

Ohio Water Environment Association | Volume 88:1 | Issue 1 2015

From High School to Highly Skilled page 21



Understanding the Reality of a Small MS4, City of Piqua page 62



Nutrient Recovery as a Green Technology for Managing Phosphorus Removal *page 54*



A Day on the Job of a Diver page 22



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2015 Government and Regulatory Affairs Workshop Thursday, March 5th pages 16-17

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What's Inside

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Check out OWEA's website, ohiowea.org, for a complete listing of OWEA approved training.

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FEATURES

WEF Collection Systems Conference/Cincinnati	7
Kocarek Korner	8-9
Government and Regulatory Affairs Workshop	16-17
WEF Operator Strategy Workgroup Update	20
Happy in Akron - From High School to Highly Skilled	21
"Maybe I'll Call In Sick Next Time" - A Day on the Job	22-23
Ohio EPA Update	26-27
2015 Technical Conference and Exhibition	35-50
Thank You 2015 OWEA Sponsors	37
Nutrient Recovery as a Green Technology	54-58
Understanding the Reality of a Small MS4	62-63
Broader Definition of Pump-Drive System Efficiency	68-69
Village of Bay View Wastewater Improvement Project	74

Grit Particle Settling - Refining the Approach 78-81

DEPARTMENTS

OWEA Officials	4
OWEA News	5
Calendar of Events	5
President's Message	6
WEF Delegates' Report	10-11
Section Reports	12-13
Committee Reports and Updates	14-19,
	28, 63
Operations Quiz	21
2015 Sponsor Program	29
Roll Call	31
Passings	31
Welcome New OWEA Members	31
Advertiser Index	86

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Get Involved - Join a Committee Today

The Ohio Water Environment Association has 25 committees which focus on various aspects of the water quality field and association operations.

Contact OWEA at **info@ohiowea.org** or the chair of a committee that interests you for more information.

OWEA News and Calendar



OWEA NEWS

OWEA's New Office Assistant

Amanda Goodwin is excited to start 2015 off as OWEA's new Office Assistant. Amanda is a graduate from The Ohio State University, where she studied English Literature. Amanda has a passion for both environmental concerns and community involvement, and is excited to learn more about water treatment in Ohio. Amanda brings with her many years of customer service experience, as well as, a desire to build a career geared towards helping



Ohio maintain safe and clean water. Along with volunteering for the Sierra Club and Green Columbus, Amanda also enjoys hiking, gardening, and biking.

OWEA Spring Intern

Elizabeth Kirby is a senior at The Ohio State University and looks forward to graduating May 10th. Elizabeth went back to school specifically to major in Environmental Public Health and will be seeking a career utilizing her environmental education in surface water or wastewater. She looks forward to meeting new contacts in the field and learning as much as she can from members of OWEA before beginning her career.



Membership Services

If you need assistance with membership details, event registration, or coursework reports, contact us at 614.488.5800 or:

Judi Henrich, Executive Manager, *judihenrich@ohiowea.org* Amy Davis, Executive Assistant, *amydavis@ohiowea.org* Amanda Goodwin, Office Assistant, *amandagoodwin@ohiowea.org*

Is Your Membership Profile Up to Date?

Are you receiving your copy of the Buckeye Bulletin and timely email updates from OWEA? Has your job or position changed? You can update your information online at *http://www.ohiowea.org/memberships.php*

Career Opportunities

The **"Careers"** page is the most visited page on OWEA's website.

- No charge for job seekers.
- No charge to post a position if you or a fellow employee are an OWEA/WEF member.
- \$143 for a 30 day posting if not a member.
- \$143 for a Professional Membership We encourage you to join OWEA and reap all the benefits of membership. Same price as a posting! Click on the Careers tab at www.ohiowea.org or

contact OWEA (614.488.5800 or info@ohiowea.org).





OWEA CALENDAR

February 2015

- 12 SE Section Meeting
- 19 NE Industrial Waste Seminar

March 2015

- 5 Government and Regulatory Affairs Workshop
- 11 OWEA Executive Committee Meeting
- 19 SW Section Meeting
- 26 NW Section Meeting

April 2015

- 1 Articles and Ads for May Buckeye Bulletin
- 9 SE Section Meeting
- 19-22 WEF Collections Conference Cincinnati
- 23 SWOWEA LAC Meeting

May 2015

- 6 OWEA Executive Committee Meeting
- 14 Collection Systems Workshop
- 21 SE Section Meeting
- 21 SW Section Meeting

June 2015

- 22 OWEA Golf Outing
- 22 NWOWEA Preconference Workshop
- 23-25 OWEA Annual Technical Conference & Exhibition
- 25 OWEA Executive Committee Meeting

July 2015

- 1 Articles and Ads for August Buckeye Bulletin
- 16 SWOWEA LAC Meeting

September 2015

- 17 SW Section Meeting
- 26-30 WEFTEC in Chicago

2015 Membership Rates

Rates include membership in the Ohio Water Environment Association and the Water Environment Federation.

- Professional & Academic.....\$143
- Operations......\$81
- Young Professional\$61
- Student.....\$25
- Executive.....\$322
- Corporate\$400

Membership information may be found at: http://www.ohiowea.org/memberships.php

President's Message



Seriously, 3 days until the New Year and I haven't even begun to develop, contemplate, or yet proclaim my New Year's resolutions. I love this time of year because you can brag about your successful resolutions from 2014 or quietly discard those that didn't take. You can adopt the motto of Lion King's royal advisor, Rafiki for your unsuccessful resolutions ... "It doesn't matter. It's in the past." Like me, you can simply look forward to 2015!

In order to get a jump start on my resolutions, I turned to the most trusted authority on this topic ... Wikipedia ... and not surprisingly the top 5 resolutions for 2014 included the following: 1) Get Fit, 2) Lose Weight, 3) Get Organized, 4) Eat Healthy and 5) Manage Stress. Yep - pretty much all of those could be repackaged and make my list of resolutions for 2015.

An interesting resolution for 2014 (that just fell out of the top 5) was to increase your volunteer activities. While most equate this resolution to spending more time at the local food pantry, helping sort donated goods at goodwill, or participating in church stewardship activities ... it wouldn't be a far stretch to consider a resolution centered around getting more involved with OWEA. A resolution to maximize your membership through attendance at more OWEA events or increasing your level of volunteerism with OWEA could round out your resolutions nicely.

Like Wikipedia, I am going to throw out some options for consideration as you contemplate an OWEA centered resolution for 2015. For reference, the list below is based on an ascending level of time commitment.

- Consider turning your *PASSIVE* membership into an *ACTIVE* membership by attending *MORE* section meetings, specialty workshops, webinars, hands-on training events, or the annual conference in 2015. By my account, OWEA will be offering in excess of 22 such events in 2015 ... complete with education and training in a range of topics from watershed to biosolids and everything in between! To start planning your 2015 events check out the OWEA calendar on page 5 of this issue or visit the website at *http://www.ohiowea.org/* and check out the calendar tab.
- 2. Become *MORE* involved and take that step from being an *ACTIVE* member to a *VOLUNTEER* member. This can be accomplished by either joining a section or state level committee. We have opportunities abound with 4 geographically-based section executive committees and 19 specialty committees. All of these committees are ready for new volunteers with passion and fresh ideas to serve OWEA and ultimately improve the water quality around us. Please contact me if you would like to discuss potential



Michael Frommer, P.E. OWEA President

volunteer opportunities. You can also contact section officers and committee chairs directly, as contact information for these folks is located on page 4 of this issue.

3. IDENTIFY and RECRUIT new members to the organization. Share the opportunities and benefits of OWEA with your peer professionals as well as young professionals and frontline operators in the industry. Please consider participating in OWEA's "pay-it-forward" campaign...as clearly our most valuable resource (next to water) is our membership. My pastor always concludes each service with the simple message of ... "go forth and share the good news"...I urge you to do the same regarding OWEA.

We conducted our annual OWEA leadership meeting on October 16th in Columbus with 22 of

our leaders in attendance. I wanted to briefly share with you the results of a breakout session that was held at the meeting. Everyone in attendance had to recall the following: *what year did you join the organization?* And *what member was most influential in you joining the association?* It was a fascinating exercise and we learned that some key leaders/members in the organization can have a huge impact on recruiting our future. Dale Kocarek and the late Al Rupp should be very proud of their past recruiting efforts. In 10-15 years from today, you too could have a significant impact on our association ...

The Power of Collaboration and Teamwork

I wanted to end my third article (75% complete!) with some words about collaboration and teamwork and recent steps taken to secure that with our AWWA brethren. Your feedback from the One Water Conference spoke volumes and overwhelmingly encouraged future collaboration between OWEA and Ohio AWWA. A meeting was held with the Ohio AWWA Governing Board in early December 2014 to facilitate continued collaboration. I am pleased to announce that a committee has been formed to coordinate current organization activities, as well as plan future joint workshops and conferences. The committee contains current officers, future officers (delegates and trustees), and association management. The committee will start meeting in early 2015 and much more will come regarding this teamwork!

Please enjoy 2015 and make sure that your resolutions are realistic and achievable ... and until next time, be safe and try to do what you can to improve the water quality around you!

Michael Frommer, OWEA President *mike.frommer@aecom.com*





Collection Systems Taking Center Stage — Seize the Opportunity April 19–22 | Exhibition: April 20–21 | Cincinnati, Ohio

www.wef.org/CollectionSystems



This conference is held by the Water Environment Federation in cooperation with the Ohio Water Environment Association and the National Association of Sewer Service Companies.

Please join us for

OWEA's Welcome Event

Sunday, April 19, 2015, 6:30 - 10:30 pm Great American Ball Park - Champions Club **Register at www.ohiowea.org** OWEA Welcome Event Sponsored by





Kocarek Korner

REMEMBRANCES OF A CENTURY AGO

by Dale E. Kocarek, P.E., BCEE, OWEA Past President 2010-2011

Introduction

I promised to set a goal for myself to write this article in 2014 to honor several events from the year 1914 – a century ago – including the invention of the activated sludge process. Originally, I had scheduled this article for the October issue of the *Buckeye Bulletin*, but decided at the last minute to write on the topic of the One Water Conference and the importance of mentorship, which resonated as a theme of the conference. Mentorship is a part of the overall concept of community and is essential to the well-being and relevance of our OWEA association, our identity as water professionals in carrying our message to the next generation, and to society in general.

In beginning, I believe that it is important to acknowledge the past and understand the context of how events occur in history and impact others. For important or transformative events, I believe that it is also important to understand the background of their beginning. While a portion of my article does not pertain directly to our profession as water professionals, it does emphasize that 1914 was a period of dramatic change and upheaval and also when our own profession was growing rapidly. I have found that progress in history is not linear, but occurs in leaps.

A World in Transformation

Of all the years in the 20th Century, the year 1914 may be one of the most transformational in modern history. It marked



Audrey Hepburn in My Fair Lady Filmed in 1964, set in 1912 England

the beginning of World War I (WWI), which reshaped the map of Europe. Old empires fell and new countries, such as my ancestral Czechoslovakia, were created from the Austro-Hungarian Empire in the aftermath. WWI was the formal ending to the Gilded Age in America and the "age of innocence" in America and Great Britain. In our field, it brought forth a new dawn called "activated sludge," which revolutionized wastewater treatment, improving water quality and human health on a grand scale. Treatment prior to "activated sludge" was largely in the form of Imhoff Tanks and sand filters, if there was any treatment at all.

Culturally, I feel that it is no coincidence that plays and musicals including *The Music Man, My Fair Lady*, and *Mary Poppins* were all set prior to the Great War. I feel that this was done to promote the "age of innocence," before the Great War, when most people living in America were on farms or small cities, and the world moved at a slower pace. America had primarily an isolationist attitude toward the events in Europe and the entry of America into WWI was a confusing time. I acknowledge taking liberty to romanticize this era, which was well before my time. Clearly, life was much better for the rich than it was for many immigrants, minorities, and factory workers.

After 1914, the world became smaller, faster, and more technology driven. The world also became a more dangerous place. For the first time in over 100 years, America could no longer feel fully protected by the Atlantic Ocean.

World War I

Officially, WWI was triggered by the assassination of Archduke Francis Ferdinand and his wife in Sarajevo on June 28, 1914, but did not begin in Great Britain until August 4, 1914. By all accounts, it should have never happened and gained little. Reasons behind the start of the war are complex and rooted in a system of alliances, monarchies, and ethnic factions formed during the Age of Kings.

WWI was predicted to end before Christmas 1914, but instead it dragged on for four years, ending on November 11, 1918. Life was lost at an unprecedented level during offenses and counter offenses over a few feet of ground. The total number of military and civilian casualties in World War I was over 36 million. This included over 16 million deaths of military and civilians and 20 million wounded.

World War I gave birth to the term "no man's land," which was the area between opposing trenches. Signs of the transitioning era were present on the battlefield, with the clash between the old world calvary and new machine-inspired weapons, such as tanks and machine guns. Fortunately, the American Expedition Force led by General John J. Pershing (1860-1948) helped turn the tide of the War to End All Wars in November 1918.

The significance of WWI is being debated a century later. Several things are clear - including the anticipated length of the conflict and the degree to which it was underestimated with respect to the length of the conflict, the total destruction, and the ultimate transformative impact on the world.



Old Photograph of No Man's Land in France in World War I

Kocarek Korner

Okio.

Tragically, the "lasting" peace was nearly as bad as the war itself. The Treaty of Versailles, born through arrogance, ignorance, and the savage quest for revenge by the victors, including US President Woodrow Wilson (1856-1924), set the stage for a war of even greater destruction 20 years later. This is the aftermath that we live in today. Fortunately, a lot has been learned since that time to partially mitigate conflicts. Since World War II, conflicts have typically been smaller, leaders have been wiser, and the United Nations, while imperfect, has been a mediating force on the world stage in promoting peace.

A Personal Celebration

On a happier note, 2014 marked the 100th birthday of my Aunt Inez. By the time this issue is published, she will be 101. She is exactly 12 years older than my late mother and one of few surviving siblings in a family of 13 children. Inez was born in Lincoln, Nebraska on January 6, 1914 and resides there still. I plan to visit her either before or after my annual WEFMAX meeting in Kansas City in 2015.



Inez (Larson) Giles

Activated Sludge: A Transformational Discovery

This year is the 100th anniversary of the invention "activated sludge" by two engineers, Edward Ardern and W. T. Lockett. They were conducting research for the Manchester Corporation of Rivers Department for the Davyhulme Sewage Works.

Activated sludge is nothing short of amazing. It is no understatement that activated sludge transformed the field of sanitary engineering. As many of us know, activated sludge is a general term that includes a broad class of water microorganisms, including amoebae, protozoans, ciliates, fungi, worms, and bacterial colonies, generally dominated by the genus pseudomonas: all of which are used to transform *polluted water into clean water*. This zoogleal culture, maintained in suspension by air and mixing, has been widely studied for the last century, but the fundamental principal has remained the same: *mix dirty water and bugs in a container or tank, mix-aerate-settle, and get clean water*! This sounds simple, doesn't it?



Simple Schematic Diagram of the Activated Sludge Process

Activated sludge promises to continue to play a large role in removing nutrients in the future as the process is manipulated using redox chemistry, sludge retention times, and aeration regimes. While the discussion of the bio kinetics of the activated sludge process is beyond the scope of this article, suffice it to say that I have studied it intently for the past 35 years. I found the process as interesting in 1980 while in graduate school as I do today, in 2015.

During their experiments on the *Aeration of Polluted Waters*, it was reported that British researchers Ardern and Lockett observed times of approximately 40 days to purify polluted water through aeration. Then strangely, one day, the treatment time was reduced significantly. Like anyone in a similar position, the experimenters wracked their brains trying to figure out what went wrong, until they saw the film on the side of the testing apparatus. This marked the discovery of activated sludge. (I will talk about this discovery in more depth in a future article.)

I believe that the discovery of activated sludge falls into the category of interesting laboratory mishaps, since the likely cause may have been due to poorly cleaned testing apparatus. One of the things I quickly learned as a laboratory technician was the importance of clean testing apparatus as critical to overall quality control. I can relate to what happened in England in 1914 because one thing I liked doing least was cleaning glassware. It took a long time, glass was prone to breaking, narrow-necked pieces were difficult to clean, and it gave me dishpan hands.



Elsie Tillison Was Born on June 1, 2014, One Hundred Years after the Author's Aunt

The Cycle of Life Continues

As I mentioned, my aunt turned 101 on January 6, 2015. She is clearly near the end of a long, interesting, and largely happy life. One thing I learned from her was the importance of a good mental outlook. I credit this as part of her longevity. She was unique among her siblings. In a family where most were very reserved, Inez embraced life to its fullest. I was told by her granddaughter that she made a decision each day to be cheerful and happy.

