The third residual stream which must be managed, the dewatered lime cake, has value as an agricultural soil amendment. Aqua Ohio’s goal is to make this available commercially, which is a more sustainable solution than landfilling or continued use of quarries. However, the lime cake must have an approved Sludge Management Plan prior to commercial sale.

This project will significantly reduce the plant’s overall waste stream, providing both environmental and economic benefits. The lime sludge is currently sent to the sludge lagoon at a rate of 92,000 gallons per day (gpd) and a solids rate of 38,000 lbs/day at average plant flow. Approximately 99% of the solids will be recycled in the form of a lime soil amendment. Tank decant and press filtrate will be recycled at about 85,000 gpd and will reduce the withdrawal rate from the plant’s groundwater wells by the same amount.

INTEGRATED 3D DESIGN AND PRESS PROCUREMENT

The compressed project schedule required assembling a project design team that was up to the challenge. From Aqua Ohio, Brian Bisson and Mike Fritz provided project leadership as well as operational and maintenance optimization input. From HDR, the project was lead by a seasoned project manager and a technical lead who has designed and commissioned many similar facilities for other clients across the Midwest. Both kept the project on the right track, along with the hard work of the entire team, enabling the 100% design documents were developed in only 3.5 months. Another key team member, integral to achieving the tight schedule, was HDR’s senior 3D CAD designer who coordinated the work of all the discipline engineers and architects into a complete 3D model of the new facility.

The selection of 3D design was made at the project onset. The project team quickly realized this project was an ideal candidate for using 3D design. Integrated 3D design has many advantages from which this project benefited:

1. Changes were able to be made in the model quickly and the 2D drawings readily updated,

2. Potential conflicts were quickly identified and resolved more readily than in 2D,

3. Owner reviews were enhanced due to the ability to better envision (thru the 3D) what the final facility will look like,

4. Project team coordination was reduced since the team can view the various discipline designs within a single platform, and

5. 3D sections and layouts can be included in the construction plan set to give a comprehensive and detailed look at the design.
The fast-paced design schedule meant no time could be wasted while incorporating operational and maintenance improvements, as well as updating plans and sections from all the various disciplines as the design progressed. Uncertainty surrounding recycle options during the initial stages of the project up to about the 50% level, discussed above, meant the team had to carry each option forward far enough so as not to lose any ground no matter which option was chosen, until regulatory decisions were finalized. Changes made as a result of design team input to enhance the design, the quality management processes, and owner operation/maintenance reviews were streamlined since only the model had to be updated. This approach also provided benefits when the team was incorporating changes from the various regulatory agencies. Once the design was completed, model outputs in the form of 2D drawings were created.

The previously introduced Figure 1 illustrates a 3D overview that was included in the plan set, which shows the filter presses, access platform, sludge feed pumps, piping, etc. This overview provides a realistic representation of what the plant will actually look like when completed. Figure 2 presents a review tool used during design meetings which shows a realistic view of the plant, from the operator's perspective, which allows for a more thorough review to be conducted.

This tool also kept the design fluid enough to allow early equipment pre-procurement. Due to the short schedule, it was quickly decided that separately pre-purchasing the filter presses was necessary to complete and commission this project in time. These plate and frame filter presses have an average lead time from signing of the contract to delivery to the site of around six months. This meant that waiting until after detailed design was complete was not possible since it would subsequently delay construction completion by approximately four months.
During the design, Aqua Ohio and HDR conducted several workshops and site visits with numerous manufacturers to chart the path for getting the equipment at the right time. This meant writing a specification that would deliver the product Aqua Ohio needed and pushing the design forward based on the manufacturers being considered. A focus was placed on providing units which offered best value, from an equipment durability as well as consistent product cake dryness standpoint. The result was a cost effective and timely delivery of the presses.

The design was completed in mid-April, approximately 3.5 months following commencement of the design. Figure 3 shows the plate and frame press as it is being prepared to be shipped from the factory and Figure 4 shows the new facility under construction.
CONCLUSIONS

Due to the required fast-track nature of this project, there are a number of key items that have made it a success. This aggressive schedule required completing the detailed design, obtaining permits, and completing construction in under a year, no small feat especially given the winter season in the Massillon area! Also, the importance of working closely with Ohio EPA and providing them with timely information was key to obtaining approval to recycle filtrate. This was an added but important layer of complexity since this plant is the first to do so in the State of Ohio. Working closely with the Aqua Ohio engineering and operations/maintenance staff, combined with use of integrated 3D design and early procurement of the filter press system, kept the project on track and on budget. Mike Fritz has served as construction manager on this project. The construction of this facility is nearly complete and it will be ready for commissioning well prior to the quarry reaching capacity.

Figure 5 shows the plate and frame press installed at the Massillon facility, ready for startup, while Figure 6 shows construction of the new sludge storage tanks, with the new lime solids storage building in the background. Figure 7 shows the new facilities, near the completion of construction. The overall construction period has been about seven months, starting with a greenfield site, to getting the facility to the point of being ready to startup. In summary, the collaborative effort of the Aqua Ohio and HDR teams, working closely together, resulted in this project being designed and then construction within a very aggressive schedule, in a cost effective manner, and achieving the goals that Aqua Ohio had identified at the start of the project.
Ohio Section AWWA – Southwest District
Spring Study Session – April 26th, 2014

Open to all Water Works Personnel - Members & Non-Members of AWWA

WALK – IN
Registrations Welcome!

Saturday, April 26th, 2014
8 am to 9 am Registration
9 am to 3 pm Study Session

Registration Information:
$25 AWWA members
$35 Non-AWWA members
$40 ALL registrations after April 11th
$25 Study Guides only

Coffee, doughnuts, and soft drinks are included in the registration fee.

Objective: Prepare individuals for State of Ohio Operator Certification Exams to be held on Wednesday, May 7th, 2014.

Study Session Location
Montgomery County Environmental Services
1850 Spaulding Road
Kettering, OH 45432

Study Session Instructors
Class I Water
Keshia Kinney
City of Dayton

Class II & III Water
Richard Pohlman
GCWW (Retired)

Class I & II Distribution
Joel Cain
City of Dayton

Study guides will be provided on the day of class for all participants

Registration Form:
Name: ____________________________ (please check one)
AWWA #: ____________________________ Water I
Address: ____________________________ Water II & III
City: ____________________________ State: ______
Zip: ________ Phone: ( ___ ) ______

Water I SG Only

Water II&III SG Only

e-mail: ____________________________

Mail to:
Nicole Diak
Montgomery County Environmental Services
1850 Spaulding Road
Kettering, OH 45432

For further info or directions contact:
Nicole Diak at 937-781-2625 or
e-mail: diakn@mcohio.org
Superintendent John Chapin is shown in the water filter gallery of the New London Water Treatment plant. An American Flag was painted on the wall of one of the filters.

31st Annual OAWWA Northern Expo

Where: Wayne County Fairgrounds
199 Vanover Street
Wooster Ohio 44691

When: Thursday, April 10th, 2014

Time: Registration begins at 8:30am

For more info: Kevin Givins, Expo Chair
City of Wooster
1123 Old Columbus Road
Wooster, Ohio 44691
Phone# 330-263-5285
Fax # 330-263-5291
kgivins@woosteroh.com

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6.0 OEPA Free contact hours available.

The tour session provides a series of exhibitor experts speaking on their product or service at their booth and handouts of their education material and product information.

Hotel Reservations to be made prior to March 18th, 2014. Call (800) 654-7036.

Contact Nichole Sajdak
(1st Vice Chair, OAWWA - Southwest District)
sajdak@hazenandsawyer.com
513.469.2750
Tuesday, April 8th, 2014
Roberts Convention Centre
off I-71 at US Hwy 68
Wilmington, OH

Exposition from 8am—3pm
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• Free Coffee and Popcorn
• Free OEPA Hours
• Exhibitor Educational Tours
• Door Prizes
• Competitions

PLUS

for $10 you get a Lunch Buffet

Sign-in for Expo begins at 7:30am
Registration for free classes every 2 hours at:
7:30am for Tech Training “A” Classes (8am-10am)
9:30am for Tech Training “B” Classes (10am-noon)
12:30pm for Tech Training “C” Classes (1pm-3pm)
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Correctly Reporting Data to Ohio EPA
Starts with the Public Water System

With the requirement to electronically report sample results to Ohio EPA, it has become increasingly important to have the correct data included with the sample results. One of the most common mistakes in reporting data is having an incorrect sample monitoring point identification code (SMP ID) accompanying the sample result. If a result is submitted with an improper SMP ID, it could result in the issuance of a monitoring violation.

Correcting simple sample reporting errors after submission, takes valuable time for Ohio EPA and the certified laboratories. This often results in a notice of violation, or may even prevent the laboratory from doing the analysis. It is the public water system’s responsibility to ensure that the correct information is included with the samples they send to certified labs. In the table below you will find the two general groups of samples required for compliance (entry point and distribution) and the sample monitoring point identification codes that should be used with each individual contaminant group. Please note that this table covers only the main contaminant groups for drinking water sampling, and it is not an exhaustive list of what is required (for example, operational parameters and other monitoring requirements are not listed here).

<table>
<thead>
<tr>
<th>Entry Point</th>
<th>SMP ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrate/Nitrite</td>
<td>EP001*</td>
</tr>
<tr>
<td>Volatile Organic Chemicals</td>
<td>EP001*</td>
</tr>
<tr>
<td>Synthetic Organic Chemicals</td>
<td>EP001*</td>
</tr>
<tr>
<td>Inorganic Chemicals</td>
<td>EP001*</td>
</tr>
<tr>
<td>Dioxin</td>
<td>EP001*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Distribution</th>
<th>SMP ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>TTHM &amp; HAA5</td>
<td>DS201, DS202, DS203, etc.</td>
</tr>
<tr>
<td>Lead and Copper</td>
<td>DS000</td>
</tr>
<tr>
<td>Total Coliform</td>
<td>DS000</td>
</tr>
<tr>
<td>Asbestos</td>
<td>DS000</td>
</tr>
</tbody>
</table>

* If a water system uses multiple treatment plants or facilities, each entry point will have a unique SMP ID (for example, EP002, EP003, etc.)
Providing the correct SMP ID with your water samples will aid in proper reporting from certified laboratories on your behalf. In addition to the SMP IDs, it is helpful to provide as much information as possible about the sample location on the chain of custody or other documents submitted with water samples. At a minimum, this should include the address and a brief description of the location where the sample was taken.

Do not rely on information related to your drinking water sample data from sources other than Ohio EPA. If you have questions about sampling locations, please consult your current monitoring schedule or call Ohio EPA at (614) 644-2752.

**Rule and Guideline Changes Underway in 2014**

There are a number of rule revisions, along with revisions to our Guidelines for Design of Small Public Water Systems (better known as the “Greenbook”), coming out in 2014. You are encouraged to look over these revisions and provide comment during the interested party review periods.

The revisions to the “Greenbook” and corresponding plan approval rules in Ohio Administrative Code (OAC) Chapter 3745-91, include exemption for softeners and cartridge filters for non-community systems serving less than 250 persons, provided certain conditions are met. The proposed conditions for exemption include NSF certification of the treatment equipment; no detection for an applicable contaminant with an MCL as defined in Chapter 3745-81; and submission of certain information to Ohio EPA, including, but not limited to, the number and size of the softening units, loading rates, well capacity and method of brine disposal.

With the greater use of alternative media in treatment systems for small public water systems, the revised “Greenbook” will also include a new filter media table. The table will address generally accepted design criteria for alternative media, something that has not historically been included in previous versions.

The “Greenbook” will also be aligned with revisions to the well rules (OAC Chapter 3745-9). These rule revisions include, but are not limited to the following items:

- Add requirements and clarify new well development and pumping tests, particularly for community water systems.
- Require drillers modifying or drilling public water system wells to be registered with the Ohio Department of Health.
- Require all new public water system wells to test for a suite of parameters per the rules.
- Decrease the chemical analysis requirements for new wells serving non-community systems.
- Define non-potable well to make the rules clearer.

This is a very brief summary of some of the rule changes happening in 2014. You are encouraged to keep up-to-date by reviewing the “Announcements” located at epa.ohio.gov/ddagw/rules.aspx and signing up for electronic notices of proposed and effective rule changes at http://ohioepa.custhelp.com/c/i/documents/detail/2/subscriptionpage.

**Funding to Address Harmful Algal Blooms**

Water systems that have experienced cyanotoxins in their raw or finished water are now eligible to receive points under the public health category of the Drinking Water State Revolving Fund ranking system, with appropriate documentation. Projects that address public health issues by adding or optimizing treatment for cyanotoxin removal, or replacing a drinking water source, may be eligible for below market rate loans. For more information on drinking water loans, please visit epa.ohio.gov/ddagw/financialassistance.aspx.
Avoid Costly Monitoring Violations

On Jan. 1, 2014, the Division of Drinking and Ground Waters launched its new program to reduce total coliform and nitrate monitoring violations. Public water systems that fail to monitor for either of these two drinking water contaminants will receive a penalty of $150 or more for each monitoring violation. Any questions about the requirements should be directed to your Ohio EPA district office: epa.ohio.gov/Districts.aspx.

Surface Water Survey – Please respond!

In early 2014, Ohio EPA will survey public water systems that use surface water to determine the overall impact of algae blooms. The survey will address all potential algae impacts, including taste and odor, cyanotoxins, disinfection byproducts, and operational problems. The survey data will be used to help refine Ohio’s Harmful Algal Bloom Response Strategy and the methodology for determining algae-related watershed impairments. The information will also help raise awareness of the economic impacts of algae blooms to water systems and may help support additional funding for research, monitoring, and restoration projects. Please respond to this important survey!

Operator Certification Examination Now Offered More Frequently

Ohio EPA is pleased to announce alternative water and wastewater operator certification examinations, which are available more frequently and in more locations than Ohio EPA’s traditional paper and pencil testing. The State of Ohio has approved the Association of Boards of Certification (ABC) as a third party examination provider. Beginning Jan. 20, 2014 operators may choose to take an ABC examination and then seek State of Ohio certification for all levels except Class IV. ABC examinations will be offered in Cleveland, Cincinnati, Columbus, Dayton and Toledo. To schedule an examination or find out more about the ABC certification program, please visit ABC’s Ohio Certification website at www.abccert.org/Ohio_EPA/certification_process.asp. The application will include documentation of an operator’s experience, documentation of a passing score and a $45 application fee submitted to Ohio EPA.