The cycle of life continues. Born 100 years after my aunt, please welcome Elsie Tillison, born on June 1, 2014. Elsie is the daughter of OWEA Northwest Section President Joe Tillison and his wife Kristen. Joe works for the City of Bowling Green Water Pollution Control Facility and is also the Co-Chair of the OWEA Plant Operations Committee.

Think about it: if little Elsie lives the same lifespan as my aunt, she will live well into the 22nd century. I wonder how we will treat wastewater then and if we will still use the activated sludge process? I will not be around then, but I would bet on it!

Dale E. Kocarek, PE, BCEE Chair, Government Affairs Committee: WEF Delegate Stantec Consulting Services, Inc. *dale.kocarek@stantec.com*

WEF Delegates' Report



Dale Kocarek





Doug Clark

January marks the mid-point of the OWEA year. The remaining six months are action packed with important workshops, section meetings, and our annual conference. President Frommer is focusing his energies on beginning to execute portions of the Strategic Planning effort that he led last year with Elizabeth Wick. All of you will be hearing more on this as we follow my motto of "always forward and never backwards!"

But, I am here mostly to talk about the Water Environment Federation (WEF) and how it is working with Member Associations (MAs) to make us stronger and more in harmony with them. WEF is a phenomenal organization and I have grown close to some of the WEF staff members over the last decade. I have made several observations during the past 15 months as a WEF Delegate from Ohio:

- I remain deeply honored to be part of the WEF organization and be of service to them and the Ohio WEA (as I like to call OWEA).
- With the WEF House of Delegates (HOD), I am with similarly minded people, many of which are close to my age and level of experience in the industry and with their member associations. This builds an immediate bond. While we traditionally and appropriately focus much of our efforts on recruiting young professionals for membership, the WEF House of Delegates (HOD) has shown there is a place for senior professionals. When I see others who are my age and older, I no longer think how old we are, but how experienced we are. Life lessons are priceless when it comes to being on the WEF House of Delegates.
- WEF requires a lot from its delegates, because we are the federation's policy governing board. Being a delegate is not an entitlement position where Past Presidents of Member Associations should go to hang out. Given the importance of the House of Delegates, MAs must be careful to select their Delegates based on a combination of factors including experience, knowledge, passion, and available time and energy.
- More than before, the House of Delegates is playing a much more influential role in working with the Board of Trustees. As the scribe (essentially the secretary) to the Speaker of the House, I can tell you that our thoughts/opinions/concerns are heard!
- As I said before, the purpose of the Delegates is to work hard. We must attend WEFTEC, show up for meetings, and participate actively and on time. As a scribe for the House of Delegates Steering Committee, I feel that I am running double time keeping up with the Speaker. She is that good!
- There is a lot about the organizational structure and practical workings of WEF that I am still learning. I thought I knew a lot going into this position, but I was wrong.
- I am meeting a lot of new people with fresh and different perspectives. To me, this is the greatest blessing of being a WEF Delegate. I had a good discussion today with a new House of Delegates friend from Nebraska, my mother's home state.

The following are some important facts about the Water Environment Federation (WEF).

- WEF was founded in 1928 and is headquartered in Alexandria Virginia
- Not-for-profit technical and educational professional organization with 36,000 individual members
- The Executive Director is Dr. Eileen O'Neill

WEF's Mission Statement is to:

- Provide Bold Leadership
- Champion Innovation
- Connect Water Professionals
- ♦ Leverage Knowledge to Support Clean and Safe Water Worldwide

WEF's Critical Objectives are to:

- Drive Innovation in the Water Sector
- Enrich the Expertise of Global Water Professionals
- Increase Awareness of the Value of Water



Dr. Eileen O'Neill Executive Director



WEF Headquarters in Alexandria, VA





WEF Membership

A simplified organizational structure of WEF is shown above and it shows the relationship between the House of Delegates, WEF Committees, Executive Director, and the Board of Trustees.

As I mentioned in my previous article, the WEF House of Delegates has a number of committees and work groups. House of Delegate members are supposed to be on either a committee or work group. I am on the Steering Committee and on two workgroups. This is not unusual.

Below is an update on several of the work groups:

MA Financial Sustainability

The purpose of this work group is to help MAs with issues of financial sustainability. This is the third year for this work group. Mark Livengood led this work group last year.

MA Leadership Development

Doug Clark and I are on this work group. This is a dynamic work group and is currently conducting webinars to assist MAs with practical aspects of leadership development, such as preventing burnout, member recruitment, and retention. The MA Leadership Development Committee has so far provided 3 free webcasts dealing with Volunteer Engagement-Avoiding Burnout, Operator Engagement, and Membership Recruitment & Retention. If you missed these webcasts and would like to view them (either recorded or in pdf format) please visit http://www.wef.org/Members/page ma detail.aspx?id=6442451557.

Water Advocates

This work group is also called the "voice of water." The purpose of this work group is to promote the importance of clean water through advocacy. This is the first year for this work group, and I expect it to continue next year.

Operator of the Future

It is no surprise that the needs of the wastewater industry are growing more complex. Added to this is the retirements of the baby boom generation. The importance of this workgroup is huge and it is just getting off the ground. Its purpose is to help recruit future wastewater operators to fulfill a future needs gap.

WEFMAX

WEFMAX is short for WEF-Member Association Exchange. I have attended all but one WEFMAX meetings since 2005, and have found them to be profoundly useful in bring Ohio WEA closer to WEF through knowledge and relationship building. I feel that this experience has made me a more effective board member. The purpose of this work group is to evaluate topics and locations for future WEFMAX meetings.

Dale Kocarek, Senior WEF Delegate, dale.kocarek@stantec.com (provided WEF Delegate Update) Doug Clark, Junior WEF Delegate, douglas.clark@bgohio.org Tom Angelo, Junior WEF Delegate, tangelo@munitreat.com



WEFTEC 2015

88th Annual Water Environment Federation Technical Exhibition and Conference

September 26- 30, 2015, McCormick Place, Chicago, Illinois

Registration Opens March 30, 2015

ONE WORLD. ONE WATER. ONE EVENT.

OWEA Member Bus Trips to WEFTEC - Free again in 2015 for members!

Section Reports

Hello to All. I would like to thank everyone for a great 2014. The Executive Committee, committee chairs, and volunteers have made the



chairs, and volunteers have made the Northwest Section more committed and dedicated to providing the best possible training and guidance to our profession. You may be an operator, sales associate, lab analyst, engineer, or reader, but everyone plays a vital role with our environment. We all have a say on what the future will hold for water quality. With that, I say thank you for all the hard work and look forward to not only this year, but years to come, providing the best possible education and training to protect the water quality for our region.

With the holiday season gone, the family back home, and the presents returned, it is time to get back to normal life. Our section has been very busy with the planning of next year's events. I would like to give a huge thanks to Doug Borkosky and his entire committee for the planning of this year's annual conference in June. Kim Riddell has also been very busy with the coordination of an Operations Challenge Invitational that will be held with the conference. I strongly encourage anyone who has interest in participating or volunteering for the annual conference to please get a hold of Kim, me, or anyone on the Executive Committee.

I would also like to thank Frank D'Ambrosia for all the hard work he has done in organizing and planning the Semi-Annual Operator Education Day. Frank has volunteers who have given up countless hours to provide training to our upcoming operators. With the help of people like Frank, our field can continue to grow with educated and skilled operators.

It is my privilege to announce that our March section meeting will be held March 26th in Fostoria. A tour of the POET ethanol plant will be held in the morning. Lunch and technical sessions will follow in the afternoon. The annual Golf Outing will be held May 13th in Delta. Plans for this meeting are still being made. The annual Spouse and Friends Day will be held August at Put-In-Bay. Please visit *www.ohiowea.org* for further details.

If you have any suggestions, comments, or want to volunteer, please contact me.

Joe Tillison, joe.tillison@bgohio.org



2015 OWEA Workshop Dates

Government & Regulatory Affairs Workshop - March 5, 2015 Nationwide Conference Center - Lewis Center north of Columbus

Collection Systems Workshop - May 14, 2015 Nationwide Conference Center - Lewis Center north of Columbus

Plant Operations/Lab Analysts Workshop - October 21-22, 2015 Nationwide Conference Center - Lewis Center north of Columbus

> Watershed Workshop - November 12, 2015 Ohio Union - Ohio State University

Biosolids Workshop - December 3, 2015 Nationwide Conference Center - Lewis Center north of Columbus

Visit www.ohiowea.org for more information

Hello fellow Southeast Section members. I hope that everyone had a great holiday and you are enjoying the beginning of 2015. It is hard to believe that 2014 has come to a close.

SEOWEA

Fred Smtih, President

On October 9, the SE Section held a joint Watershed Section Meeting with the Northwest Section. The joint meeting was held at Union County Services Center and included a tour of the new City of Columbus John R. Doutt Upground Reservoir. The Northwest Section volunteered to cook pancakes for lunch and the proceeds were donated to Water for People.

Below is the upcoming schedule for the SE Section winter and spring meetings:

- February 12th at Southerly Wastewater Treatment Plant with the business meeting at the Blue Moon Event Center.
- April 9th at Athens Wastewater Treatment Plant
- May Section Meeting will be held at Glatfelter in Chillicothe on May 21st.
- We are also developing plans for a Section Plant Operations Day and for a Past Presidents luncheon.

Check out all the details for future events on the OWEA website at *www.ohiowea.org*.

Fred Smith, smithfj@cdmsmith





SE Section and NW Section touring the new City of Columbus John R. Doutt Upground Reservoir

Section Reports

I hope everyone enjoyed the holiday season, and now we can begin to look forward to Spring! We have had some very successful events the last few months. Counted among them are:

- The Plant Operations Seminar and Section Meeting this past November.
- The Young Professionals Committee Utility "Meet and Greets" with the City of Dayton and the Metropolitan Sewer District of Greater Cincinnati in October and November.
- The Industrial Waste Seminar and Section Meeting in January.

These, and all of our events, have been quite successful, with very good technical presentations and lots of opportunities for networking with our peers. A big "Thank You!" to the exhibitors who participated at the Plant Operations and Industrial Waste Seminars. You allow us to continue to offer great educational events at reasonable prices. There is a lot of hard work that goes into making the events successful and I am proud of the committees for their efforts and contributions!

The future and the past: It isn't often in our business we take a moment to reflect, but our recent events have brought this to the forefront. It was rewarding to see at the Utility "Meet and Greets" how many young and intelligent professionals we have in our Section. The future of our industry and our Section is bright!

I also want to take a moment to reflect on our past. In December we held our annual Past Presidents' lunch following the SW Executive Committee Meeting. This event is the one time each year when we get a chance to thank the Past Presidents for their service to our Section, and to the State. As you proceed through the leadership chairs in the Section, it becomes increasing obvious that these folks are the ones

SWOWEA

Tom Brankamp, President

who set the stage for what we are doing today, and have made it easy for us to carry on the events and traditions of our Section. This year twenty-one Past Presidents joined us for lunch. It was great seeing each of you!

Upcoming events: Here are some of our upcoming events:

- The March Section Meeting will be at the City of Miamisburg on March 19th. Please save the date.
- We are entering into Science Fair season. If you are interested in participating as a judge, please let me know.
- As always, we have Lab Analyst Committee meetings, Young Professionals Committee activities, Student Chapters startups, and more for you to participate in.

For all the latest you can find us at www.swowea.org.

A final "Thank You!": It is with great sadness that we say goodbye to John Eastman from LJB Inc. John passed away suddenly on December 28th. He was very well known for his professionalism throughout his career, was a very good friend to many at OWEA, and very active with the Southwest Industrial Waste Committee. The SWOWEA Executive Committee has made a donation to the Fund for Antioch College to honor his service to our Section. John will definitely be missed. Thank you for all you have done!

Tom Brankamp, tom.brankamp@strand.com



SW Section's 2014 Annual Past Presidents' Luncheon

The Northeast Section held their annual Operators Seminar on January 22 and educated a full house. The Industrial Waste Seminar is February 19 and we are anticipating a full house for that event as well. Between these events, there are a minimum of 12 contact hours provided for the attendees. Many thanks go to Terry Gellner for putting together a wonderful slate of presenters for the January meeting, and the NE IWS committee for putting together their wonderful list of presenters and the vendor expo.

Each of these meetings attracts an average of 240 attendees. The NE events could not run as well as they do without the hard work of my board members and our many volunteers. Their assistance and attention to detail are what makes the events so well received.

We have a meeting and tour in March, as well as the Watershed meeting coming up in April. Watch for us on the OWEA calendar.

Our scholarship is available for members of the NE section, their children, or children for whom they have guardianship. Please take a few minutes to look at the information on our website at: *http://nesowea.org/awards.html*

Denise Seman, dseman@cityofyoungstownoh.com

NEOWEA

Denise Seman, President



RESIDUALS MANAGEMENT COMMITTEE

by Jamie Gellner, Chair

Welcome to 2015! The OWEA Residuals Management Committee had a busy last quarter of 2014. Our annual workshop was held on December 11, 2014 at NorthPointe Conference Center. We had a record turnout this year - 154 attendees! If you were able to attend - thanks so much. We sincerely thank our speakers who took the time to share their information with us. We also thank our booth sponsors. A special thanks to Jason Beck and Steven Reese of Hazen and Sawyer for coordinating and serving as moderators for the event. Also, a big thank you (as always) to Judi and Amy for coordinating the venue and registration for this event.

A special congratulations and good luck goes out to Lois Wachtman who retired from the City of Columbus in November 2014. Lois has been an active member of the committee for many years and we sincerely thank her for her service to the committee. We will miss her (but hope to see her at some upcoming meetings and activities). Best wishes Lois!

During 2015, we hope to increase our outreach and informational efforts related to the benefits of biosolids reuse. In addition to our Farm Science Review Booth, which is a yearly event for us, we hope to participate in some water related events across the state. We also hope to be able to offer more current news and information to the OWEA membership related to biosolids.

Our committee meets on a quarterly basis, typically in January, April, July, and October - be on the lookout on the OWEA website for future meeting dates and locations. We plan to hold conference calls for at least two of these meetings to allow folks from the "far reaches" of the state to participate.

If you haven't received any correspondence from me and you would like to receive the correspondence related to committee activities, please send me an email (see contact information below). Please also drop me an email if your contact information has recently changed so that we can include you in upcoming activities.

We would love to have you as part of our committee. The Residuals Management Committee is focused on serving the OWEA membership through education, promotion of effective biosolids management, technical information on biosolids, and interface with OEPA on regulatory issues. We always welcome new membership and we would love see you at our next meeting. If you are interested in getting involved or if you have any questions about the committee, please contact me.

Jamie Gellner, Residuals Chair: jgellner@hazenandsawyer.com



Residuals Chair Jamie Gellner and OWEA President Michael Frommer



Speaker Hunter Long, Hazen and Sawyer



Speaker Brandon Fox, City of Columbus



Speaker Robert Bastian, USEPA



Preworkshop networking



Networking and visiting with exhibitors



Kenneth Blue, John Kincaid, and Roger Baldinger

2014 Biosolids Workshop presentations are posted at http://www.ohiowea.org/presentations_2014.php



LABORATORY ANALYSIS COMMITTEE

by Denise Seman, Chair

Hi Everyone!

Hope you had a great holiday, and your year is off to a fantastic start!

The LAC will be participating in the Ops Challenge Event that will be held at the annual conference in June. We will be looking for judges for this event, so please let me know if you are interested in helping out.

The annual Plant Operations/ Lab Analysis workshop (POLA) will be on October 21 & 22nd. I look forward to seeing many of you there.

As always, if there any suggestions for topics that you would like to have presentations on, please let me know. Hands on workshops truly must be done at the section level, the sheer number of attendees at the Lab workshop prohibits us from holding them there.

SW LAC - Jim Davis and Karen Tenore

SW LAC Meeting News!!

We had a great fall SW LAC meeting, which was generously hosted by YSI. There were 75 people in attendance who earned up to 4.5 contact hours. Technical sessions presented were: *Online Process Monitoring, Troubleshooting Ammonia and Nitrate Sensors*, and *ISE Sensors*, plus tours of Yellow Springs WWTP and Yellow Springs Instruments.

On February 5, 2015 the SW LAC meeting was held at Dayton's WRF in the afternoon.

Future meetings will be April 23 in Greene Co., July 16 at YSI, and October 8 at Cincinnati MSD.