<table>
<thead>
<tr>
<th>Fees for Certification Through ABC’s Ohio EPA Certification Pathway</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fees for Certification Through ABC’s Ohio EPA Certification Pathway</td>
<td>Examination Fee = $110</td>
</tr>
<tr>
<td>Ohio EPA application for Certification through an exam provider</td>
<td>Application Fee = $45</td>
</tr>
<tr>
<td><strong>Total cost for Certification through ABC</strong></td>
<td><strong>Application Fee = $45</strong></td>
</tr>
</tbody>
</table>

Ohio EPA will continue to offer traditional examinations in Columbus in the spring and fall of each year. If you have any questions, feel free to contact the operator certification unit at 1-866-411-OPCT (6728) or internet.opcert@epa.ohio.gov.
### 2014 Ohio Section Governing Board/ District Officers

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YP Committee Offers 8 Free Admissions to OneWater Conference

The Young Professionals (YP) Committee is pleased to announce an opportunity for selected YPs and Students to receive free admission to OWEA & AWWA’s Joint OneWater Conference in August, 2014 as well as a one night free stay at the Hilton Hotel in Columbus, Ohio during the conference.

Due to the joint conference, the YP Section and Student awards are slightly changed for this year. The Young Professional Award and Student Award requires the following:

To enter this competition, submit a one-page abstract on an interesting project you worked on. For operators this might be a piece of equipment or process you optimized. For students this might be a topic you studied or were involved with. For other YPs it might be a model or challenging project you worked on. Eight winners will be selected: 4 YPs and 4 Students.

In order to be considered for the award, you must meet the following criteria and/or guidelines: You must either be a young professional (35 years or younger or with less than 5 years in the industry) active in the water or wastewater industry as an engineer, scientist, plant operator or mechanic, designer, regulator, etc., or a student currently enrolled in school or graduated within the past year; you must prepare and submit to a presentation abstract (approximately one page) for a topic related to Water by April 18th, 2014. If selected for the award, you agree to provide a 30 minute presentation or develop a poster at the One Water Joint Conference in August. If you have already submitted an abstract for the 2014 One Water Conference, please submit the same abstract for consideration for the YP Award. To be considered for this award you must be either a WEF/OWEA or AWWA member.

Please submit abstract electronically at: OneWaterOhio.org

If you have any questions, please contact Alicia Adams at 740-627-0431 or Sierra McCreary at 614-473-0921

For more information on joining Water Environment Federation (WEF)/Ohio Water Environment Association (OWEA) or the Ohio American Water Works Association (OAWWA), please visit the respective websites: www.owea.org www.oawwa.org
Welcome new AWWA Members!

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David Zeleznak  
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ANNOUNCEMENTS

Chad Roby Joins Civil and Environmental Consultants

Chad Roby, P.E., recently joined Civil and Environmental Consultants (CEC) as a project manager and process engineer. Chad works within CEC’s water resources group and provides delivery of a variety of municipal and industrial and water/wastewater projects. Chad is active in AWWA including serving as the 2nd Vice Chair for the Southeast District and sits on the National Reuse Committee. Chad holds a BS and MS in Environmental Engineering and also serves as an Engineering Officer for the Army Reserve.

H. R. Gray Announces Promotion of Thomas Merritt

H.R. Gray has appointed Thomas Merritt to Vice President Business Operations. For the last 10 years, Tom has directed the firm’s communications, marketing, advertising and media strategy development, human resource and financial initiatives as Director of Business Development. In his new role, Tom will work closely with members of senior leadership at H.R. Gray and The Haskell Company to align people and business strategies while executing and growing business operations. In December 2012, H. R. Gray was acquired by Haskell – one of the nation’s leading design-build firms, headquartered in Jacksonville, Fla.

Since joining the H. R. Gray team in March 2003, Tom served in many capacities overseeing administration, marketing and business development. “Tom has more than 25 years of proven leadership experience and is recognized, both internally and externally, as a consensus builder and strategic planner,” said Steven T. Halverson, CEO of Haskell. “His remarkable organizational and team development skills, combined with his background in operations, marketing and business development, have been an important piece of the successful integration of H.R. Gray with Haskell.”

Matthew Carpenter Joins Arcadis

ARCADIS hired Matthew Carpenter, P.E. to serve as the major market manager in Ohio. Carpenter will help clients achieve their regulatory, organizational and bottom line improvement objectives.

Carpenter has a broad and varied background, having spent more than 10 years managing day-to-day utility operations and capital improvement projects such as wastewater and water treatment plant upgrades and repairs for municipalities. Additionally, he is versed in facilitating inter-governmental agreements between communities in the Dayton area.

“Matt’s diverse background and demonstrated success in municipal leadership is an ideal fit with ARCADIS’ culture of putting clients first,” said John Amend, market area leader. “He has a great track record that can be leveraged to help our clients develop tailored approaches and solutions to complex water resources challenges.”

Carpenter holds a B.S. in civil engineering and music from Ohio Northern University and is a registered professional engineer in Ohio.

Building a Valuable Partnership

Lee Supply Company, Inc., and Tyco-Grinnell have partnered to provide their customers with the best quality, service, and products in the industry. Lee Supply’s extensive inventory and supply network, coupled with the dependability of Tyco-Grinnell piping systems, fittings and accessories maximizes capability and efficiency for their customers. The mutual commitment is to bring value to their customers while reducing their total cost of ownership.

Together, they supply more that products, they supply solutions!
Elyria YWCA Presents Lynn Miggins with Achievement Award

Lynn S. Miggins, P.E., President of KS Associates, Inc., was among an elite group of women recognized by the Elyria YWCA with the 2013 Women of Achievement Award. The award was established to honor women who have made substantial inroads toward eliminating racism and empowering women. Standing out in the crowd is not new to Miggins. She was one of three females among the 200 engineering students in her class at the University of Dayton. Her career includes being the first female to have worked in the engineering department at the City of Elyria.

Since founding KS Associates, Miggins has propelled her career and her firm to the forefront of the Northeast Ohio civil engineering industry, despite the challenges associated with a historically male-dominated environment. Approximately 30 percent of KS employees are female, and women hold key technical and managerial positions at KS.

Miggins was nominated by her partner, Mark B. Skellenger, P.E., Vice President and Co-Owner of KS Associates. Skellenger has worked side-by-side with Miggins for more than 26 years, since founding the successful civil engineering and surveying firm in 1987. “Lynn invests countless hours managing important public works projects that have beneficial impacts to local communities. She is also driven in volunteering her time, talent and insight to propel initiatives aimed at growing the local economy and creating opportunities for women pursuing technical careers in engineering.”

Rick Day Deceased

Rick Day passed away on February 4. Rick started in the water profession with Montgomery County Environmental Services in 1980 as a meter reader. Rick advanced through the organization to Field Services Manager before his retirement in 2012. Rick held Class III Water Supply and Class I Wastewater Treatment Operator Licenses. During his career, Rick also served on the OTCO Board of Trustees. Rick was an avid golfer who loved being with his friends and family and will be greatly missed.

Brian Bisson Joins CT Consultants, Inc.