To inquire about being added to our e-mail list or to get information about attending, hosting, sponsoring, or presenting at a future LAC meeting, please contact:

Karen Tenore, City of Dayton WRF Karen.Tenore@daytonohio.gov, (937) 333-1845

Jim Davis, Montgomery County Water Services DavisJi@mcohio.org, (937) 496-7051

Committee Members: Lynette Hodnicki, City of Fairfield Lori Kyle, Greene County Teresa Shinkle, Greene County Gregg Mitchell, City of Sidney Roger Rardain, City of Fairborn Dr. Robert Smith, YSI

<u>NE LAC – Bev Hoffman</u>

During 2014 the Northeast Lab Analyst Committee offered 7 contact hours with 83 people attending the meetings. The meetings were held in Stow, Cleveland, and Akron. A big THANK YOU goes out to all of the facilities that hosted our meetings and to all of our speakers. Unfortunately, our November meeting was postponed

until March or April of this year. Alloway will be our host for this meeting with presentations on Free Cyanide, Low Level Mercury, and a tour of the laboratory.

If anyone has a topic they would like to have presented or knows someone who would like to present a topic, please let me know. If you would like to be added to the NES LAC membership directory and receive automatic email updates for training events and other news please email *nesowealac@gmail.com*.

Beverly Hoffman nesowealac@gmail.com

SE LAC – Melodi Clark

Well, 2014 has come to end and I cannot believe how fast the year flew by. We had a great meeting on October 28th here at the City of Columbus Surveillance Lab. We had a great turn out and wonderful presenters. I want to say thank you to Laura Carfagna from Corning for her presentation on *Glassware Safety*, Timothy Meirose from Thermo Fisher on his presentation on *Essentials of pH Measurement*, and Chris Tarr from Great Lakes Environmental on his presentation on the *Overview of Whole Effluent Toxicity Testing for NPDES Permits*.

I am looking forward to 2015. I plan to hold four meetings this year and have started to schedule them. If anyone has any suggestions or ideas, please let me know. Hope everyone had a great Holiday Season!

Melodi Clark, MLClark@columbus.gov

<u>NW LAC – Bridget Shiets</u>

Planning some fun and interesting meetings for this year, hope to see everyone there!

If you have any topic ideas or presentations you may want to present at future meeting please email Bridget at the email below.

Bridget Shiets, wwtplab@cityofbellevue.com.

Lab Analysis Committee Contact Information

State Chair

Denise Seman, 330.742.8820, dseman@cityofyoungstownoh.com

Northeast Chair

Beverly Hoffman, 440.446.4228, nesowealac@gmail.com

Southeast Chair

Melodi Clark, 614.645.1239, mlclark@columbus.gov

Northwest Chair

Bridget Shiets, 419.483,7514, wwtplab@cityofbellevue.com

Southwest Chairs

Karen Tenore, 937.333.1501, karen.tenore@cityofdayton.org Jim Davis, 937.496.7051, davisji@mcohio.org



Join Your Section LAC (Laboratory Analysis Committee)

Certified wastewater analysts are a valuable resource to the industry. Network with and learn from other certified wastewater analysts in your area. Learn how to become certified by contacting the LAC Chair in your section.



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Committee Report

GOVERNMENT AFFAIRS COMMITTEE UPDATE

by Dale Kocarek, P.E., BCEE, Chair

March 5, 2015 Workshop Update

The Government and Regulatory Affairs Workshop Subcommittee is pleased to present the 2015 Government & Regulatory Affairs Specialty Workshop. This year's workshop will be held on March 5, 2015 at the Nationwide Hotel and Conference Center (formerly known as the Northpointe Hotel and Conference Center) in Lewis Center, Ohio.

The presenters at the workshop include Ohio EPA Director, Craig Butler; Division of Surface Water Chief, Karl Gebhardt; Ms. Deborah Nagle, Director, Water Permits Division in the Office of Wastewater Management, U.S. EPA, Washington DC; Ted Boggs of the Vorys Law Firm; and Claudio Ternieden, the Regulatory Affairs Director for the Water Environment Federation (WEF).

I met Deborah Nagle at the NACWA-WEF Fly in in 2014. She was the leader of our table discussion on Integrated Planning from the USEPA perspective. As you know, USEPA issued the *Integrated Municipal Stormwater and Wastewater Planning Approach Framework* in June 2012. The framework encourages cities to integrate work needed to comply with storm water regulations and sewer overflow regulation to achieve maximum benefit at minimum lifecycle cost.

During the last few years, the OWEA Government and Regulatory Affairs Committee has been striving to continue to improve our program by bringing topics of interest and relevance to our members and other interested persons. In general, the purpose of the Workshop is to provide updates and information on topics of interest, including new and pending rules, and topics of broad interest to benefit Ohio communities, permit holders, and consulting engineers. Topics are presented at a level of breath and depth to provide clear "take away" messages and updates to a wide audience on what may be upcoming. These "take away" messages and updates can help a community plan and budget for future initiatives. Most of the topics tend to be directed towards rule making, planning, and public policy and not of a detailed technical nature.

The Workshop Subcommittee seeks to include a wide variety of current topics and trends. In the last few years, we have reached out more to USEPA and WEF to provide a national focus in addition to state-wide focus. In the future, we are going to seek topics from utilities on case studies to provide the Owner's perspective. Anyone that is interested in presenting from the Owner's perspective in the future on a case study, please contact me at *dale.kocarek@stantec.com* or John Owen at *john.owen@epa.ohio.gov.*

Fly In Update

We are tentatively scheduled to participate again in the annual Fly In to Washington DC, which is scheduled for April 13-15, 2015. This will be our first encounter with the 114th Congress of the United States. Again, like last year, WEF is teamed with NACWA, so the message that we "take to the Hill" is one that is partially crafted by these two organizations, but customized by each member association. It is too early to say what the hot topics for April 2015 will be. Possible topics include the Omnibus Bill, including Waters of the United States, WIFIA funding and implementation, financial affordability, and integrated planning.

Last year, we asked our congressional appointments if there was anything we could do for them as they are continually presented with requests - usually for money. To this, we helped prepare letters of support for WIFIA and HR 2707, which was a pilot program pertaining to green infrastructure. It was a bi-partisan bill authored by Representatives Chabot and Fudge.

Legislation Research

I wish to create an opening on the Committee for a person to help with legislative research. This person would provide review of proposed legislation at the state and federal levels. This is important to help us become aware of legislation so that we can be an active part of the legislation process, while we have the opportunity to offer comments or testimony.

I would propose to work in conjunction with other bodies such as AOMWA, NACWA, and the Ohio AWWA. The purpose of this effort is not to duplicate the fine work done by other organizations, but to allow us to participate more fully in the lawmaking process in our own government and get the news to you, our members, in a timely manner. If you would be interested in exploring this opportunity, please contact me at the email below.

Dale Kocarek, P.E., BCEE dale.kocarek@stantec.com, 614.486.4383

Register Soon - This Workshop Sold Out in 2014

Government and Regulatory Affairs Workshop Featured Speakers (I-r):

Craig Butler Director, Ohio EPA (left)

Deborah Nagle Director, Water Permits Division Office of Water Management, US EPA (center)

Theodore Boggs Of Counsel, Vorys (right)





Dogic	Earn up to 6 Contact Hours	
Regis	ster online at www.onlowea.org	
7:30-8:00	Registration, Continental Breakfast, Visit with Exhibitors	
8:00-8:15	Welcome and Opening Remarks - Dale Kocarek P.E., BCEE, Committee Chair - Michael Frommer, President, Ohio WEA	
8:15-9:00	Ohio EPA Update - Craig Butler, Director, Ohio EPA	
9:00-9:45	Ohio EPA Division of Surface Water Update - Karl Gebhardt, Chief, Ohio EPA/DSW	
9:45-10:00	Break in Exhibit Area	
10:00-10:45	Nutrient Work Group (TIC/SNAP) Update - Guy Jamesson, P.E., BCEE, City of Columbus - Elizabeth Toot-Levy, NEORSD	
10:45-11:30	Sustaining Scioto - David Rutter, Mid-Ohio Regional Planning Commission	
11:30-12:45	Lunch Buffet in Conference Dining Room Visit with Exhibitors	
12:45-1:30	NPDES Permit Program Update - Deborah Nagle, US EPA WA DC	
1:30-2:15	Storm Water Update - Jason Fyffe, Stormwater Unit Supervisor Division of Surface Water, Ohio EPA	
2:15-2:30	Break in Exhibit Area	
2:30-3:15	Washington Update - Claudio Ternieden, Director, Regulatory Affairs, WEF	
3:15-4:00	Ohio Supreme Court Update – Wastewater Permitting Issues - Theodore Boggs, Of Counsel, Vorys	
4:15	Closing Remarks	
Exhibitor		
	Opportunities	
Available		
Workshop Sponsored by		
Stantec		

March 5, 2015

Nationwide Hotel and Conference Center 100 Green Meadows Drive South Lewis Center, Ohio 43035



Register online at *www.ohiowea.org* or by phone at 614.488.5800

Registrat	ion Fee
 OWEA/WEF Member (or with new membership added) 	\$125
Nonmember	\$175
 Member plus Exhibit Table (or with new membership added) 	\$300
Nonmember plus Exhibit Tabl	e \$400
□ Add Professional Membership	\$143
Add PWO Membership	\$ 81
Add Young Prof Membership	\$ 61
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Committee Report

VIOLENCE IN THE WORKPLACE. THE REALITY OF IT ALL

by James Graham, Safety Committee Co-Chair

We live in a world where bad things happen in the workplace.

In September 2014, shots were fired near the White House and, in September 2013, a lone gunman created havoc at the Navy Shipyards. As much as we fear the acts and despise the perpetrators, the reality is these events have become commonplace. In addition to these acts of terror, the safety of your team can be at risk due to natural disasters and other unexpected events.



Yet few people ever really think it will happen to them. As a leader, you are responsible not only for

your own safety, but for the safety of those you lead. To help you lead safely at work, here are seven very important thinking points:

1. Come to terms with reality. It can happen in your workplace. A perpetrator can be someone you know or a complete stranger. Living in denial is the riskiest strategy of all. Post-tragedy interviews prove the point. You will often hear "I could never imagine it happening here."

2. Be aware and teach awareness. Criminals use the element of surprise. By paying closer attention to unusual or suspicious behavior and challenging it, you can reconfigure the odds. Don't be afraid to inquire or report, and make sure your people are not afraid either. Be polite but assertive in challenging anyone that you think looks or acts like a possible threat.

3. Get expert advice. Law enforcement officials are usually willing to offer suggestions and even training courses. Private enterprises can teach and provide security. Find someone in your community who is a proven expert in workplace safety. What is safest and most effective is not always instinctive, but an expert will know what works best.

4. Develop a plan. Make sure every employee understands what needs to happen should there be a crisis, whether by a violent person or a natural disaster. A written plan of action should be included in your Policies and Procedures Manual. It is a good idea to go over this plan with your legal counsel.

5. Do the drill. It is not enough to have a plan others cannot implement. Every quarter, or at least every six months, alert your employees to a drill and practice it so people know what to do and where to go in case of specific emergencies.

6. Find leaders within your team. These individuals can serve as captains to help coordinate and take on additional responsibility in case of an emergency. Make workplace security a team effort.

7. Consider providing a basic self-defense and safety course to all employees. It is an employee perk that will not only be appreciated, but could potentially save lives.

Remember: "An ounce of prevention is worth a pound of cure."

James Graham, Safety Committee Co-Chair *james.graham@bgohio.org*

IT'S TIME TO SUBMIT YOUR SAFETY AWARD APPLICATION

Safety Certificate and Award Recipients Will Be Recognized at the OWEA Awards Brunch on Tuesday, June 23, 2015

OWEA's Safety Recognition Program

In order to increase the level of safety in the wastewater industry, the Safety Committee of the OWEA conducts a safety recognition program to reward systems with good safety programs. There are three possible levels of recognition: OWEA Safety Certificate, OWEA Safety Award, and the WEF Burke Award.

Award will be selected from the following categories:

- 1. 1 9 Person Collections
- 2. 1 9 Person Wastewater Treatment Facility
- 3. 10 20 Persons Collections
- 4. 10 20 Person Wastewater Treatment Facility
- 5. Over 20 Person Collections
- 6. Over 20 Person Wastewater Treatment Facility

In documenting your award package, do not try to dazzle the Safety Committee with quantity. Do not include countless pages of SOP's, written programs, and other materials that can be derived from countless sources and consultants. Instead, provide proof that your program is actually complied with. Course signin sheets, tests, certificates, inspection sheets, and receipts are examples of solid documentation. In addition, a member of the OWEA Safety Committee will visit potential winners so that submitted information can be clarified and verified. Applications and supporting documents must be submitted to your section Safety Committee representative by March 2, 2015. Application available at *www.ohiowea.org* under the Committee tab -Safety

Ohio Water Environment Association 2014 Safety Award



Application filing deadline is **March 2, 2015** Application available at www.ohiowea.org on the Safety Committee page.

PLANT OPERATIONS COMMITTEE REPORT

by Kim Riddell and Joe Tillison, Co-Chairs

The Plant Operations Committee met on December 9, 2014 at the OWEA office in Columbus to start planning for OWEA 2015 Operations Challenge Invitational and the 2015 Plant Operations and Laboratory Two-Day Workshop. Members in attendance were: Kim Riddell and Joe Tillison (Co-chairs), Dave Reinker (SW Operations Chair), Walter Ariss, Bill Hill, Chad Roby, Ed Nutter, Denise Seman, and Kevin Givins. Planning is in full swing for the 2015 Operations Challenge which will be held during OWEA's 2015 Technical Conference and Exhibition at Kalahari, June 22-23, 2015. We are happy to announce that the event will again be an invitational with up to 12 teams being hosted. We will save at least 6 spots for Ohio teams until the deadline of April 15, 2015, at which point all remaining available spots will become open on a first-come first-serve basis. Register early to reserve your spot for this exciting event! Registration is now open and contest rules will be available on the website. Contact Kim or Joe to be put on a mailing list for all pertinent information.

The 2015 Plant Operations and Laboratory Analysis Workshop will be held at the Nationwide Conference Center (formerly North Point Conference Center) on October 21 and 22, 2015. We are working on a great line-up again this year! Topics will include nutrient removal, asset management, energy savings, emergency operations, reliability-centered maintenance, industrial operations, Ohio EPA updates on phosphorus optimization and certification, and of course, the return of our much anticipated cocktail hour round table forum. Save some money in the training budget and be sure not to miss this great opportunity to learn from some nationally recognized leaders in the industry as well as some Ohio "home-grown" best! We look forward to seeing you there!

In WEF Plant Operations and Maintenance news, the Board of Trustees created a workgroup in 2014 charged with developing a strategy to educate and train operations personnel. They worked to populate the workgroup with people that have expertise in operator training and understand the current, as well as future, needs of our industry. The steering committee members are Jeanette Brown (WEF Past President), Stacy Passaro, and Mike Kyle. Additional workgroup members are Philip Ashcroft, Gary Burrows, Rhonda Harris, Ken Jacob, Steve Motley, Logan Olds, Jim Pyne, Christine Radke, Kim Riddell, Matt Ries, Rob Villee, and Chuck Weir. One of the workgroup's first projects was to evaluate the information that WEF has collected from various surveys and focus group meetings over the past several years. Several critical gaps were noted in available data and it was determined that it was necessary to conduct an additional survey.

The survey will target utility managers, and others who make staff professional development decisions, at facilities of all sizes and complexities in the U.S. and Canada. Questions will be asked regarding where training is received, what the average training budget looks like, are you sending people to conferences, and what is your preferred method of operator training. Through the WEF House of Delegates (HOD), the workgroup is working with Member Associations (MAs) to encourage participation in the survey and also to help us understand their role and needs in operator training. This is an important partnership between WEF and the MAs.

The workgroup will also be concentrating on developing a knowledge framework addressing what operators need to know now and in the future. The workgroup hopes to determine the baseline knowledge that might allow for better reciprocity between states, as well as a more comprehensive understanding of operator training needs across the United States and Canada. Kim Riddell and Stacy Passaro will be coordinating this effort moving forward.

Look for additional information regarding the survey in e-Blasts and future Buckeye Bulletin issues as well as other activities / initiatives coming from this WEF workgroup. An article related to this workgroup by Jeanette Brown can be found at http://news. wef.org/wef-workgroup-develops-strategy-to-educate-and-trainoperators/ and on page 20 of the issue of the Buckeye Bulletin.

If you are interested in putting a team together for Operations Challenge, becoming a member of the committee, or assisting as a judge or volunteer for Operations Challenge, please contact Kim Riddell or Joe Tillison.