CT Consultants, Inc. is pleased to announce the addition of Brian T. Bisson, P.E. to its staff. Brian joins CT Consultants as a Senior Project Manager in their Water/Wastewater Division for the Youngstown Regional Office. CT Consultants is an Ohio based engineering, architecture, land surveying and construction services firm which has been providing municipal engineering services for over 90 years. CT currently has over 160 professionals in eight offices including Akron, Columbus, Delaware, Independence, Mentor, Toledo and Youngstown, Ohio and Wheeling, WV.
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CONSERVING MORE EFFICIENTLY
City of Dayton Lime Recovery Facility

Philip Van Atta, City of Dayton Water Department
David Cornwell, President, EET, Inc.

City of Dayton water plants use calcium oxide (quick lime) to soften extremely hard well water. Dayton is one of two water utilities in the U.S. that creates calcium oxide from recovered lime softening residuals. The Lime Recovery Facility, aka Lime Plant, reclaims calcium carbonate from the lime softening residuals of both water treatment plants and produces more lime for softening. Because calcium from Dayton’s well water precipitates into the lime softening residuals, more lime is produced than is consumed.

There are advantages and disadvantages related to operating the Lime Recovery Facility (LRF). Operating the LRF normally eliminates the need for purchasing lime for softening, it produces excess lime that can be sold, and it eliminates the need and associated costs for disposing of over 700,000 gallons of lime softening residuals produced by Dayton’s water plants on an average day. The disadvantages include the high labor costs for running the Lime Plant 24/7, the cost of natural gas to heat the kiln, costs for maintenance and capital improvement projects, and the large water usage for cooling water.

The Lime Recovery Facility has operators that work on shifts 24 hours per day. The Operator II position has overall responsibility for operating the plant. The Operator I is responsible for the feed end of the kiln and minor maintenance. The plant has a maintenance employees and an electrician on staff during the day. The plant supervisor oversees 24/7 operations, ensures that Dayton’s water plants receive sufficient lime for water softening, sells excess lime to other water systems, and coordinates importation of lime sludge.

Both of the City of Dayton’s water treatment plants pump calcium carbonate/magnesium hydroxide lime softening residuals to our Lime Recovery Facility (LRF). The LRF is located next to the Ottawa Water Treatment Plant. At the LRF, carbon dioxide produced by the lime recalcination process selectively dissolves and separates magnesium from the lime softening residuals. Then, relatively pure calcium carbonate is dewatered in centrifuges and pumped into a rotary lime kiln.

During the recalcination process in the kiln, heat at approximately 2000 degrees F converts the calcium carbonate into calcium oxide and carbon dioxide. The carbon dioxide is used for carbonation of lime softening residuals. The final product of the recalcination process is calcium oxide. The Lime Recovery Facility produced over 23,000 tons of lime in 2012.

Calcium oxide, in a pebble form, is conveyed pneumatically from the LRF to the adjacent Ottawa Water Plant. Because lime is easily conveyed to the plant, the Ottawa Water plant has only approximately 80 tons of calcium oxide storage capacity. An LRF employee drives a dedicated truck to the Miami Water Plant on a daily basis during the week and on weekends as needed. The Miami plant has a storage capacity of approximately 740 tons of calcium oxide. At the water plants, the calcium oxide is mixed with water in slaking machines to create calcium hydroxide for water softening.

To prepare for Ohio EPA’s adoption of NSF/ANSI Standard 60 requirements for water additives, Dayton completed all NSF International requirements to allow Standard 60 certification of Dayton Lime (calcium oxide). To comply with certification requirements, Dayton submitted a Lime Plant Quality Control Plan, a complete description of the recalcination process, NSF certification paperwork, and made arrangements for audits, sampling and NSF testing of the calcium oxide. After testing and toxicological evaluation, Dayton Lime received Standard 60 approval for lime softening.
and pH control in 1997. To comply with NSF requirements and to ensure good product quality, Dayton’s Water Quality Laboratory maintains annual NSF certification, and oversees testing by Lime Plant operators and Dayton’s Water Quality Laboratory analysts.

LIME RECOVERY FACILITY PROCESS

The Lime Reclamation Facility (LRF) receives lime softening residuals that are pumped from the Ottawa and Miami water treatment plants (WTP). The Miami Water Plant Operator I calls the Lime Plant Operator I before lime sludge transfer is started. Ottawa Water Plant lime sludge pumping is normally continuous but the water plant operator communicates any changes to the Lime Plant Operator II.

The sludge pumps at the Miami Water Plant are operated from the chemical feed room at the water plant. The lime sludge is normally pumped from two to four hours each shift. Sludge pumping is followed with 30 minutes of potable water flushing to clear out the line. Sludge pumped from the Miami Water Plant travels approximately two miles to reach the Lime Plant. Lime sludge pumped through a pipeline from the Ottawa Water Plant combines with Miami Water Plant sludge in a pipeline just west of the Lime Plant.

At the Lime Plant, lift pumps convey lime sludge into one or both of two 65,000 gallon carbonation basins. In these basins, the pH of the lime sludge is reduced to solubilize magnesium hydroxide and allow it to be separated from the calcium carbonate. Carbon dioxide that is blown from the kiln is applied to the basins to provide the pH reduction. The pH is normally lowered to the 8.0 to 8.5 range.

After the carbonation stage, the sludge enters the two 65-ft gravity thickeners where the residuals are thickened. The thickener overflow is discharged to an L-shaped to allow settling before the flow is discharged to the Mad River. This overflow water is sampled to ensure compliance with an NPDES permit.

continued on page 60
The thickener underflow is pumped to the sludge storage tanks. Two sludge storage tanks provide equalization and mixing before the sludge is pumped to the expansion chamber. The 30-ft diameter sludge tanks have liquid depths of about 19 feet providing approximately 100,000 gallons of capacity each. The mechanical mixing provides constant solids loading to the centrifuges by creating a homogeneous residual stream.

Sludge is pumped from the sludge storage tanks to the expansion chamber where it is heated to about 90 degrees Fahrenheit. Then, sludge is pumped into one of two centrifuges. One of the centrifuges serves as a backup unit. Data from 2009 indicates that sludge entering the centrifuge is about 21 percent solids at flows that were usually between 90 and 100 gallons per minute. The centrate stream, one of the two effluent streams from the centrifuge, consists of the excess water removed from the influent stream and is usually around 0.5 to 1 percent solids. The thickened calcium carbonate, called “cake”, from the centrifuges is relatively consistent in solids concentrations. On average the cake has a 69 percent solids concentration.

The cake is pumped by a moyno pump through a three inch diameter line into the kiln. Chains inside the kiln, near the feed end, help distribute the sludge and transfer heat. The kiln is 265 feet long, 9.5 feet in diameter, and is lined with fire brick for insulation. A four speed, 100 HP electric motor drives the kiln. If electrical power is lost, a backup gasoline powered engine can be used to move the kiln and prevent warping caused by the uneven application of high temperature.

As the kiln rotates at 1 rpm, heat converts the sludge to pebble lime (calcium oxide) and carbon dioxide leaves the kiln through the feed end. The kiln is sloped downward ½ inch per foot from the feed end to the firing end. It takes approximately one and ½ hours for material to travel through the kiln.
Near the firing end, pebbles of calcium oxide fall out of the kiln and enter cooling tubes. Stainless steel flights that are inside the tubes channel the finished product to exit ports where it falls onto a vibrating screen that has one inch openings. The vibrating screen segregates the pebble lime from large chunks. The pebbles fall through the screen and large chunks are carried to a reject dumpster.