Kim Riddell, *kim.riddell@alloway.com*, 419.234.4507 Joe Tillison, *joe.tillison@bgohio.org*, 419.354.6274

CERTIFICATION BOARD UPDATE

by Kathy Richards, Director

Well Done!

We would like to congratulate the following analysts for passing the voluntary Wastewater Laboratory Analyst Exam, which was given in October 2014.

Class I

Jon Barron Lisa Dubose Nicole Erkkila Clifton Fletcher Rhonda Golubski Rachelle Howe Emily Kerber Christopher Lannan Thomas McGrain Stephen Rossette John Stein Dawn Webb

Class II

Stacie Hark Kathleen Rish Benjamin Jackson

The next opportunity to sit for the examination will be April 24, 2015. The application deadline is March 20, 2015 and the necessary form can be found at *http://www.ohiowea.org/certification.php*.

Thank you to the 450+ analysts that renewed their certifications that were set to expire on December 31, 2013. I am proud to be counted in your company.

Should you have any questions you may reach me at *certification@ohiowea.org*

Kathy Richards, Director, Certification Board

WEF WORKGROUP DEVELOPS STRATEGY TO EDUCATE AND TRAIN OPERATORS

by Jeanette Brown, WEF Past President

A little more than a year ago, I was asked to chair the Water Environment Federation (WEF) Operator Strategy workgroup. I was honored because operators are a key element in protecting public health and the environment, and I want to do whatever's necessary to ensure we have the best trained people working in these positions. We can have facilities with the best designs and the best equipment, but if we do not have well-trained operators, we cannot guarantee that these facilities will perform as expected.

As we move toward the utility of the future, we must have operators of the future who are ready to control and monitor more sophisticated processes and equipment. We have changed from wastewater treatment plants to water resource recovery facilities. We now are factories for manufacturing energy, recovering nutrients, and creating water suitable for any purpose. We are a very different sector now and that will continue to change with each passing year.

The Water Environment Federation recognizes the importance of operators to our sector and created this workgroup with the charge to develop a strategy to educate and train operations personnel. We have been extremely fortunate in populating the workgroup with people that have expertise in operator training and understand the current as well as future needs of our industry. I am honored to work with the steering committee members Stacy Passaro and Mike Kyle as well as the other workgroup members Philip Ashcroft, Gary Burrows, Rhonda Harris, Ken Jacob, Steve Motley, Logan Olds, Jim Pyne, Christine Radke, Kim Riddell, Matt Ries, Rob Villee, and Chuck Weir.

One of the workgroup's first projects was to evaluate the information that WEF has collected from various surveys and focus group meetings. We discovered several critical gaps in available data and determined that it was necessary to conduct an additional survey. Although most people groan when they hear that word, this is a necessary step to ensure that we have the right data to make decisions.

The survey will target utility managers, and others who make staff professional development decisions, at facilities of all sizes and complexities in the U.S. and Canada. We will ask questions such as where do you get your training, what is your training budget, can you send people to conferences, and what is your preferred method of operator training. I encourage all utility managers to participate in this survey. Taking the few minutes to provide answers can result in huge returns and ensure the best opportunities for your operators.

Through the WEF House of Delegates (HOD), we are working with Member Associations (MAs) to encourage participation in the survey and also to help us understand their role and needs in operator training. This is an important partnership between WEF and the MAs. The HOD has been working on operator issues for several years and their input into this process has been extremely beneficial. We also will be concentrating on developing a knowledge framework addressing what operators need to know now and in the future. We hope to determine the baseline knowledge that might allow for better reciprocity since we live in a very mobile society. As you look from state to state, there are different requirements, different grades, and different certifying agencies. We need to standardize on at least a skill set that all organizations can agree upon and accept.

WEF truly is committed to this initiative and to ensuring that the "Utility of the Future" is staffed by well-trained operators. The workgroup has identified questions that we hope to answer through our survey and focus groups such as:

- Do we need some national standard for certification?
- What is WEF's role in operator training, education, and certification?
- WEF produces high quality, peer reviewed training documents that are, in my opinion, the best money can buy. But, do we need more and different formats or different delivery mechanisms?
- If we produce the training documents, does WEF conduct the training, or do we partner with MAs, or companies to conduct the training?

A recent survey by the Department of Labor indicates there will be 20,000 jobs becoming available in the water sector during the next few years. This does not include positions opening by the retirement of Baby Boomers. It will take a major initiative to fill these positions with well-trained operations personnel. However, I believe that with the commitment of WEF and the MAs, we will develop programs that will ensure quality operations personnel will fill these vital positions.

Jeanette Brown served as president of the Water Environment Federation from 2010 to 2011. Currently, she teaches environmental engineering courses for both graduates and undergraduates at Manhattan College (Bronx, N.Y.). Prior to that, she was executive director of the Stamford (Conn.) Water Pollution Control Authority.



Reprinted with permission from WEF Highlights, December 2014; http://news.wef.org/wef-workgroup-develops-strategy-to-educate-andtrain-operators/; Water Environment Federation, Alexandria, Virginia. All rights reserved.

Do you know an operator who gets things done, goes beyond the ordinary, and makes a contribution to Ohio's water environment? Do you have a great operator story, recruitment example, or operator profile you would like to share? Contact OWEA at *info@ohiowea.org* or 614.488.5800 if you do. We can help or you can view author guidelines at *http://www.ohiowea.org/buckeye_bulletin_author_guidel.php*

Operator Feature



by Vince Zampelli, City of Akron

We have a lot to be proud of here at Akron's Water Reclamation Facility. We can boast of a string of NACWA Silver and Gold Awards, chemical savings, energy savings, and energy generation. We can boast about the re-engineering of our facility that changed the way we operate our plant. The re-engineering led us from a staffing level of around 115 persons in the 1980's to 38 today (all through attrition). Of course, we are a little lower than we want or should be, and that leads me to my point. What we are most proud of are not things, but people, and I would like to focus on one individual in particular.

His name is Joseph T. Sykes III. He was one of two young men who helped me present *"From High School to Highly Skilled* - *Akron's High School Intern Program"* at the NESOWEA Supervisory Seminar in Richfield, Ohio on October 22, 2013. Joe was selected to be the plant's high school intern in September of 2012. He worked part time his senior year 2012-2013. In June of 2013, after a season of evaluating him, we were able to hire him full time as a treatment plant utility worker (entry level position). Joe's time at the plant was spent on various tasks in operations and maintenance, but he opted to spend more of his time in operations. In May 2014, our need for operators and the initiative that Joe has shown since day one, led us to ask him to train as a wastewater operator. Finally in July, Joe was promoted to wastewater operator.

Oh, did I mention that all along Joe has been studying and preparing to take the wastewater exam? Well, his preparing, training, studying, and caring has paid off because at 20 years of age, Joe has received his State of Ohio Class I wastewater operator license. Joe was most recently heard asking when could he go for his Class II license. For the record, Joe is not an isolated situation. I am blessed to see many success stories in the making.



Joseph T. Sykes III, Akron's Water Reclamation Facility.

This is our future and we are excited!

Vince Sampelli, City of Akron vzampelli@akronohio.gov

Article and photo reprinted with permission from NESOWEA Sparkling Waters, December 2014; Vol 19, Issue 1

TEST YOUR KNOWLEDGE – TAKE THE OPERATIONS QUIZ

- 1. An organism that can live in either an aerobic or anaerobic environment is called ____?
 - a. Facultative
 - b. Aerobic
 - c. Anaerobic
 - d. Digestive
- 2. The average time a microorganism spends in the activated sludge process is referred to as ____?
 - a. DT
 - b. MCRT
 - c. WAS
 - d. RAS
- 3. Total Dynamic Head (TDH) determines a pump's _____ in practical applications.
 - a. Horsepower
 - b. Speed
 - c. Performance
 - d. Weight

- 4. Which of the following pumps are Positive Displacement pumps?
 - a. Plunger
 - b. Peristaltic
 - c. Progressive Cavity
 - d. All of these
- 5. Gears are commonly used to change the speed or direction of a rotating force. Gear reduction means that the output of the shaft speed will _____ and the output of the torque will _____?
 - a. Decrease; increase
 - b. Increase; decrease
 - c. Increase; increase
 - d. Decrease; decrease

Answers noted below.

Questions, comments, or submit a suggested question? Email OWEA at info@ohiowea.org

Answers: 1-a; 2-b; 3-c; 4-d; 5-a



"A Day on the Job" Feature

MAYBE I'LL CALL IN SICK NEXT TIME?

by Capt. Travis M. Clower, MBA, PE, Integrity Aquatic, LLC

Over the years, I've always heard the older commercial divers say, "Working (diving) in wastewater is not that bad." With our occupation, we often have to work in environments other than water that are not always so pleasant. So for comparison I asked a few of my divers about their worst dives. These will help set the stage for my story that follows.

The first example that comes to mind is a job for another contractor at a steel mill in northern Ohio about 10 years ago. Several of us had worked pumping grease from the bottom of a pit filled with cooling oil and grease. The area was fairly small and could usually be cleaned out in a few days. The divers wore drysuits and worked in four hour shifts (or until your bladder was about to explode – whichever came first). They then came up for a break. The oil had the consistency of water and the grease felt like soft mud on the bottom. We often pump mud from intake pipes and this wasn't much different. I know what you are thinking. "How can you see anything?" Not being able to see is the norm in this job and after a few hours your senses adapt. When you can actually see underwater, it's a real treat. Other than the cleanup at the end of the day, the steel mill oil/grease pit job wasn't too bad.

The next job that came up in our conversation was for a paint manufacturer. One of my more experienced divers did some work a few years ago in a paint tank. He said he needed to wear a lot of weight to sink but the job went well. I forgot to ask him what color the paint was!

After finishing the paint story, he then laughed and said the worst one he's dove was for a sausage factory. He turned his head, looked down, and curled his bottom lip as if he might gag. He had to go in and fix the mixer in a tank of semi-liquid pig parts. He is a far better diver than I am and I've never seen him pass up the chance to get in the water. For him to say that he didn't want to get back in, it had to be bad. Glad I wasn't on that job.

Anyways, you get the point. Our occupation puts us in some pretty nasty stuff but somehow, in the past 24 years, I've avoided the wastewater diving. Eventually curiosity got the best of me and I had to do it! Some people just have a twisted sense of adventure. So I bid the job low and PRESTO! We got it. After a few rounds of immunization shots and a lot of equipment prep, we were on our way to dive at a treatment plant in northeast Ohio. My crew affectionately called it the "Poo" dive. Nobody else on the crew wanted to dive that day. Funny how that works.

It was a pretty simple job that involved mounting a piece of conduit vertically to the concrete wall with stainless steel expansion anchors and stainless steel brackets. The room was about 20 feet tall with about 16 feet of raw



Last chance to back out!

water flowing through it. Learning to dive in Baltimore Harbor, I was used to pushing aside the solids on the surface before getting in. Instead of the normal floating trash, syringes, and prophylactics, this dive offered about 3 inches of feces and cooking grease. At that point it was better to block that part of the job out of my mind and focus on mounting the conduit.

In preparation, we assembled as much of the brackets above water as possible. Three brackets were drilled and mounted above the surface and three below. The drill was working well, the helmet was dry and the smell wasn't too terribly bad. "Everything was going too smooth", I thought. Oooops! I just jinxed myself. Of course I had to hit a piece of rebar buried in the concrete and wedged the drill bit on the fourth bracket down. The next 15 minutes were spent hanging in mid water fighting to free a stuck drill bit. Of course we had a spare, but it was a matter of principal that the boss wasn't going to leave a bit down there. I would never hear the end of it from my crew. There was a rusty cast iron pipe about 3 feet away that I could wrap my legs around to get leverage and pull on the drill. About the time the bit finally came loose, I felt the all-toofamiliar feeling of a leak in the leg. Seems the rusty pipe I was so happy to find for leverage ripped a small hole in the drysuit leg



Diver suiting up for the plunge.



A day at the office.

during the stuck bit fiasco. "All I've got to do is finish this bracket and install the two below it. How much water can possibly leak into the suit in that small amount of time! Yes we have another suit, but at this point I'm not coming out until the job is done." Again, ego got the best of me.

Eventually it all got done, the diver exited the manhole, and the decontamination process started. About a gallon of water came out of the suit when I took it off. Yuck!



Getting a much needed bath!

"A Day on the Job" Feature

There were some lessons learned on my first wastewater dive. Besides the stuck drill bit, the biggest challenge was the grease that covered all the tools and the faceplate of the helmet.

Lesson 1: The grease made it almost impossible to hold anything and impossible to see anything above or below water. We did not plan on encountering that.

Lesson 2: If I ever get a drill bit stuck in a situation like that, I'm going to purposely break it off in the hole, plead the fifth, get the spare bit, and drill another hole. My guys will never know.

Lesson 3: Yes, the old timers were right. "Working (diving) in wastewater is not that bad." Some companies do it routinely and it is just another day at the office for them. More power to them. The water was warm and before the grease accumulated on the helmet faceplate I could actually see an inch or two. Not bad conditions. But maybe I'll call in sick next time?

Capt. Travis M. Clower, MBA, PE

Owner of Integrity Aquatic, LLC, Commercial Diving Services *integrity.aquatic@yahoo.com*





This Week in Washington is a weekly publication of the Water Environment Federation's Government Affairs Department. It provides updates on the latest legislative and regulatory developments that affect water quality.

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Ohio EPA Update

ORGANIZATIONAL AND PROCESS IMPROVEMENTS IN OHIO EPA'S DIVISION OF SURFACE WATER

by Elizabeth Wick, P.E., Ohio EPA, NWDO

"Change is the law of life. And those who look only to the past or present are certain to miss the future." John F. Kennedy

There have been a lot of changes at Ohio EPA and in the Division of Surface Water (DSW) in the past year. In DSW it started with the addition of **Karl Gebhardt** as our division chief and deputy director of water resources. Karl came to us from the Ohio Department of Natural Resources where he served as deputy director and as the agency's point person for water quality and water resource issues. Prior to his role as deputy director at ODNR, he was the Chief of the Division of Soil and Water Resources. There he provided leadership for the expansion of onthe-ground conservation practices, and developed legislation that would help in the efficient and effective delivery of conservation programs for nutrient management.



Karl's career has spanned more than 40 years in natural resource management, public policy and development community relations in both the private and public sectors. He began his career with the ODNR Division of Parks before being one of the first employees in ODNR's Division of Natural Areas and Preserves in the early 1970s. He later became a legislative liaison. In addition to his work at ODNR, Karl also held

Karl Gebhardt

various management and policy related positions for the Ohio Farm Bureau Federation. He also served as the first executive director for the Office of Farmland Preservation at the Ohio Department of Agriculture. His experience also includes 12 years as the owner of Teater-Gebhardt and Associates, a natural resources consulting and policy firm, and as a senior vice president with Paul Werth Associates, a Columbus public relations firm.

As you can see from his extensive background in natural resources and environmental issues, Karl is a great asset to the Division of Surface Water. He coordinates at the local, state, and national levels on nutrient, harmful algae bloom, invasive species, and related issues across Ohio EPA and with other agencies. As deputy director, he works with both the Division of Surface Water and the Division of Drinking and Ground Waters.



Tiffani Kavalac

The division also welcomed a new assistant chief recently. **Tiffani Kavalac** was appointed in August 2014, when she joined Brian Hall to help manage the many programs in DSW. Tiffani has been with Ohio EPA since 1995. She worked as an environmental specialist in the Division of Environmental Response and Revitalization (DERR) enforcement program for more than five years. In 2002, Tiffani became

the manager of the Site Assessment and Brownfield Revitalization (SABR) program, where she did a lot of work on the Clean Ohio Revitalization Fund. In 2009, she became the manager of DERR's Assessment, Cleanup and Reuse (ACRE) section, where her duties included oversight of the voluntary action, federal facilities, remedial response and site assessment programs.

The addition of a second assistant chief enables DSW programs to be distributed more appropriately. The programs that report directly to Tiffani are Lakes Management (AOCs), Surface Water Improvement Section (319), Permits (Storm Water, 401, PTI, NPDES) and Compliance & Enforcement. The programs that report directly to Brian Hall are Information Systems, Standards and Technical Support, Fiscal, Assessment, Modeling and TMDL, and Ecological Assessment.

Many of you may already know that Paul Novak retired from Ohio EPA and joined the Indiana Department of Environmental Management. Dan Gill (NPDES permit manager) also left the Agency at the end of October. Paul's position will not be filled. **Erin Sherer**, former compliance and enforcement supervisor in Central District Office, is now managing the permitting program, as well as the pretreatment and biosolids programs. Erin brings extensive experience with water quality and watershed modeling; development and implementation of TMDLs; compliance and enforcement of NPDES permits; and district office and central office perspectives. She has a holistic and collaborative approach to permitting and a very positive attitude toward improving permit processing efficiency.

Erin holds a BS in Mathematics and an MS in Civil Engineering from The Ohio State University. She began her DSW career in the modeling and assessment section, and rose to be the lead worker and technical supervisor for this group. She then accepted a position in DSW Central District Office as the compliance and enforcement supervisor. There she gained on-the-ground experience with facilities, as well as with many challenging regulatory



Erin Sherer

situations. Prior to Ohio EPA, Erin worked for the Environmental Remediation Section of Battelle Memorial Institute designing and installing sub-surface remediation systems for petroleum contamination. Erin greatly enjoys her family, including her husband, her five-year-old daughter, and two-year-old son. She is a competitive one-design sailboat racer who has earned multiple national titles, a before-kids marathoner, and an avid reader. She looks forward to working with OWEA and its members in the near future and appreciates your patience as she grows in her new position.

Changes also are occurring in the structure and internal processes of the division to improve customer service and efficiency. The 401 and storm water programs have been combined. The

Ohio EPA Update

management position for this combined unit was in the process of being filled when this article was written. In addition, the TMDL program management was merged with the modeling and assessment section.

In an effort to improve the NPDES permitting process, a LEAN event was held last October to identify ways to improve internal efficiency and the quality of service to DSW customers. Lean Six Sigma examines existing processes and explores ways to improve the speed and quality of those processes. The projects implemented help save money while maintaining the critical functions and purpose of the process.

The DSW LEAN project started by surveying stakeholders on how they thought the division was doing and where improvements were needed.

Some highlights of the LEAN process:

- Role Clarifications NPDES major and coal permits were moved from central office lead to the district offices, which should eliminate some duplicative reviews.
- Communication Central office staff will focus on guidance, development, and training both on internal staff and external applicants. In addition, a new step will be added to the permitting process that allows the applicant to review and comment on their draft permit and provide feedback prior to public notice.

- Better Website Communications A web-based permit tracking tool will be developed that allows applicants to easily see the status of a permit in the renewal process.
- In the future, permit renewals will be more in line with the permit expiration date rather than the state fiscal year or calendar year. In other words, a permit renewal should be effective within 30 days of the expiration date of the previous permit.

During the LEAN event, other program areas were identified that should be evaluated for improvements. Stay tuned for other customer service enhancements.

All of us in the Division of Surface Water are trying to ride with the flow and work through these changes. We hope you will have patience with us as we adjust to the new procedures and staff alignments, while keeping and improving our commitment to excellent customer service.

Elizabeth Wick, P.E., Ohio EPA, NWDO elizabeth.wick@epa.ohio.gov



AVAILABLE FUNDING FOR WASTEWATER TREATMENT PLANT EFFORTS TO REDUCE NUTRIENT DISCHARGES

Ohio EPA is pleased to announce that financial assistance continues to be available to promote enhanced nutrient reduction efforts at publicly owned wastewater treatment plants in Ohio.

Nutrient pollution is a major water quality problem in Ohio as significant increases in algae growth and resulting impact to human health have recently occurred throughout the state due to increased phosphorus concentrations in our water from various sources. More information on harmful algae blooms (HABs) can be found at http:// epa.ohio.gov/habalgae.aspx.

In 2013, Ohio finalized its Nutrient Reduction Strategy (http:// epa.ohio.gov/Portals/35/wqs/ONRS final jun13.pdf) which recommends voluntary practices and regulatory based initiatives designed to reduce nutrient losses in runoff and subsurface drainage and to remove nutrients through point source treatment technologies.

Ohio EPA is offering a financial incentive to communities to help implement point-source nutrient treatment and reduction projects in 2015. While the formal nomination period for 2015 WPCLF projects has closed, in an effort to ensure that all Ohio communities have the opportunity to avail themselves of this funding, Ohio EPA will accept funding requests on a rolling basis until the \$100 million has been awarded in 2015.

These funds will be administered through Ohio EPA's Water Pollution Control Loan Fund (WPCLF) and can be used for planning, design, and construction of qualifying projects. Specifically, Ohio EPA is making \$100 million available at a 0% interest rate for projects that include equipment and facilities to reduce the levels of phosphorus and/or other nutrients from the effluent discharge.

The discounted rate applies to the portion of the project directly attributable to the nutrient reduction. Below-market interest rate loan funds (including hardship rates, where applicable) will be offered for the balance of a proposed project. Priority will be given to public wastewater treatment systems that are in the Lake Erie Watershed, or that are located in a watershed where Ohio EPA has identified (through a Total Maximum Daily Load (TMDL) study) that phosphorus and other nutrients are excessive.

In order to be assured of fund availability, please let your district surface water manager (listed below), know by March 6, 2015 if you will be seeking this funding. Ohio EPA district surface water staff may also contact facilities in watersheds where nutrient impairments have been identified, to see if this program might be of interest. For specific information on or assistance with requesting funding for your project, you should contact Becky McKinney at Ohio EPA's Division of Environmental and Financial Assistance at 614-644-2798 or epa.defamail@epa.ohio.gov.

Thank you in advance for your consideration of this program and for your on-going efforts to help improve Ohio's water quality.

District Surface Water Managers

Elizabeth Wick, NWDO Manager 419.373.3002 Elizabeth.Wick@epa.ohio.gov Richard Blasick, NEDO Manager 330.963.1112 Richard.Blasick@epa.ohio.gov Mike Gallaway, CDO Manager 614.728.3843 Michael. Gallaway@epa.ohio.gov Debora Roth, SWDO Manager 937.285.6100 Debora.Roth@epa.ohio.gov Marco Deshaies, SEDO Manager 740.380.5426 Marco.Deshaies@epa.ohio.gov

Committee Report

PUBLIC EDUCATION COMMITTEE UPDATE

by Tyler Linton, Chair

District and State Science Fair Judges Needed

Help OWEA select the Ohio winner of the State Stockholm Junior Water Prize. Be an OWEA Judge at the Ohio State Science Day. If you are interested in science and education, we can use your help.

If you've judged in the past, thank you. Please join us again. If you would like to get involved but do not know how, please contact:

Public Education Chair, Tyler Linton, *tlinton@glec.com* OWEA Office, 614.488.5800, *info@ohiowea.org*.

District and State Science Fair

Consider volunteering to help judge waterrelated projects at the The Ohio Academy of Science, Ohio State Science Day on May 16, 2015.



OWEA recruits members to judge at the Ohio State Science Day to award OWEA's \$1000 Scholarship and 1st (\$500), 2nd (\$300), and 3rd (\$200) Place Awards.

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Also, section representatives judge water projects at the District Science Days. Contact your section leadership if you would like to help out at the District Science Days. For dates and locations, visit *www.ohiosci.org*.



Stockholm Junior Water Prize Competition

District judges - if you see good water projects, please encourage the students to enter the Ohio Stockholm Junior Water Prize (SJWP) competition. Ohio students are encouraged to enter the SJWP competition to compete for a chance to attend the national competition, which will be held in Herndon, Virginia. OWEA judges will select an Ohio representative to compete at the National Competition for the SJWP. Last year, Mason, Ohio student, Bluyé DeMessie was runner-up at the National Stockholm Junior Water Prize Competition.

Students interested in vying for the Ohio Stockholm Junior Water Prize should visit *http://www.wef.org/SJWP/* to enter the competion. Eligibity and entry information is posted there. The entry deadline is April 15, 2015.

Public Education Committee and Science Teachers

OWEA's Public Education Committee hosted a booth at the Science Education Council's Ohio Science Institute. The committee held a drawing to give out 24 water test kits and shared information on "Do and Don't Flush; OWEA's Public Education and Outreach Funding Assistance; and the importance of science education for future water quality professionals.

Chair, Tyler Linton, tlinton@glec.com



Melodi Clark at OWEA's booth at the SECO Conference.

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Ted Baker, OWEA Sponsorship Committee Chair 440.829.8405, kingsnu@aol.com

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Roll Call, Passings, and New Members





ROLL CALL

Jennie Celik, PE, ENV SP, has joined HDR as a water project manager. Celik is based in the Cleveland office and will serve water and wastewater clients in Northeast Ohio and across the region.

Celik joins HDR after spending nearly nine years at AECOM, where she served as project manager and design manager of the City of Akron's program management team. She has extensive experience in planning and design of sewer collections systems, consent decree

compliance, and water/wastewater treatment. Her experience includes major projects in Akron and Northeast Ohio regional sewer district.

A registered, professional engineer, Celik is president of the Akron-Canton section of the American Society of Civil Engineers, and a member of the American Water Works Association and the Water Environment Federation. She holds a bachelor's degree in civil engineering from the University of Akron and a master's degree in environmental and water resources engineering from the University of Texas, Austin.

Ed Haller started December 1, 2014 as the new Director of Water Pollution Control for the City of Warren. He retired from the Northeast Ohio Regional Sewer District after more than 30 years of service.





PASSINGS

John A. Eastman, PH.D., P.E., 67, passed away December 28, 2014 in Yellow Springs, Ohio.

Dr. Eastman was an environmental engineer with 37 years of experience. He specialized in water and wastewater infrastructure and facilities. Areas of expertise included design and quality control for water and wastewater treatment systems, wellfields, water distribution, wastewater collection, pumping facilities and groundwater remediation.

He earned a doctorate degree from University of Washington and a master's degree from The John Hopkins University, both in environmental engineering, and a bachelor's degree in engineering science from Antioch College. Dr. Eastman was employed by LJB, Inc. for 27 years.

John was a lifetime resident of Yellow Springs, and a 1970 Antioch College graduate. He expressed his love for his community in many roles, most recently as Miami Township Trustee, Friends Care Center board member and clerk of the Yellow Springs Friends Meeting. He was an active member and supporter of OWEA for many years.

> OWEA members may complete the Roll Call form at http://www.ohiowea.org/memberships.php

Information regarding members who have passed away may be emailed to info@ohiowea.org

OWEA's WEF Utility Partnership Program Member Utilities

Avon Lake Municipal Utilities City of Canton WRF City of Columbus DPU City of Fairborn City of Harrison City of Mansfield City of Newark WTP City of Solon City of Steubenville City of Toledo DWR

City of Warren WWTP Clermont County Sewer District Fairfield County Northeast Ohio Regional Sewer District Sanitation District No 1

To learn about the benefits for your utility visit http://www.wef.org/UtilityPartnership/ or contact Judi Henrich, judihenrich@ohiowea.org, 614.488.5800 or Brittany Burch, bburch@wef.org, 703-684-2400 x 7213.

WELCOME NEW MEMBERS

October 2014 to December 2014

- Tom Abraham Kailen Akers Joe Bauman Jason Beck Brian Bidwell David Billie Frank Conner Joseph Cook James Crawford
- Dave Dechristopher Lisa Deguzman Kenneth Duplay Rhyan Eichhorn Clemens Halene Isabelle Hammer Wick Hathaway John Hredzak Daniel Johnson
- Thom Johnson Daniel Knecht Kenrick Knighton Brad Kuhlman Terry LeMaster Roger Lind Michael McGing Timothy McLelland

Rick Johnson

- Shawn Nation Glenn Neese Alissa O'Donnell Greg Peters Shyam Prasad Jonathan Reynolds Bryce Rizzo Talia Rozenbojm Geoffrey Schweinfurth
- Robert Smith Adam Sprague Jeremiah Swetel Betsy VanWormer Melinda Watkins Donnajean Wells

Thank you for joining the Ohio Water Environment Association and the Water Environment Federation. We welcome your contribution to preserving and enhancing Ohio's water quality environment.

Visit http://www.ohiowea.org/memberships.php for OWEA membership information



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Hosted by the Northwest Section. For information contact:

Doug Borkosky Conference Co-Chair 614.361.3673 doug@hlbaker.com Dave Sprague Conference Co-Chair 419.394.8616 spragoo@bright.net Elizabeth Wick Technical Program Chair 419.373.3002 elizabeth.wick@epa.ohio.gov

Ohio Water Environment Association 614.488.5800 info@ohiowea.org

Dear Colleagues,

Join OWEA as we go back to Kalahari and the Lake Erie Shores region for the OWEA 2015 Technical Conference and Exhibition! Will it be the **Same Old, Same Old**?

We invite you to decide for yourself . . . because like so many things in life, assumptions about the **"Same Old, Same Old"** vary from person to person. In fact, the entire conference is being framed with the mindset of questioning our own perceptions and judgements about the **Same Old, Same Old**. (In our conference logo, note the aptly placed question mark. . .)



Some traditions are extremely valuable and important. Some habits are worth keeping. Old friends are always enjoyable to see.

But: Some traditions can stand change. Some habits are destructive or, at the least, unproductive. Some strangers will bring welcome ideas and laughs to the table.

We invite you to revel in the past, assess the present, and vision forward to the future . . . all in the comfortable and recently expanded Kalahari Convention Center in Sandusky, Ohio. Our conference committee is working diligently to lay the groundwork for everything from intellectually stimulating tech sessions to emotionally fulfilling networking. Be our guests for several days of challenging the **Same Old**, **Same Old**.

Sincerely,

2015 Conference Committee Co-Chairs Doug Borkosky, *doug@hlbaker.com* Dave Sprague, *spragoo@bright.net*

Same Old, Same Old – VALUE

The 2015 Technical Conference and Exhibition promises to embrace at least one **"same old, same old"** time-honored tradition—**Value**. OWEA is offering value throughout this conference:

Exhibitors: We are utilizing the large Kilimanjaro Ballroom—maximum square footage! The Exhibit Hall is going to be spacious enough to welcome around 100 booths and the Ops Challenge Invitational. Also, except for the Sandusky WWTP Tour, there will be no other contact hour sessions other than Exhibit Booth tours and one track of exhibitor presentations (in an adjacent room). Exhibit booths also include a ticket to our (time honored and revered) Meet & Greet. Tuesday is your day for value.

Operators: Yes, it is about contact hours—up to 4 hours Tuesday, 6 hours Wednesday, and 3 hours Thursday. Attend the additional Northwest Section Utility Workshop on Monday (5 hours more), and you could earn up to 18 total contact hours! BUT, no, its not just about the same old, same old contact hours—the conference also offers you the opportunity to meet, converse, and share with operators from all over the state (and beyond). There is an immeasurable value in the learning from the operations experience gathered at the conference.

Consulting Engineers: Continuing education . . . Got it! Operators from all over . . . Got it! Access to 80 to 100 equipment and technology vendors in one place . . . Got it! Doesn't that equate to good value?

Everyone concerned about the water environment (managers, regulators, NGO's): this is Ohio's premiere week of value for you . . . access to knowledge, experience, and cutting edge information—don't miss it!

OWEA Needs Your Help

A successful conference relies on the contributions of time and effort from volunteers. Meet other water professionals, network, have fun - all while helping out. If interested, contact OWEA at *info@ohiowea.org* or 614.488.5800. Full details and online volunteer form available at *www.ohiowea.org*

Volunteer Opportunities include:

Registration:Monday - ThursdayGolf Volunteers:MondayFacility Tour Monitors:TuesdayExhibit Tour Monitors:Tuesday

Sign Wranglers: Tuesday - Thursday Ticket Takers: Tuesday and Wednesday Moderators: Tuesday - Thursday Monitors: Tuesday - Thursday


Kalahari Convention Center





Interested in becoming an OWEA Sponsor? Sign up at www.ohiowea.org or contact OWEA at 614.488.5800, info@ohiowea.org Sponsors committed as of 1/28/15. See page 29 for more details

Registration Options

Early Registration - by May 31st:

Full Conference Member	.\$275
Full Conference Nonmember	.\$375
Retired Member Full Conference	.\$150
Tuesday Only Member	.\$145
Tuesday Only Nonmember	.\$195
Wednesday Only Member	.\$145
Wednesday Only Nonmember	.\$195
Student	\$50
Spouse/Guest Program	.\$160
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Late Registration - June 1 and after:

Full Conference Member	\$325
Full Conference Nonmember	\$425
Retired Member Full Conference	\$200
Tuesday Only Member	\$170
Tuesday Only Nonmember	\$220
Wednesday Only Member	\$170
Wednesday Only Nonmember	\$220
Student	. \$75
Spouse/Guest Program	\$210

Budget Options*

*This option for attendees who only want to attend Technical Sessions on Tues, Wed, or Thur, or walk the Exhibit Exposition on Tuesday. Except for lunch on Wed, which is included, Food/beverages/networking events are not included in this price.