Screened pebble lime is moved by a screw conveyor to a bucket elevator. The bucket elevator carries lime into two storage silos. One silo, with a capacity of approximately 550 tons, is used to store lime that is loaded into a truck that delivers lime to the Miami Water Treatment Plant or lime that is loaded into contractor's trucks for delivery to lime purchasers. The larger silo, which has a capacity of approximately 750 tons is used to store lime that is pneumatically transported to the adjacent Ottawa Water Treatment Plant. Dust from the pneumatic feed system at the large calcium oxide storage silo is captured and retained in barrels. These barrels are removed by a contractor for free because they have found a beneficial use for the calcium oxide dust.

A natural gas burner with a capacity of 60,000 CFH is used to heat the kiln to approximately 2000 degrees F at the firing end of the kiln. A blower provides primary air for combustion. Secondary air enters the kiln through the cooling tubes. Temperatures at the feed end of the kiln are approximately 400 degrees F. Temperature control is essential for producing good quality calcium oxide. If the temperature is too high the final product is hard and slaking reactions are slow. If the temperature is too low the final product will be soft and have a low percentage of calcium oxide.

The kiln has a dust controller system that is monitored by the Regional Air Pollution Control Agency. Exhaust air, containing large quantities of lime dust, is pulled out of the feed end of the kiln by blowers. Before October 2012 a wet scrubber system removes the dust and the wastewater enters the sanitary sewer. This wastewater contained large concentrations of calcium carbonate. A new exhaust system was installed in October 2012. This system has a venturi and cyclone dust removal system before the kiln exhaust air enters the exhaust stack. Modifications to improve this system are scheduled to take place in June 2013.

Dayton has investigated potential routing of this waste stream to the L-shaped lagoon. Unfortunately, it appears that this alternative could cause NPDES compliance problems. The L-shaped lagoon overflow goes to the Mad River and the extra solids would require increased excavation of solids to prevent suspended solids from reaching the outfall. During normal plant operations water overflowing the thickening basins enters this lagoon. The solids in this lagoon are excavated every two years and transported to a lagoon that is approximately ½ mile from the Lime Plant, near the Findlay Street interchange of Ohio Route 4.

The Lime Reclamation Facility is taken out of service twice per year, usually for seven to ten days, for major maintenance and repair projects. Lime Plant staff build up storage inventories at the Lime Plant and water plants to prevent the need to purchase lime from vendors during the shut down periods. When the Lime Reclamation Facility is out of service, lime softening residuals from both water treatment plants are pumped to a lagoon near State Route 4, approximately ½ mile from the Lime Plant.

A large quantity of lime softening residuals and other lime plant or lime softening related materials have built up in this lagoon over the years. Solids, primarily calcium carbonate/magnesium hydroxide, are dredged from the Route 4 lagoon by a contractor and applied to farmland for pH adjustment of soil. When the Route 4 lagoon is overflowing to the Mad River, Dayton Water Quality Laboratory employees perform required NPDES testing of the water for pH, total chlorine, and suspended solids.

Central WQ Laboratory employees also perform quality control testing of the lime plants feed material before and after thickening (slurry and cake), reject water from the centrifuges, and the finished calcium oxide. Tests performed include; slaking to measure the rise in temperature, calcium oxide percentage, insoluble material percentage, and metals analysis. Lime Plant operators perform slaking and calcium oxide percentage tests at least twice per shift to determine finished product quality. For process control, operators also perform total solids testing for slurry and cake, and pH analysis for the thickener basin water.
LIME RECLAMATION REACTIONS

The following information summarizes reactions that occur during carbonation of sludge and recalcination. Carbonation removes magnesium hydroxide (Mg(OH)2) from lime softening residuals (CaCO3/Mg(OH)2) before lime recalcination occurs.

\[
\text{Mg(OH)}_2 + 2\text{CO}_2 \rightarrow \text{Mg(HCO}_3\text{)}_2
\]

(solid) (liquid)

After magnesium is removed, relatively pure calcium carbonate (CaCO3) is thickened and heated to 20000 F in a rotary kiln. The lime product (CaO) is used for lime softening. The carbon dioxide (CO2) is used for carbonation of lime softening residuals.

\[
\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2
\]

heat

2. LIME PLANT IMPROVEMENT AND EXPANSION PROJECTS

When necessary, replacement of kiln brick and other repairs are completed during scheduled maintenance shutdowns of the Lime Plant. The Lime Plant’s expansion chamber was replaced during a plant shutdown in November 2011. The Lime Plant’s exhaust system and dust scrubber system were replaced during the fall shutdown in 2012. Operation control improvements through SCADA were completed in 2012. These improvements included optimization of feed end controls and the burner management system.

The City of Dayton sells some calcium oxide to other water systems for lime softening and occasionally contracts with a broker to sell excess lime to other users. In 2010 Dayton contracted with Environmental Engineering and Technology (EE&T) to optimize Lime Plant Operations and to investigate the potential use of other water system’s lime softening residuals so that Dayton could increase production in the lime kiln. Increased production would optimize the energy efficiency of the kiln.

EE&T assisted in several areas to evaluate expansion of the kiln. One of the main tasks was to determine the capacity of the kiln and costs associated with operating at higher production of lime which of course would be offset by lime sales. To help determine the kiln capacity, CFD modeling was used along with mass balance of heat and moisture. This allowed for estimating the capacity at 150 TBD lime and also provided gas use information at higher productions. An example of CFD modeling of the kiln’s temperature is shown in figure A. Figure B similarly shows the conversion of CaCO3 down the length of the kiln into CaO. This type of modeling allowed the capacity of the kiln to be determined as well as to project the operating parameters (e.g. gas use) at different production capacities. The kiln capacity was projected to be between 150 and 160 TBD of CaO. Since the plant was producing an average of 65 TBD, there was opportunity to increase the kiln’s production by partnering with neighboring utilities.

Dayton’s abundant water supply and capacity in an effort to attract new companies that would use large amounts of water. In 2010 EE&T and the City of Dayton began a new evaluation to determine ways to increase the throughput of the kiln.

Dayton’s Lime Plant capacity is 150 tons per day (TPD). Lime production is directly tied to water production. When auto manufacturing plants and suppliers closed down around 2007, Dayton’s water production rate decreased dramatically. Dayton’s Economic Development and Water Department staff began a campaign to market
Figure A. CFD Modeling of the Kiln's Temperature

*Inside wall and bed temperatures are predicted to increase for 100 spd and 150 spd*

Figure B. CFD Modeling of Conversion of CaCO3 to CaO in the Kiln

*continued on page 64*
Next a detailed cost model was developed that incorporated expenses for importing lime residuals from other utilities, increased operating and maintenance costs, increased fuel - which is a major expense for kiln operation, and capital costs for improvements to receive and handle the imported residuals as well as adding additional redundancy to the LRF. The optimal cost point was to increase the lime production to 125 TBD, or to produce approximately 60 TBD more than the 2010 production rate that relied solely on residuals from Dayton's water plants.

The next major aspect was to locate facilities within a reasonable distance that have lime residual stockpiles - generally in lagoons. The utilities could excavate the sludge and bring it to the Dayton kiln facility rather than paying for disposal. The utility would save money on its haul and disposal as well as purchasing lime from Dayton at a reduced cost. Several utilities were located that were a reasonable distance from Dayton and have lagoons that require regular cleaning.

In 2011 Dayton began collecting and evaluating the quality of other water system's lime softening residuals that could potentially be used in its kiln. These residuals were selected based on relatively high calcium and low magnesium concentrations, and the absence of inorganic coagulant residuals. Alum or ferric coagulants create a residual that would produce poor quality quicklime in Dayton's kiln.

Water Quality Laboratory employees processed the acceptable "outside" lime residuals and performed bench scale recalcination experiments in a muffle oven. The calcium oxide produced by these experiments was sent to the NSF laboratory for quality testing and approval. NSF granted approval in December 2011 and these lime softening residuals were used in a thirty day trial at our Lime Recovery Facility that was took place in March and April 2012.

To prepare for the trial Dayton's WQ Lab developed new testing protocols for operators and lab staff. The laboratory increased the testing capabilities of the Lime Plant's process control laboratory, and worked day and night shifts during the trial. Many of the tests were completed within minutes after samples were collected. A large number of additional samples were collected for extensive metals testing at the Central WQ Laboratory. The WQ Laboratory also conducted training sessions for Lime Plant operators to show them new, expeditious testing methods for lime residuals and calcium oxide (quicklime) testing. Dayton's Research and Control Specialist was the project coordinator.

During the trial lime residuals from Troy and Middletown lime lagoons were trucked to Dayton's lime plant. Tanker trucks pumped the residuals into frac tanks to allow mixing with water to a concentration between 10 and 15 percent. This ensured that the residuals could be adequately carbonated to allow selective dissolving and removal of magnesium hydroxide. The imported residuals were pumped into the south carbonation basin to allow careful monitoring. Dayton's water plant residuals were pumped into the north carbonation basin. All residuals were eventually mixed together in equalization tanks before the material was pumped to the feed end building of the Lime Plant.

A variety of problems were encountered during the trial; inconsistent solids percentages for the imported residuals, equipment breakdowns, pipe clogging issues, unexpected ingredients (sand and wooden boards), trucking issues, etc. However, staff responded in a heroic manner and a huge quantity of high quality lime was produced. Every bureau in Dayton's Division of Water Supply & Treatment Division was involved in this project. Employees from Dayton's Water Utility Field Operations Division and the Wastewater Plant provided valuable assistance to ensure the success of the project. The trial was scheduled for 30 days but actually ran for 35 days. During the trial 318 truck loads delivered 2,393 dry tons of residuals, and 1000 tons of additional calcium oxide was produced. Dayton sold 13 truck loads of lime to the suppliers of the lime softening residuals.
In August and September of 2012, Ottawa Water Plant and Lime Plant employees worked together to repair long abandoned receiving and thickening basins to use for the importation of lime softening residuals from the City of Troy. The thickening basin was last used during a brief period after a major Lime Plant improvement project was completed in 1989. Use of this basin eliminated the need to rent frac tanks for receiving lime residuals pumped from tanker trucks as was done during the March/April 2012 project.

The basins were cleaned, thickener rake drive motors were repaired, and the system was tested. This equipment was used in early October 2012 to process 3,000,000 pounds of lime softening residuals. Trucks pumped lime residuals into a receiving basin where it was mixed with water before flowing into the primary thickener basin. A diesel pump was used to pump residuals from this basin to the carbonation basins for processing. Lime residuals from Dayton’s water plants mixed with imported residuals in the primary thickener or the carbonation basins. Thickened, purified calcium carbonate was pumped into the kiln to create calcium oxide. This project was short term but resumed in February 2013 on a long term basis.

The City of Dayton is working on long term contracts with other cities that involve importation of suitability lime residuals to produce calcium oxide that will be sold to the suppliers of the residuals. Due to the success of the residuals importation projects and sales of lime to various systems, the plant was named by the plant supervisor as The City of Dayton Regional Lime Facility.
Berkeley Springs International Water Tasting 2014 Winners

BERKELEY SPRINGS, WV – It was a battle of titans at the 24th annual Berkeley Springs International Water Tasting. The best tap water in the world hailed from Clearbrook, British Columbia where they get to add a third gold medal to their collection. The gold medal winner in the USA was Santa Ana, CA which moved up from a silver medal in 2012 and beat out four previous gold medalists. Greenwood, BC, Canada won the bronze. Tied for fourth were Dickinson, ND and Montpelier, OH while 2013’s winner, Emporia, KS placed fifth. All but one of the six top rated municipal waters had won at Berkeley Springs before.

The importance of a commitment to excellence in providing drinking water was underlined by the selection of Dian Taylor, CEO and President of the award-winning Artesian Resources of Delaware as the 2014 Lifetime Achievement award. Artesian is a public water provider to more than 300,000 customers in Delaware and Maryland.

“The consistency in winners from year to year with different panels of judges validates the choices,” remarked perennial watermaster, Arthur von Wiesenberger. “It also speaks to the impressively high caliber of the waters entered.”

Castle Rock Water from Dunsmuir, CA won over 32 other entries for the title of world’s best bottled water. Two waters were tied for the silver medal: Eldorado Natural Spring Water, Eldorado, CO and first time entrant, Samaria Natural Springs Water, Crete, Greece. The bronze medal went to Mountain Drop from Linthicum, MD bottling local Berkeley Springs water. The silver was a tie between Indigo H2O, Elkhart, IN and Bar H2O, Richmond, MI. Berkeley Springs water entered under its own name of Berkeley Springs Purified Water won the bronze tied with January Springs, Barnston QC, Canada.

“Adding Tanzania gave us all six continents.”

“Adding Tanzania gave us all six continents.”

It was another wonderful year for the longest running and largest water tasting in the world,” said von Wiesenberger. “Berkeley Springs is the granddaddy of them all.”

The crowd was interested in the peoples’ choice packaging competition where it was their votes that chose which of the 13 entrants was the most alluring. Hallasu’s long sleek bottle was the overwhelming favorite and representatives of the Republic of Korea company were on hand to accept the reward. The silver medal also went to Asia won by the tiny egg-shaped bottles of Bama Tianshou Spring, Bama, China. The turquoise four-sid-
ed bottle from Waiakea, Kea’au Aquifer, HI won the bronze. Both fourth place winner, Cerebellum H2O, Hoboken, NJ and fifth place Marvelus Sparkling Mineral Water, Ocala, FL were on hand to accept the strong votes of the crowd.

Conclusion of the daylong water tasting is the famed “water rush” where the audience is invited to take home hundreds of bottles of water sent as part of the judging. “I spent about six hours arranging all the waters in a display,” said Jeanne Mozier, an event founder. “The crowd spent less than ten minutes making it all disappear. It's like a Tibetan sand mandala,” she laughed. “I was pleased to see our favorite couple from Brooklyn in the rush. Peter and Cynthia Lloyd come every year especially for the water tasting – and the rush.”

The ten media judges selected by Klein Rone included representatives from various regional and national media including television and online magazines. They were instructed by von Wiesenberger to look, sniff and taste each water under guidelines similar to those in a wine tasting. The waters were rated for each attribute including appearance (it should be clear - or slightly opaque for glacial waters), aroma (there should be none), taste (it should taste clean), mouth feel (it should feel light), aftertaste (it should leave you thirsty for more). Waters were tasted in four separate flights over two days.