Tues Tech Sessions & Exhibition	\$50
Wed Tech Sessions & Lunch	\$75
Thur Tech Sessions - 1/2 Day	\$50
Multiple Day Combo Available	

NWOWEA Preconference Workshop*

Monday, June 22 \$25
*requires a separate registration

Exhibitor Registration:

Includes Full Conference Registration	
for Primary Exhibitor	
Mombor Exhibitor	700

Nonmember Exhibitor	\$850
Extra Booth Attendant (2 max)	\$50

Golf Registration:

Foursome	\$	360
Individual	Golfer	\$90

OWEA 2015 Sponsorship Levels:

Titanium	. \$7500
Platinum	\$6000
Gold	\$4500
Silver	\$3000
Bronze	\$1500
Copper	\$1000
Break	\$500
Golf	\$250
Sustaining	\$250

Register online *www.ohiowea.org*

Schedule | Monday, June 22 - Thursday, June 25

MONDA	Υ	<u>JUNE 22</u>	
8:00 a	-	9:00 p	Registration Sponsor ARCADIS
9:00 a	-	4:30 p	Operations Challenge Sponsor OVIVO
9:00 a	-	4:00 p	Preconference Utility Workshop Sponsor NWOWEA
10:00 a	-	4:00 p	Golf Outing - Thunderbird Hills North Course
6:00 p	-	9:00 p	Exhibitor Setup
7:30 p	-	10:30 p	Welcome Social - Attendees and Ops Teams
TUESDA	Υ,	<u>JUNE 23</u>	
7:00 a	-	5:00 p	Registration Sponsor Hazen and Sawyer
7:00 a	-	8:30 a	Exhibitor Setup
8:00 a	-	10:30 a	Operations Challenge Sponsor OVIVO
8:30 a	-	10:30 a	Exhibition Open
8:30 a	-	9:30 a	Coffee & Pastries in Exhibition
10:30 a	-	1:00 p	Awards Brunch
10:30 a	-	1:00 p	Exhibitor & Ops Challenge Optional Brunch Seating
1:00 p	-	5:00 p	Exhibition Open
1:00 p	-	5:00 p	Operations Challenge Sponsor OVIVO
1:00 p	-	3:00 p	Facility Tour City of Sandusky WPCP
TBA	-	TBA	Kalahari Facility Tours
1:10 p	-	4:00 p	Technical Sessions - TBD
1:00 p	-	2:30 p	Spouse/Guest Program
1:00 p	-	4:00 p	Exhibit Tours (earn Contact Hours)
4:00 p	-	5:00 p	Exhibitor Reception Sponsor Brown and Caldwell
4:00 p	-	5:00 p	Ops Challenge Awards
5:00 p	-	6:00 p	OWEA Annual Business Meeting
5:00 p	-	6:00 p	Exhibit Tear Down
6:30 p	-	10:30 p	Meet & Greet Sponsor CT Consultants
10:30			After Party at Longnecks
WEDNES	5D/	AY, JUNE 2	24
7:00 a	-	5:00 p	Registration Sponsor ARCADIS
7:00 a	-	8:00 a	Crystal Crucible Breakfast Sponsor Alloway
7:00 a	-	9:00 a	Breakfast Sponsor Stantec
8:00 a	-	11:45 a	Technical Sessions (4 Concurrent Sessions)
11:45 a	-	1:00 p	Lunch
11:45 a	-	1:00 p	President's Luncheon (by invitation)
1:00 p	-	4:45 p	Technical Sessions (4 Concurrent Sessions)
6:00 p	-	7:00 p	Reception – 5S Induction
7:00 p	-	9:30 p	Annual Banquet & Awards Sponsor CDM Smith
THURSD	A	<u>, JUNE 25</u>	
7:00 a	-	11:00 a	Registration Sponsor Hazen and Sawyer
7:00 a	-	9:00 a	Breakfast Sponsor Stantec
7:00 a	-	8:00 a	5S Breakfast Sponsor Jones & Henry

Did you know?

8:00 a - 11:45 a 12:00 p - 2:00 p

- You can earn up to 13 Contact Hours at the 2015 Technical Conference and Exhibition.
- Over 500 individuals have attended and/or participated in each of the past six Ohio Water Environment Association's annual conferences held 2008 - 2013.

Executive Committee Meeting

Technical Sessions (2 Concurrent Sessions)

- The Exhibition floors have filled with exhibitor booths over the past six years, so reserve your booth soon!
- An army of OWEA volunteers provides the planning, coordinating, moderating, monitoring, ticket taking, sign wrangling, and many other tasks to provide this educational experience for Ohio's water quality professionals.

NWOWEA Utility Workshop - 4.5 Contact Hours for \$25!! June 22, 2015

Attn: Front line operators, engineers, and management/city officials from small to large utilities.

Be our guest! The OWEA Northwest Section invites you to attend the pre-conference Utility Workshop.

This one-day technical workshop is open to ANYONE — conference registrants and one-day visitors. The cost of the workshop is being offset by NWOWEA as a member service and therefore the workshop, including lunch and continental breakfast is only \$25 (about the same as a section meeting.)

Special Offer: Invite your manager to come with you for **FREE!** If an operator or superintendent registers for the workshop, they may register one manager, engineer, or governmental official (from the same city or village) to attend for free. (Pre-registration is required) Examples of qualifying individuals would be council member, mayor, service director, facility engineer, county engineer, city engineer, utilities director, board of public affairs member. It is our hope that the manager will benefit from the presentations offered and that it will give them additional insight into some issues facing Ohio's water professionals.

(Note: This event requires SEPARATE registration from the conference. Non-members are also encouraged to attend at the same rate.)

NWOWEA Pre-Conference Utility Workshop				
8:00	9:00	Registration with Continental Breakfast		
		OPERATIONS/ENERGY EFFICIENCY MANAGERIAL		
9:00	9:45	Plant Safety	Shared Services	
10:00	10:45	Energy Savings and Saving Money in Operations	Innovative Leadership Practices	
11:00	11:45	Energy Audits - What Are They and How Can They Help You?	Construction Manager at Risk - New Project Delivery Methods	
11:45	1:00	Lunch -	Lunch - Included	
1:00	1:45	Nutrient Management	Asset Management	
2:00	2:45	Biosolids	Asset Management	
3:00	3:45	Ohio EPA Update	CMOM - How to Develop Your Collection System Maintenance Program	

OWEA thanks NWOWEA, RCAP, OEPA and other presenters for making this workshop possible.

Welcome Reception and After Hours | Mon, Tue, and Wed - June 22, 23, & 24

Monday Welcome Event

Join conference attendees in welcoming the 2015 Operations Challenge team members. Meet the competitors who will be competing on Tuesday in the Maintenance, Collections, and Safety Events.

Tuesday and Wednesday After Hours

Continue networking and keep the dialogue going. OWEA will have its own gathering place at Longnecks, in the Kalahari Convention Center.



Exhibition | Tuesday, June 23, 8:30 - 10:30 a.m. & 1:00 - 5:00 p.m.

Exhibitor spaces are limited so reserve your booth now!

The Exhibition will be held at Kalahari Convention Center in Sandusky, Ohio. The Exhibit Hall will be open Tuesday from 8:30 - 10:30 a.m and 1:00 - 5:00 p.m., with a social in the Exhibition Hall from 4:00 - 5:00 p.m.

Register online at www.ohiowea.org. or contact OWEA at 614.488.5800/info@ohiowea.org.

Registration includes one full conference registration for primary exhibitor:

\$700 for OWEA members\$850 for NonmembersAdditional Booth Attendants: \$50 includes Exhibition access and Tuesday brunch





Exhibitor Reception | Tuesday, June 23, 4:00 - 5:00 p.m.

Join the 80+ Exhibitors in the Exhibition Tuesday afternoon for a light afternoon social as you take advantage of the last hour to stroll the exhibit aisles. Enjoy a refreshment and see the new offerings by the 2015 exhibitors. Congratulate the winners of **OWEA's Operations Challenge Invitational** as the event trophies are awarded to the victors!



Exhibit Learning Tours | Tuesday, June 23

Earn 1 Contact Hour per tour

Each tour will include four 15 minute sessions in the exhibit hall, educating attendees about new technology, systems, and BMP's in various aspects of water reclamation and treatment.

OWEA's exhibitors typically include representatives from collections, treatment, stormwater, instrumentation/SCADA, laboratory services, and consulting engineers. Exhibit tours are a great way to get updates on trends and innovations nationwide as exhibitors include both local and national companies. Sign up for exhibit tours the day of the Exhibits!

City of Sandusky WPCP | Tuesday, June 23, 1:00 - 3:00 p.m.

Sign up Online or at Registration Desk - Space Is Limited

Earn 1.0 Contact Hour!

Nestled on the shore of Sandusky Bay and a stone's throw from Lake Erie, the City of Sandusky Water Pollution Control Plant is a classic WWTP in its use of primary settling, activated sludge, and anaerobic digestion. With an average daily flow of 15.7 MGD and peak flows of 42 MGD, the WPCP is the major treatment facility for the City and surrounding tourism sites. The WPCP was most recently upgraded in 2010.

Join the City of Sandusky WPCP staff for a tour of the plant and get a peek of the Bay on your way by!

No additional charge for the tour.

Available option for Full and Tuesday One Day registrations.



Kalahari Facility Tour | Tuesday, June 23 - Sign up at Registration Desk

Kalahari Resort Sandusky has an indoor water park that covers 173,000 SF and an outdoor waterpark covering 77,000 SF. Underneath the waterpark and the nearly 900 hotel rooms lies a service area that manages not only housekeeping and laundry but also water treatment and reuse.

Earn 1 Contact Hour for the tour - Times TBA

As part of the tour, attendees will see:

- Several banks of pressure filters
- Inline UV disinfection units
- Chlorine storage and dosing
- Chlorine monitoring equipment
- Boilers and heat exchangers
- Centrifugal blower room for wave generation

In addition, the tour will also explore other pollution prevention, energy saving, and green initiatives in the waterpark, laundry and kitchen areas of the resort.

OWEA Annual Business Meeting | Tuesday, June 23, 5:00 - 6:00 pm

Participate in the election of OWEA's officers, hear OWEA's financial report, catch up on organizational news, committee news, and learn about the activities of the NW, NE, SW, and SE Sections.



Wednesday, June 24 - Morning Technical Sessions - Four Tracks

Nutrients - Zambezi Room				
8:00	8:45	Roadmap for Phosphorus Control in Ohio-Three Pillars for Achieving Compliance	Sam Jeyanayagam, PhD, PE, BCEE, CH2M HILL	
9:00	9:45	Final Clarifiers-The Achilles' Heel of Phosphorus Compliance	Sam Jeyanayagam, PhD, PE, BCEE, CH2M HILL	
10:00	10:45	Deammonification Technology for Nitrogen Removal: Is That the Right Technology for You?	Ting Lu, PhD, PE; James Fitzpatrick, PE; and Sid Sengupta, PE, Black and Veatch Biju George, PE, MSDGC	
11:00	11:45	While We Are At It, Nutrients Too, in Clark County	Bill Meinert, O'Brien & Gere	
		Green Technology/Energy - Suite 6		
8:00	8:45	Getting to Zero: Energy Best Practices to Reduce Energy at your WW Facility	Patrick Eiden, PE, HDR	
9:00	9:45	Green Infrastructure Maintenance Management at MSDGC	Leslie Schehl, PE, MBA, PMP, MSDGC	
10:00	10:45	Heating and Cooling Energy from Wastewater-Design for Energy Savings and New Income for Water Utilities	Nick Meeten/Chris Hubbard, Huber Technology	
11:00	11:45	Wastewater Key Performance Indicators: Proof of Efficiency	Kevin Krejney, Montgomery County Environmental Services	
Collections - Suite 5				
		Collections - Suite 5		
8:00	8:45	Collections - Suite 5 Developing a MOM Program	Sean O'Rourke, PE, Hazen and Sawyer and Dave Reimer, City of Miamisburg	
8:00 9:00	8:45 9:45	Collections - Suite 5 Developing a MOM Program Maximize Your Investment-City of Lorain Collection System Optimization Eliminates SSOs	Sean O'Rourke, PE, Hazen and Sawyer and Dave Reimer, City of Miamisburg Mary Garza, Lorain and Laura McGinnis, ARCADIS	
8:00 9:00 10:00	8:45 9:45 10:45	Collections - Suite 5Developing a MOM ProgramMaximize Your Investment-City of Lorain Collection System Optimization Eliminates SSOsUsing Acoustic Inspection to Priortize Sewer Cleaning	Sean O'Rourke, PE, Hazen and Sawyer and Dave Reimer, City of Miamisburg Mary Garza, Lorain and Laura McGinnis, ARCADIS George Selembo, PhD, PE, Infosense	
8:00 9:00 10:00 11:00	8:45 9:45 10:45 11:45	Collections - Suite 5Developing a MOM ProgramMaximize Your Investment-City of Lorain Collection System Optimization Eliminates SSOsUsing Acoustic Inspection to Priortize Sewer CleaningChallenges and Lessons Learned from Cleaning and Inspecting 860 Miles of Sewer Pipe	Sean O'Rourke, PE, Hazen and Sawyer and Dave Reimer, City of Miamisburg Mary Garza, Lorain and Laura McGinnis, ARCADIS George Selembo, PhD, PE, Infosense Tim Antos, PE, and Brandon Long, Burgess & Niple	
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8:00 9:00 10:00 11:00 8:00 9:00	8:45 9:45 10:45 11:45 8:45 9:45	Collections - Suite 5 Developing a MOM Program Maximize Your Investment-City of Lorain Collection System Optimization Eliminates SSOs Using Acoustic Inspection to Priortize Sewer Cleaning Challenges and Lessons Learned from Cleaning and Inspecting 860 Miles of Sewer Pipe Biosolids/Lab - Suite 4 Secondary Digester Cleaning to Meet Ohio Sludge Rules The Energy Production, Economic Benefits and Advancements of quasar energy group's Anaerobic Digestion System Integrated with WTP's in a Public/Private Partnership	Sean O'Rourke, PE, Hazen and Sawyer and Dave Reimer, City of Miamisburg Mary Garza, Lorain and Laura McGinnis, ARCADIS George Selembo, PhD, PE, Infosense Tim Antos, PE, and Brandon Long, Burgess & Niple Timothy McCann, PE, AECOM and Keith Bovard, Rocky River WWTP Mel Kurtz, quasar energy group	
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2015

June 23-25

Kalahari Convention Center

2015



Nutrients - Zambezi Room					
1:00	1:45	City of Canton WRF Phosphorus and Total Nitrogen Project- Design, Bidding and Year 1 of Construction	Doug Harris, PE and Ashley Williston PE, CT Consultants		
2:00	2:45	Successful Strategies for Meeting Nutrient Removal Standards- Case Studies	James Gellner,PE, and Dan Miklos, Hazen and Sawyer		
3:00	3:45	Operation and Control of Multiple Biological Nutrient Removal Processes in One WWTP	Phil Anderson, ARCADIS		
4:00	4:45	Wisconsin Case Studies Using Cerium Chloride to Reduce Phosphorus to Ultra Low Limits	Joseph Carlston, Molycorp, Inc.		
		Integrated Planning - Suite 6			
1:00	1:45	Leveraging Technology for Integrated Master Planning and Asset Management for the Holy City of Makkah	Kevin Slaven and Hasem Gheith, ARCADIS		
2:00	2:45	The Lima Story: First Integrated Plan Approval in Ohio and USEPA Region 5	Thomas Ungar PE, MWH Global and Gary Sheely, Lima		
3:00	3:45	A Healthy Marriage: Community Engagement and Integrated Planning	Mo Wright, RAMA Consulting Group, Inc.		
4:00	4:45	CSO Affordability, What is the Right Answer	Jordan McCormack, American Structurepoint		
		Wet Weather - Suite 5			
1:00	1:45	Alternative Methods to Reducing Infiltration and Inflow into Sanitary Sewer Laterals	Ed Kelly, Storm Water Control Services, LLC		
2:00	2:45	Advancing Wet Weather Treatment: The NEORSD Demonstration of a Cost-Effective Solution	Nick Bucurel, Brown and Caldwell and Greg Binder NEORSD		
3:00	3:45	Using Existing Infrastructure at the LeSourdsville WRF to Increase Wet Weather Capacity	Anthony Farina, PE Hazen and Sawyer		
4:00	4:45	Hamilton's Shrinking Consent Ordered Project - Do Court Decisions in Parallel Districts and Regions Affect Your Treatment Plant?	Peter Kube, PE, ARCADIS		
	Wastewater Treatment - Suite 4				
1:00	1:45	Testing of PAA and Sodium Hypochlorite for Wet Weather Bypass Flow Disinfection	Jason Beck,PE, Hazen and Sawyer & Brian Clark Assist. Supt. Sidney		
2:00	2:45	Ten Year Performance Study for Air Ionized Odor Control at the Denver Metro WW Reclamation District	Dennis Tulenko, REM		
3:00	3:45	Masses at Massillon: IFAS for Industrial Loads and Nutrient Removal	Kristin Waller and Bill Meinert, O'Brien & Gere		
4:00	4:45	Screen and Grit Removal Facilities Upgraded to Treat Billion GPD Wet Weather Flows	Carl Seifried, Burgess and Niple		



Thursday, June 25 - AM Technical Sessions - 2 Tracks

Asset Management - Suite 6					
8:00	8:45	Holistic Approach to Planning Projects	Tom Fishbaugh, RCAP		
9:00	9:45	ReNewark-The Renovation of Newark's Downtown Infrastructure	Roger Loomis, Newark and Michael Irwin, ARCADIS		
10:00	10:45	Expansion or Optimization: What's in Your Future?	Joel Davenport, P.E., Supt Holland Area WRRF and Jack Rafter, P.E., BCEE, Fishbeck, Thompson, Carr and Huber		
11:00	11:45	Updating WRFs for Biological Nutrient Removal	Don Esping, PE, Brown and Caldwell		
		Government and Regulatory - Suite 5			
8:00	8:45	Nutrient Management, Water Quality, and a Right-Sized Approach to Regulatory Compliance	Jennifer Frommer, P.E., HDR		
9:00	9:45	Ohio EPA Update	Craig Butler, Ohio EPA		
10:00	10:45	Division of Surface Water Update	Karl Gebhardt and Tiffani Kavalac, Ohio EPA		
11:00	11:45	DEFA Update	Alauddin Alauddin, Ohio EPA		

Technical Program as of 1/29/15. Visit **www.ohiowea.org** for up-to-date Technical Program.