**BEST MUNICIPAL WATER 2014**
Best in the World – Clearbrook, BC, Canada
Best in USA – Santa Ana, CA
2nd – Hamilton, OH
3rd – Greenwood, BC, Canada
4th (tie)– Dickinson, ND & Montpelier, OH
5th – Emporia, KS

**BEST BOTTLED WATER 2014**
1st – Castle Rock Water, Dunsmuir, CA
2nd – Eldorado Natural Spring Water, Eldorado, CO
Samaria Natural Springs Water, Crete, Greece
3rd – Mountain Drop from Linthicum, MD bottling Berkeley Springs water.
4th – Avita Premium Artesian Alkaline Water, Roscommon, MI
Element, Vrnjaca Banja, Serbia
Best Sparkling – 2014
1st – Canadian Gold Sparkling Mineral Water, Marchand, MB, Canada
2nd, Jackson Springs Natural Premium Spring Water, MB, Canada
3rd – Antipodes, Whakatane, New Zealand
4th – Tesanjski Dijament, Tesanj, Bosnia
Naked Luxury Artesian Water, Bay of Plenty, NZ
Tesanjski Kiseljak, Tesanj, Bosnia

**BEST PACKAGING – 2014**
1st – Hallasu, Republic of Korea
2nd – Bama Tianshou Spring, Bama, China
3rd – Waiakea, Kea’au Aquifer, HI
4th – Cerebellum H2O, Hoboken, NJ
5th – Marvelus Sparkling Mineral Water, Ocala, FL
Best Purified Drinking Water – 2014
1st – Mountain Drop from Linthicum, MD bottling Berkeley Springs water.
2nd – Indigo H2O, Elkhart, IN
Bar H2O, Richmond, MI
3rd – Berkeley Springs Purified Water – Berkeley Springs, WV
January Springs, North Hatley, QC, Canada.
4th – Rain Fresh Oxygen-Rich Purified Water – Garland, TX

**Congratulations to two returning Ohio “Best Municipal Waters”**
2nd Place - City of Hamilton
4th Place - Village of Montpelier
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☐ Mr.  ☐ Ms.  ☐ Mrs.  ☐ Dr.
Name _______________________________________________________
Title _______________________________________________________
Company Name ______________________________________________
Is your company a member of AWWA?  ☐ Yes  ☐ No
Company Member number (if known) ___________________________
☐ Home  ☐ Business
Address _____________________________________________________
City _______________________________________________________
State/Province __________ ZIP/Postal code _____________ Country _____
Phone  ____________________________________________________
Email  _____________________________________________________
Were you referred by an AWWA member?  ☐ Yes  ☐ No
Referring Member_____________________________________________
Member # (if known) __________________________________________

Section 2 Payment

Annual Dues—Section 3A  $________________________
Section Assessment*—Section 3B  $________________________
Additional Section Option*—Section 3C  $________________________
Total  $________________________
*If applicable

Payment Method
☐ Check enclosed
☐ American Express  ☐ MasterCard
☐ Discover  ☐ Visa
☐ (make payable to AWWA, US currency only, drawn from a US bank)
Card Holder Name ____________________________________________
Card Number ________________________________________________
Expiration Date ______________________________________________

Your membership will be activated when payment is received.

Section 3A Annual Dues

☐ Individual Active $174
An individual, such as a water utility employee, municipal official, public
health professional, engineer, scientist, educator, consultant, or other
person interested or serving in the field of water supply. (02)

☐ Young Professional $99
A special discount for first-year dues for individuals interested or serving
in the field of water supply, who are age 35 or younger, or new to the water
industry. (YP2014)

☐ Operations/Administrative $72
An individual employed in any operating or administrative position
by a water utility that has 1,000 or fewer service connections or any
employee below the supervisory level in a utility that has more than
1,000 service connections. (06)

☐ Student $25
A student enrolled in a minimum of nine credit hours (or the equivalent)
of accredited classes. (14)

Signature________________________________________ Date________

By signing this application, you certify that you have selected the appropriate
membership category.

Section 3B Section Assessments

AWWA has 43 local Sections in North America. You are automatically enrolled
in a Section based on your address. Some Sections require additional fees
to better serve their local members. The Section assessment is required if your
address is located in one of the following areas:

<table>
<thead>
<tr>
<th>Your State/Province</th>
<th>Individual/Young Professional</th>
<th>Operations/Administrative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alaska, Colorado, Minnesota, Missouri, New Mexico, North Carolina, Ontario, Wyoming</td>
<td>$9</td>
<td>$4</td>
</tr>
<tr>
<td>Alberta, Arizona, Illinois, Kentucky, Manitoba, North West Territories, Saskatchewan, Tennessee, Texas, Wisconsin</td>
<td>$17</td>
<td>$7</td>
</tr>
<tr>
<td>Florida, Georgia, Indiana, Iowa, South Carolina</td>
<td>$35</td>
<td>$14</td>
</tr>
<tr>
<td>California, Maine, Massachusetts, Nevada, New Hampshire, Rhode Island, Vermont</td>
<td>$70</td>
<td>$29</td>
</tr>
</tbody>
</table>

In addition to your Section membership, you may join other AWWA sections.
There is a $33 multi-section fee, plus the assessment fee for the second section.
Please call 1.800.926.7337 for more information.
Section 4 Tell Us About Yourself

All applicants must complete this section.

What one business activity best describes your company? (Please check only one)
- A Public Water Supply Utility—Municipally Owned
- B Public Water Supply Utility—Investor Owned
- C Government—Federal, State, Local
- D Consulting Firm
- E Contractor
- F Private Industrial System or Water Wholesaler
- G Manufacturer of Equipment & Supplies (including representatives)
- H Distributor of Equipment & Supplies (including representatives)
- I Educational Institutions (faculty & students), Libraries and other related organizations
- J Fully Retired
- K Research Lab
- L Other allied to the field (please specify) ________________________

What one category best describes your job title? (Please check only one)
- A Executive (General Manager, Commissioner, Board Member, City Manager, Municipal Superintendent, Mayor, President, Vice President, Owner, Partner, Director, etc.)
- B Management/Non-Engineering (Division Head, Section Head, Manager, Department Head, Comptroller, etc.)
- C Design and Engineering/Both Managerial and Non-Managerial (Chief Engineer, Civil, Mechanical, Electrical, Environmental, or Field Engineer, Planning Manager, System Designer, etc.)
- D Scientific/Non-Managerial (Chemist, Biologist, Biophysicist, Researcher, Analyst, etc.)
- E Purchasing (Purchasing Agent, Procurement Specialist, Buyer, etc.)
- F Operations (Foreman, Operator, Maintenance Crewman, Service Representative, etc.)
- G Marketing & Sales/Non-Managerial (Market Analyst, Marketing Representative, Salesperson, Sales Representative, etc.)
- I Professional (Educator, Teacher, etc.)
- Z Other (please specify) _____________________________________

What one category best describes your field served/principal activity? (Please check only one)
- 9 Both Water Supply & Wastewater
- 5 Water Supply Only
- 7 Wastewater Only
- 3 Other

What areas of the water and wastewater industry are of current interest to you? (Please check all that apply)

- Asset Management
- Backflow/Cross Connection
- Climate Change
- Conservation/ Efficiency
- Customer Service
- Desalination
- Design/Construction
- Distribution/Plant Ops.
- Drought
- Emergency Preparedness/Security
- Groundwater
- Laboratory
- Membrane Treatment
- Public Health
- Public Info./Communications
- Regulatory Issues
- Reuse
- Small Systems
- Stormwater
- Training/Career Development
- Utility Management
- Wastewater
- Water Loss
- Water Quality/Treatment
- Water Research
- Water Resources/Planning
- Workforce Strategies
- Young Professionals

Dues and Section assessment rates valid through December 31, 2014. Dues are not deductible as charitable contributions for income tax purposes. The following is for USPS periodical mailing requirements only. In some AWWA Sections, a portion of the Section allotment equal to 50% or more of the domestic subscription rate charged for the Section periodical will be allocated toward a subscription to that periodical. Allocation for each publication recipient authorized—Journal - American Water Works Association—$50; Opflow—$16. Members with APO/FPO addresses will receive e-periodicals only. Print periodicals may be purchased for an additional fee. NOTE: Members’ phone numbers and email addresses are protected under AWWA’s Privacy Policy.
Ohio Department of Health
Fluoridation Assistance Program

How is your fluoride metering pump performing? Is your ISE test meter working? Do you need a new fluoride or reference electrode? Are you interested in implementing community water fluoridation in your system?

About 92% of Ohioans who are served by public water systems enjoy the benefits of fluoridation. However, nearly 820,000 Ohioans on public water systems do not receive optimally fluoridated water. In addition, almost 340,000 children in Ohio have never been to the dentist. Community water fluoridation is the cornerstone of any preventive dental program because it is the most equitable and economic way to prevent dental decay. Research shows that fluoridation can reduce cavities by about 25% and it is effective in both children and adults. The evidence supporting fluoridated water’s effectiveness has been building for many years and recent studies support earlier findings.

The Oral Health Section of the Ohio Department of Health (ODH) promotes fluoridation and provides technical assistance to public water systems that adjust fluoride levels to the optimum level necessary for the prevention of tooth decay. For over 30 years, ODH administered a program to assist water systems by reimbursing some or all of the costs to purchase new or replacement fluoridation equipment and/or supplies. Federal funding was terminated for this program in 2012. However, thanks to the generosity of the Delta Dental Foundation, the ODH continues to assist water systems through the Fluoridation Assistance Program.

Costs associated with the start-up and maintenance of community water fluoridation are eligible. ODH will help communities of any size using the following guidelines to determine the level of reimbursement to be made:

<table>
<thead>
<tr>
<th>Initial or Replacement Equipment</th>
<th>Population</th>
<th>Reimbursement Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Installation of Fluoridation System (systems which have not previously fluoridated)</td>
<td>Any</td>
<td>100% May include a portion of fluoride compound for year 1</td>
</tr>
<tr>
<td>Replacement Equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,000 - 5,000</td>
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<td>90%</td>
</tr>
<tr>
<td>5,001 - 15,000</td>
<td></td>
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<td>25,001 - 50,000</td>
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<td>60%</td>
</tr>
<tr>
<td>Over 50,000</td>
<td></td>
<td>50%</td>
</tr>
</tbody>
</table>

The Fluoridation Assistance Program will not provide reimbursement for capital costs; taxes; freight, shipping and handling; or redundant systems (i.e., back-up equipment).

Communities interested in applying for funding through the Fluoridation Assistance Program can access the program guidelines and application materials at: http://www.odh.ohio.gov/odhPrograms/ohs/oral/oralprev/reimbprg.aspx.

Contact Theresa Bonn, Oral Health Section, with any questions: Theresa.Bonn@odh.ohio.gov (614) 466-4180
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Since 1933, you’ve trusted Gorman-Rupp to manufacture the best-performing, most durable pumps in the industry. Easy to specify, purchase and install, ReliaSource® systems come precisely engineered and completely tested by a company that has been building complete pumping stations for over 40 years.

Carefully inspected, they carry an industry-leading warranty. And, most importantly they carry the Gorman-Rupp name - giving you the confidence that your pumping system will stay on the job so you don’t have to.

QUALITY ENGINEERED RELIACSOURCE® LIFT STATIONS DISTRIBUTED BY:

For Northern & Central Ohio Contact:

The Craun Liebing Company
CRAUN LIEBING COMPANY
11801 CLIFTON BLVD. CLEVELAND, OH 44107
PH: 216.228.7800  FAX: 216.228.7995  www.craunliebing.com

For Southern Ohio Contact:

SOUTHERN SALES COMPANY, INC.
3316 SANDER DR. JEFFERSONVILLE, IN 47130

RELIACSOURCE™
The Gorman-Rupp Company
P.O. BOX 1217  MANSFIELD, OHIO 44901-1217  USA
419.755.1011  GRSALES@GORMANRUPP.COM  GRPUMPS.COM

Gorman-Rupp - Mansfield Division is an ISO 9001:2008 and an ISO 14001, Registered Company.
2014 National Conferences

Mar 30 - Apr 2
Denver CO - Sustainable Water Management

Apr 7-9
Charleston, SC - Financial Management

Jun 8-12
Boston, MASS - Annual Conference and Exposition

2014 Specialty Conferences

Jul 15
Water Distribution Workshop

Aug 21
Canton Hall of Fame Drinking Water Workshop

Nov 5
Safe Drinking Water Act Seminar

(6 Contact Hours Each)

2014 State Water Tests

May 7
Water I / II / III, Water Distribution I / II

Nov 6
Water I / II / III, Water Distribution I / II

Deadline for application August 8

2014 Review Sessions

Northeast District
Apr 26, Oct 25

Northwest District
Apr 26, Oct 25

Southeast District
April 21, Oct 20

Southwest District
April 26, Oct 25

2014 Joint AWWA - Ohio WEA Conference and Exposition
August 26-29, 2013, at the New Hilton Columbus Downtown and Greater Columbus Convention Center

District Conferences (Contact Hours TBA)

Northwest District Meetings
Apr 11
Northern Expo/ Meter Madness

Apr 17
Village of Paulding

Jul 17
TBD

Oct 16
City of Bryan

Southwest District Meetings
Apr 3
Joint SE/SW Expo - Deer Creek

Apr 8
Southern Expo/ Meter Madness

Jul 18
Raymond Memorial

Oct 17
City of Westerville

Northeast District Meetings
Apr 11
Northern Expo/ Meter Madness

May 1
TBD

Aug 21
Hall of Fame Canton

Oct 2
City of Avon Lake

Southeast District Meetings
Apr 3
Joint SE/SW Expo - Deer Creek

Apr 8
Southern Expo/ Meter Madness

Jul 10
Raymond Memorial

Nov 20
City of Westerville

The Ohio Section Newsletter is the newsletter of the Ohio AWWA, published three times a year. Send comments, news notes, glossy / digital photos, and articles to:

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Deadline for material to be in the 2014 newsletters are:

Summer Issue - May 2 - Target mailing week of Jun 23
Winter Issue - Oct 3 - Target mailing week of Dec 8

Disclaimer: The ideas, opinions, concepts, procedures, etc. expressed in this publication are those of the individual authors and not necessarily those of the Ohio Section AWWA, its officers, general membership, or the editor.