2015 Golf Outing | Monday, June 22 - 10 a.m. Shotgun Start

Where: **Thunderbird Hills North Course** Times: 1316 Mudbrook Road Huron, Ohio 44839 419.433.4552

: 8:30 a.m. Registration 8:30 a.m. Driving Range Open 10:00 a.m. Shotgun Start

\$360 per Foursome includes: Golf Cart, Range, Light Breakfast, Lunch, Dinner, Beverages, Prizes, and Events.

Thunderbird Hills Golf Club offers golfers of all levels the opportunity to combine golf with nature. The North Course opened in 1959 and it is characterized by its mature trees and rolling fairways. The course is 6,347 yards in length with par at 72.

It is literally minutes from the best roller coaster park in the world, the largest indoor water park in the country, some of the nicest beaches in Ohio, and the Lake Erie Islands.

Golf Hole Sponsor Signs available for \$250 per hole.

Register online at *www.ohiowea.org*

Breafast Sponsored by **HR Gray** Keg sponsored by **Thermal Process Systems**



Awards Brunch | Tuesday, June 23, 10:30 am to 1:00 pm

Bring your appetite and your appreciation for the 2015 award winners to the Ohio Water Environment Association Awards Brunch. The brunch will be held on Tuesday, June 23 at 10:30 am in the Nile & Orange Rooms. After a bountiful brunch including Chef carved top sirloin, herb roasted chicken with sauce velouté, butter crumb baked Atlantic haddock polonaise, scrambled egg bar, Eggs Benedict, buttermilk pancakes, potatoes, sausage, bacon, mixed salads, fruit and yogurt bar, nut breads, desserts, orange juice, coffee, tea and milk, OWEA will recognize this year's award winners.



The Awards Brunch will highlight the **same old, same old** excellence we witness year to year from Ohio's water professionals. Presentations will include the OWEA state awards, the 5S nominees, the Crystal Crucible, and Golden Manhole award winners.

If you know someone who is a candidate for a future award, please give their name to your section award committee representative (available online at www.ohiowea.org).

Meet & Greet | Tuesday, June 23, 6:30 pm to 10:00 pm

Rocking Through the Decades!

Do you listen to the **same old, same old** music? From which decade does your same old music hail? Come to the 2015 OWEA Meet & Greet and network while also enjoying a selection of music from the 1950's and decades hence. **Free Rider**, the popular and well-received band from the 2011 Meet & Greet, is back to take our hands and hearts and walk us through sixty years of the same old, same old favorites. (In case you remember 2011: the M&G will be inside—no thunderstorm is going to interrupt our fun this time!) No need to bring your own CDs, tapes, LPs or 8-tracks— the guys of **Free Rider** will be ready!

A delicious menu of foods popular in each decade will be available. Although the menu will be diverse, everyone should be able to find a favorite that brings back memories. Rumor has it that the 70s may just include a chocolate fountain . . .

Networking is a business habit that benefits everyone - regardless of your stage in work and life. Take advantage of knowledge and wisdom of others to discuss the same old problems, while looking for new ideas, new technologies, and new opportunities. Same old friends and same old chance to make new connections!

The **"Rocking Through The Decades Meet & Greet"** begins Tuesday evening at 6:30 pm!





Reception and Annual Banquet | Wednesday, June 24, 6:00 to 9:30 pm

The evening will begin with a Reception at 6:00 p.m. Witness the ceremonious 5S Induction and the "roast worthy" introductions of this year's inductees.

Beginning at 7:00, this year's banquet program will honor those receiving WEF Awards, presented by Jenny Hartfelder, the 2015 WEF Board of Trustees' representative. Next will be the passing of the Ohio Water Environment Association gavel from outgoing President Mike Frommer to the incoming President Elizabeth Wick.

Emcee and Co-Chair Doug Borkosky is always up to his **same old, same old** tricks so there are sure to be some entertaining surprises along the way.

Enjoy a delectable dinner prepared by the excellent Kalahari chefs and help celebrate the work of OWEA and its long tradition of dedicated and talented leaders.



Mike Frommer OWEA President



Elizabeth Wick OWEA President-Elect





Jenny Hartfelder WEF BOT Representative

wef member association

OPERATIONS CHALLENGE

2015 Operations Challenge Invitational

Monday, June 22 and Tuesday, June 23

The Ohio Water Environment Association is proud to announce they will host an Operations Challenge Competition and National Invitational as part of the 2015 Technical Conference and Exhibition.

- 12 teams total
- 6 spots held for invitational teams.

\$50 Team Registration (up to 5 people) includes:

- Monday Morning Continental Breakfast
- Monday Lunch
- Monday Night Welcome Social at Longnecks
- Tuesday's Awards Brunch
- ♦ Tuesday's Meet & Greet

Registration and details at www.ohiowea.org





PROCESS CONTROL EVENT

Put on the thinking hat

This event consists of a written test meant to evaluate an operator's knowledge of WWTP process control. The test consists of three main sections: short math, multiple choice, and process control scenarios. The point values for the questions in each section vary. The teams have to decide on how to divide up the sections among the four team members and chose which questions to answer. The test is designed to have enough questions that the teams will not complete the entire test within the 20 minute event. Teams will often consult the WEF MOP 11 manual and Ohio EPA "need to know criteria" for the operator certification exams, while preparing for this event.

Test Your Skills! Meet and Compete with Fellow Operations Challenge Teams

LABORATORY EVENT

<u>Time to run the BODs</u>

Most operators have been there . . . it's Saturday and the lab people aren't there, but somebody has to read the BODs. This event is designed to simulate operators preparing and reading a set of BODs. Working as a team, the competitors will verify the sample to be tested is within parameters, prepare a set of 10 BOD dilution bottles, and then fill the bottles with differing amounts of dilution water, seed material, and sample. The dissolved oxygen content of each is bottle is determined after filling. A laboratory bench sheet must be completed accurately documenting the BOD dilutions. Teams are evaluated on completing the event in accordance with acceptable lab practices and in the least amount of time possible.





SAFETY EVENT

Man Down!!!

Words that no one wants to hear . . . a co-worker has become incapacitated while in a confined space. You need to get them out, and fast. But first things first . . . you must complete a confined space permit, test the atmosphere to be sure it's safe for a rescue, and get your safety equipment ready. Assemble the gantry recovery crane, insert the fresh air blower, then pop the manhole cover and lower the rescuer. Place a harness on the unconscious co-worker and lift him out. Then retrieve the rescuer. The key is to be fast, but also be safe. Teams are judged on time to complete the event and on penalties assessed for safety violations. Remember it does not do any good to try to rescue someone and injure yourself in the process.

Great Way to Prepare for the 2015 National Competition in Chicago

COLLECTION SYSTEMS EVENT

The fastest two minutes in wastewater

How long do you think it would take you to cut through an 8" SDR-35 pipe with a **hand saw?** No battery powered Sawzall[®] here. 30 seconds . . . how about 45 seconds? Unless you can be around 20, don't even try. The object of the Collections Event is to cut out a 1' - 2' section of broken sewer line from a six foot long pipe, replace it with another unbroken section using two Ferncos[®], and install a new saddle connection on the fresh pipe. You have four team members: who cuts what, and when? Choreographed chaos is the best way to describe the event. Complete the whole thing in less than two minutes and you might just be fast enough to be the winners.



Don't Miss It! . . . Not Competing? Be Sure to Watch the Competition



MAINTENANCE EVENT

<u>The power is out again</u>

Weather in Ohio is always changing, wait an hour it will go from winter to summer. Imagine a summer thunderstorm. A lightning strike has knocked out the power and fried the control panel at a remote lift station. It is time to mobilize your trailer mounted engine and pump set. Before you can take the trailer out, you have to be sure it will work. Your team must perform maintenance on the trailer, engine, and pump. Check the tires, change the filters, vacuum test the pump – just a sample of the tasks to be completed. Wheel the trailer over to the model wet well, then attach the suction and discharge hoses, program the engine and pump control unit, and away it goes. Remember move quickly . . . the Mayor's house is the first lateral up from the lift station!

Kalahari Convention Center | Tuesday, June 23 - Thursday, June 25

Join OWEA at the **Kalahari Convention Center** in Sandusky, Ohio for the **2015 Technical Conference and Exhibition**. The Kalahari Convention Center facility has over 215,000 SF of convention space. State-of-the-art audio/visual, spacious meeting rooms, superb culinary capabilities, over 890 rooms, and highly personalized services will ensure the OWEA event will be a success. OWEA will be taking over the Kilimanjaro Ballroom and nearby meeting rooms for the 2015 conference. With free parking, free wi-fi, nearby Sandusky attractions, and a relaxing venue, conference attendees will enjoy an educational experience!

- Standard room rate **\$144 per night** for up to four persons (*Rates may vary for larger accommodations.*)
- One night deposit required to guarantee reservation.
- Rooms include a coffee maker, refrigerator, microwave, free Wi-Fi, voice mail, television, in-room safe, pay-perview movies, and much more.
- Resort Fee has been waived for OWEA attendees and will not be charged. The standard wording on their website and confirmation letters though cannot be changed so it will talk about the Resort Fee but will not be charged to OWEA attendees.



OWEA room rates available for nights of Sun June 21 thru Wed June 24, 2015. Make your reservations via the link at *www.ohiowea.org* or call Kalahari: **877-525-2427** Please ask for 2015 OWEA *or* booking ID 19637 Cutoff date for special rate is Sunday, May 31, 2015

Family friendly!

Attendees and their guests can also enjoy America's largest indoor waterpark. Visit Kalahari's website for more info: http://www.kalaharimeetings.com/ohio# Kalahari Convention Center 7000 Kalahari Drive Sandusky, OH 44870 877.525.2427



2015 Spouse/Guest Program | Tuesday, June 23 - Wednesday, June 24

TUESDAY AFTERNOON Immediately following the Awards Brunch, the registered spouses and guests are invited to a welcome reception. During this event, the participants will be greeted by representatives of Kalahari and the Lake Erie Shores & Islands welcome team. Hosts will share ideas about great side trips, attractions, and entertainment in Sandusky and the surrounding area. A Kalahari chef may even drop in and share with the group. It may be that the **same old** friends show up - but this also may be a chance for some OWEA stalwarts to welcome newcomers as well . . .

WEDNESDAY Let's face it - you're going to be at a resort, in the heart of Lake Erie's tourist attractions - you don't need to ride around on a bus to the same old, same old shops. There's a whole region to explore . . . or you can grab the same old, same old drink and lounge by the pool. It's your choice, and the options are plentiful. Although there are no formal events planned for just the Spouses & Guests on Wednesday, we know you'll enjoy the day and show up at the Banquet relaxed (and maybe a little more tan) . . . Once again, use the time on Tuesday to network and plan your Wednesday excursions.

Program includes tickets to Awards Brunch, Meet & Greet, Annual Banquet, and special Spouse/Guest activities. Just \$160 per guest if registered by May 31 (\$210 June 1 or later)



June **23-25 Kalahari Convention Center**

Register Online at ohiowea.org

First Name (for name badge)	Last Name		
Company Name		Title	
Address			
City	State	Zip	
Email:	Tel #:		
OWEA/WEF # (req for member rate)	Spouse/Guest Name (if attending)		

Conference Registration	Registration Type	by May 31	June 1 and after	Row Total
	Full Conference Member	\$275 🗖	\$325 🗖	
Full Conference includes: All Technical Sessions, Exhibition,	Full Conference Nonmember	\$375 🗖	\$425 🗖	
Awards Brunch, Meet & Greet, Wed	Full Conference Retired (not working)	\$150 🗖	\$200 🗖	
	Full Conference Student (ID Req'd)	\$50 🗖	\$75 🗖	
Tue Only includes: Exhibition,	Tuesday Only Member	\$145 🗖	\$170 🗖	
Awards Brunch, Meet & Greet	Tuesday Only Nonmember	\$195 🗖	\$220 🗖	
Wed Only includes: Technical	Wed Only Member	\$145 🗖	\$170 🗖	
Banquet	Wed Only Nonmember	\$195 🗖	\$220 🗖	
Includes: Awards Brunch, Meet & Greet, Annual Banquet, Spouse Event	Spouse/Guest Program	\$160 🗖	\$210 🗖	
Sandusky WPC Plant Tour 🗍 ¢0	Extra Awards Brunch Ticket(s)	x \$35 each		
Tues, June 23, 1:00 - 3:00 p.m.	Extra Meet & Greet Ticket(s)	x \$60 each		
Avail to Full/Tues Registration Options	Extra Annual Banquet Ticket(s)	x \$75 each		
OWEA Golf Outing M	onday, June 22 at Thunderbird	Hills North Cours	se	
Includes: Golf Cart, Range, Lunch,	# Team(s) of four golfers	-	x \$360 each	
8:30 am Registration, 10 am	# Individual Golfers	x \$90 each		
Shotgun Start, 4 person Scramble. Proximity Prizes and Course	Hole Sponsorship Sign	x \$250 each		
Winners. Thunderbird Hills North Course www.thunderbirdgolfcourses.com	Print names of golfers:			
	TOTAL AMOUNT DUE			

For Reduced Rate Technical Session/Exhibition Registration Only Options - Visit www.ohiowea.org

Tickets will be taken for the events below. Please check which events you plan to attend. Included in Full Included in Full and Tues Registration and Wed Registration Awards Brunch Wednesday Lunch □ Meet & Greet Annual Banquet

Hosted by OWEA's Northwest Section

Doug Borkosky Conference Co-Chair 614.361.3673 doug@hlbaker.com

Dave Sprague Conference Co-Chair 419.394.8616 spragoo@bright.net

Terry Spiegel Golf Co-Chair 419.562.8981 wwtp@cityofbucyrusoh.us Jeff Lamson Golf Co-Chair

419.334.3876 jslamson@fremontohio.org



FORM OF PAYMENT					
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OWEA Refund Policy Cancellations 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.

Any Cancellation 72 or more hours prior to the conference will receive a 65% refund minus any credit card processing fees

Any Cancellation 7 days or more prior to the conference will receive a full refund minus any credit card processing fees.



EXHIBITOR REGISTRATION

Register Online at ohiowea.org

Company Name			
Address			
City	State	Zip	
Primary Exhibitor Responsible for Exhibit:			
Email:	Tel #:		
OWEA/WEF # (req for member rate)	Fax #:		
Signature		Date:	

(by signing you agree to the Exhibitor Terms & Conditions posted at www.ohiowea.org)

Exhibitor Registration Registration Type Cost			st	Row Total
Includes One Full Conference Registration: All Technical Sessions, Exhibition, Awards	Exhibit Booth Member	\$700 🗖		
Brunch, Meet & Greet, Wed Lunch, Annual Banquet for primary exhibitor.	Exhibit Booth Nonmember	\$850 🗖		
Add a Professional Membership:	OWEA/WEF Membership		\$143 🗖	
Additional Booth Attendant	Booth Attendant (max 4)	-	x \$50 each	
includes: Exhibit Exposition access and Tuesday Brunch in Exhibit Area	Print Names:			
Includes: Awards Brunch, Meet & Greet, Annual Banquet, Spouse Program	Spouse/Guest Program	rogram \$160 Starly Bird Rate After May 27		
Note Special Requests (subject to a	avail)			
Exhibitor Tour: If you would be interested in giving a 15 minute booth presentation, check here:				
	Extra Awards Brunch Ticket(s) x \$35 each			
	Extra Meet & Greet Ticket(s)			
	Extra Annual Banquet Ticket(s)	x \$75 each		
OWEA Golf Outing M	onday, June 22 at Thunderbird	Hills North Cours	se	
Includes: Golf Cart, Range, Lunch,	# Team(s) of four golfers	x \$360 each		
8:30 am Registration, 10 am	# Individual Golfers	x \$90 each		
Shotgun Start, 4 person Scramble. Proximity Prizes and Course	Hole Sponsorship Sign	x \$250 each		
Winners. Thunderbird Hills North Course www.thunderbirdgolfcourses.com	Print names of golfers:	·		
	TOTAL AMOUNT DUE			
Tickets will be taken for the events below				

Please check which ever	its you plan to attend.		FORM OF PA	YMENT		
Included in Full	Included in Full		Check #	□ P. O. #		
and Tues Registration	and Tues Registration and Wed Registration		Credit Card - you wi	ou will be emailed a secure link		
Awards Brunch Wednesday Lunch			to enter your created the OWEA office v	lit card payment. Or you may call vith your credit card number.		
Meet & Greet	Annual Banquet		□ I have read & agree to the OWE			
Michael Voshefski Exhibit Chair 513.899.9992 michael@hydrodynamicsco	ompany.com	hitor Recognition	OWEA 1890 Northwest B Columbus, OH 43	Slvd, Suite 210 212		
Terry Spiegel Golf Co-Chair 419.562.8981 wwtn@citvofbucvrusob.us	EXIII Coni O	erence Progree WEA Website Buckeye Bulletin	I: 614.488.5800 E: info@ohiowea.	F: 614.488.5801 org		

OWEA Exhibitor Refund Policy Booth Cancellations received after April 1 or no-shows the day of the Exhibition will not receive a refund.





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Technical Article - Nutrient Recovery

NUTRIENT RECOVERY AS A GREEN TECHNOLOGY FOR MANAGING PHOSPHORUS REMOVAL

by Ronald Latimer P.E., Wendell Khunjar Ph.D., and Paul Pitt Ph.D., P.E., Hazen and Sawyer

Introduction

The discharge of reactive nitrogen (N) and phosphorus (P) into water bodies is unwanted as it accelerates the process of eutrophication. To avoid discharge of these nutrients, energy and resources in the form of aeration (for nitrification), organic carbon (for denitrification and/or enhanced biological phosphorus removal (EBPR)), and chemical precipitants (e.g. ferric, alum, lime, polyaluminum chloride) are used to sequester and reduce N and P availability and reactivity.

Nutrient recovery is an alternative to conventional removal options, whereby nutrients are extracted from sidestreams as value added products and reused within a secondary market/industry. N and P recovery technologies must employ some variation of a process flow whereby the nutrients are concentrated into a low volume stream from which nutrients can be extracted. Concentration processes can be biological, chemical, or electrochemical, while recovery methods can include physical as well as thermo-chemical processes. It should be noted that while N only recovery has garnered interest, technologies that recover N and P together or P only are more widely applied at present. In this article, we will focus our discussion on P removal and recovery alternatives (**Table 1**) and present two situations where P recovery has been demonstrated as a viable nutrient treatment option.

Application	Principle behind recovery	Chemical additions needed	Recovered element	Examples of technology	Reuse potential
	A concentration step (e.g. EBPR or adsorption onto selective media) acts to removes P from the mainstream flow. The P is then released into a smaller stream via anaerobic digestion, VFA stripping or media regeneration. This stream is then subjected to chemical precipitation and crystallization under alkaline conditions.	Mg, Ca, NaOH	P, N, Mg	OSTARA Pearl®, Multiform Harvest (MH) process, PHOSPAQ™, PHOSNIX®, PRISA®	fertilizer
		Ca, NaOH	P, Ca	P-ROC	replacement for P rock
Wastewater and Sludge		quartz (sand), NaOH, Ca	P, Ca, trace metals	DHV Crystalactor®	replacement for P rock
	Acid addition to digested sludge re-dissolves nutrients. The sludge is then dewatered to generate a nutrient rich stream which is then subjected to chemical precipitation at alkaline pH.	H ₂ SO ₄ , H ₂ O ₂ , Na ₂ S, Mg, NaOH	P, N, Mg	SEABORNE®	fertilizer
	Acid addition to sludge ash redissolves nutrients. Selective precipitation of phosphate complexes is performed at pH 3.5.	H₂SO₄, Ca	P, Ca, Al	SEPHOS®	replacement for P rock; coagulant
Sludge Ash	Potassium or magnesium chlorides are added to the ash. This mixture is then heated to > 1000 °C to remove heavy metals chlorides. Potassium and magnesium phosphates can then be recovered directly from the residue.	P, K, Mg	Р, К, Мg	SUSAN	replacement for P rock

Table 1. Overview of P Recovery Alternatives

Phosphorus Removal and Recovery

P removal from conventional WWTP systems is limited to approximately 30%. If EBPR is employed, P removal up to 90% can be achieved from the mainstream flow. As phosphorus limits become more stringent, EBPR must be coupled with a multi-point chemical precipitation approach to ensure that total P discharge limits are met. Subsequent anaerobic treatment of the EBPR sludge results in the release of P into a dewatering centrate that is returned to the bioreactor and can be greater than 30% of the overall P load. These recycle loads can compromise EBPR performance, resulting in the need for auxiliary chemical precipitant addition to ensure that discharge limits are met. Chemical sludge that is produced is usually disposed of or hauled off-site.

Similar to removal only strategies, P recovery technologies exploit P complexation chemistry; however, the goal of these processes is to produce a precipitant that can be productively reused. In the most common technology used for P recovery, phosphorus rich sludge from EBPR is treated by anaerobic digestion to allow P release from the biomass into an liquid stream. Pelletized P is then precipitated from this sidestream flow in an up-flow fluidized bed reactor as struvite ($NH_4MgPO_4 \cdot 6H_2O$) or hydroxyapatite ($Ca_5(PO_4)_3(OH)$). Feed and recycle streams fluidize the particles which are harvested at the bottom of the reactor. The pH and precipitation potential in the reactor is controlled by sodium hydroxide (NaOH) addition while limiting reagents, typically magnesium (Mg) and calcium (Ca), are added to the nutrient rich stream. Effluent from this process can then be recycled or is returned to the head of the plant. During this crystallization process, approximately 80% of the P from the centrate can be recovered. The P enriched products can then be reused as slow release fertilizers (struvite) or feedstock (hydroxyapetite) for other industries.

Nutrient Recovery - Technical Article



These crystallizer recovery systems typically use centrate as the feedstock; however, if sufficient Mg or Ca is present in the waste activated sludge, nuisance precipitation of struvite and hydroxyapetite can occur. Therefore, selective precipitation of P before anaerobic digestion can minimize nuisance precipitation in the digester and on dewatering equipment. To facilitate this precipitation prior to anaerobic digestion, waste activated sludge can be combined with volatile fatty acid rich fermentate to accelerate P release. Clean Water Services has patented a technology based on this principle (WASSTRIP®) that has been successfully combined with the OSTARA Pearl® process for reducing nuisance P precipitation and minimizing P recycle loads.

Case Study 1 - F. Wayne Hill Water Resources Center

The F. Wayne Hill Water Resources Center (FWHWRC) is Gwinnett County, Georgia's largest and most advanced wastewater treatment facility (**Figures 1A and 1B**). Rated at 60 million gallons per day (mgd), the FWHWRC uses enhanced biological phosphorus removal and chemical treatment to meet a stringent total phosphorus (TP) limit of 0.08 mg/L. Solids handling consists of anaerobic digestion of combined primary sludge (PS) and waste activated sludge (WAS) in egg-shaped digesters. Since 2011, combined primary and secondary sludge from Gwinnett County's 22 MGD Yellow River Water Reclamation Facility (YRWRF) has also been transferred to the FWHWRC through the collection system.

In 2009, Gwinnett County (GC) began adding magnesium hydroxide $(Mg(OH)_2)$ into the collection system to control odor and corrosion. As a result, P precipitation from the digester centrate significantly decreased P recycle loads to the bioreactors, allowing for the stabilization of EBPR performance; however, this P precipitation in the form of struvite restricted flow in the centrate drain lines and reduced centrifuge dewatering capacity.



Figure 1A (above) Overview of the F. Wayne Hill Water Resources Center. Figure 1B (below) Process flow diagram



Case Study 1 - Approach

The FWHWRC desired a solution that allowed the utility to meet its stringent TP limits while simultaneously fulfilling three conflicting needs i.e. mitigation of odor in the collection system, reduction of phosphorus and nitrogen recycle loads to the FWHWRC, and control nuisance struvite formation. Hazen and Sawyer (H&S) evaluated five alternatives for these purposes [1].

- 1. OSTARA Pearl® and WASSTRIP® with Mg(OH)₂ addition
- 2. Ferric addition at digesters with Mg(OH)₂ addition.
- 3. OSTARA Pearl® and WASSTRIP® without Mg(OH), addition
- 4. OSTARA Pearl® without Mg(OH), addition
- 5. Ferric addition without $Mg(OH)_2$ addition.

Special sampling, bench, and pilot test data were used to calibrate a BioWin® model that was used to simulate each of the alternatives at three flow rates representing current, 10 year and 20 year estimated flow. Additionally, a "do nothing" scenario was modeled for comparison even though this option was not acceptable because the utility would exceed TP discharge limits. The modeling results were used to assess effectiveness of the P control strategy and to perform a net present cost analysis.

Technical Article - Nutrient Recovery

Case Study 1 - Findings

In most WWTPs, Mg availability limits struvite formation so magnesium chloride $(Mg(Cl)_2)$ is typically added to induce precipitation. At FWHWRC though, Mg addition in the collection system resulted in a unique situation where P was the limiting reagent for struvite formation. As a result of this, P recovery and ferric addition showed equal potential to mitigate nuisance struvite formation at FWHWRC if Mg addition was continued. This is illustrated in **Figure 2A**, where the difference in struvite production between the "do nothing" scenario and each treatment option represents the decrease in nuisance struvite formation. As illustrated in **Figure 2B**, P recovery was also a competitive option for reducing P recycle loads when Mg addition was discontinued.



Figure 2. Effect of treatment alternatives on struvite formation and recycle flow P concentrations. 2A - Struvite formation in sludge cake for each alternative scenario at 3 flow scenarios, 2B - soluble P concentrations in the recycle stream

Results from the net present cost (NPC) analysis indicated that P recovery with WASSTRIP was the most economical option for nutrient control at FWHWRC regardless of whether Mg addition was continued or discontinued. Under either scenario, P recovery had less than an 8 year payback compared with the ferric option, and provided equivalent struvite reduction to the ferric option (Figure 3). The fact that this alternative is a green solution, offering resource recovery for phosphorus and carbon footprint reduction, is also a benefit. Additional business cost evaluations showed that ferric cost, energy cost, inflation and discount rate variations (within typical historical range) did not change the rank of alternatives. Upon completion of this work, the FWHWRC initiated efforts to implement the WASSTRIP and Ostara struvite harvesting technology. The Nutrient Recovery Facility is projected to be completed in the fall of 2015, and is expected to result in savings of approximately \$13,500,000 over the 20 year project life.



at F. Wayne Hill Water Resources Center

<u>Case Study 2 – Nansemond Wastewater Treatment Plant</u>

The Nansemond Treatment Plant (NTP), Hampton Roads Sanitation District in Virginia, is designed to treat 30 mgd using a 5-stage BNR process with supplemental carbon addition (**Figures 4A and 4B**) to meet 8 mg/L total nitrogen (TN) and 1 mg/L total phosphorus (TP) discharge limits as per the Chesapeake Bay Nutrient Reduction Program requirements. The influent is characterized by high nitrogen (41 mg/L) and phosphorus (8.6 mg/L) concentrations due to large industrial contributions. Recycling of dewatering centrate also contributes to an abnormally high P loading of the EBPR process which results in frequent process upsets (**Figure 5 on page 58**). As a consequence, ferric chloride addition is required to ensure that the plant meets the TP discharge limits.

Case Study 2 – Approach

H&S conducted process modeling of the facility which indicated that side stream treatment of the P rich centrate would increase the reliability of EBPR [2]. Two options were considered for this controlling P recycle loads:

- 1. Ferric chloride precipitation
- 2. OSTARA Pearl® on Centrate

Nutrient Recovery - Technical Article



A cost evaluation was performed to compare the cost of P recovery with that of side-stream ferric chloride removal. For the ferric alternative, it was assumed that the precipitate would ultimately be processed through centrifuges and disposed of through incineration. For the P recovery option, two different scenarios were evaluated. In the first, the equipment would be purchased from OSTARA, and operation and maintenance of the facility would be the responsibility of the utility (capital option). In the second option, the utility would provide a monthly fee in exchange for OSTARA providing the facility and equipment (fee option). In both options, recovered product would be purchased by OSTARA to offset the operation costs borne by the utility (electricity, chemicals, etc).

Figure 4. Overview of the Nansemond Wastewater Treatment Plant. A - Aerial photo (above); B - Process flow diagram (below)



Case Study 2 – Findings

The present worth analysis indicated that both P recovery options would be less expensive than using ferric for P removal. A comparison between capital and fee P recovery options indicated that the capital purchase option was superior to the fee option. As a consequence, the utility chose to construct the OSTARA facility using this option.

The OSTARA Pearl® technology was piloted on-site in a small-scale demonstration project. Based on the pilot tests, the Ostara process was expected to remove about 400 lb/d of phosphorus and reduce the centrate phosphorus load by 90%. Full-scale operation of the facility (Figure 6 on page 58) has now been underway since July 2011. Operation of this facility has stabilized the recycle load through an 87% reduction in the P content (average value) of the centrate. N content of the centrate has also been reduced by 30%. Since the implementation of this technology, ferric addition has not been needed at this facility. The projected cost savings associated with implementing this technology is \$4,000,000 over the 20 year project life.

continued on page 58

Technical Article - Nutrient Recovery



Figure 5. Diurnal TP loading at Nansemond Wastewater Treatment Plant

Lessons Learned

These projects represented two unique scenarios where nutrient recovery was a feasible nutrient treatment option. For FWHWRC, nutrient recovery was the cheapest technically sound option for controlling nuisance struvite precipitation and reducing P recycle loads. Similarly, at NTP, nutrient recovery was superior to the conventional ferric precipitation approach for controlling nutrient recycle loads. In both cases, results indicated that successful implementation of recovery systems is highly dependent on the amount of nutrient that must be removed and that payback periods are shorter for more concentrated wastestreams.

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Figure 6. OSTARA Pearl® reactors at Nansemond Wastewater Treatment Plant

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Watershed Article



by Devon Alexander, City of Piqua

Introduction

Located in western Ohio, just 30 minutes north of Dayton, the City of Piqua is the picturesque image of a river town along the Great Miami River, with a population of just over 20,000 residents. Like most small MS4's (Municipal Separate Storm Sewer Systems), the requirements to meet and exceed the EPA requirements and internal expectations are always a challenge. On one hand, we have our guidelines that are handed down through the Ohio EPA with the NPDES permit requirements. On the other hand, we have an aging infrastructure, with limited dollars, and a belt that can only stretch so far. These are the challenges that I would assume some, if not all, municipalities in our size range are encountering in their push to meet permit requirements.

Thankfully, here in Piqua we have our own Stormwater Utility, which generates roughly \$900,000 a year. That sounds like a lot for a small program, but as I said before, aging infrastructure, permit requirements, and other administrative cost can really make that go away in a flash! So let me pose a question to all the readers: What is really obtainable when it comes to covering all the bases of stormwater, with a limited budget?

Current Structure

Being the Stormwater Coordinator since 2010, I have always taken an approach that we have a two-part system here in Piqua. We obviously have our annual NPDES permit requirements to meet, but we also must give attention to the system itself, and the aging infrastructure. Some might agree or disagree with this method, but for the past five years it has worked well for Piqua.

Meeting our NPDES requirements is not as difficult as one may think. We love outreach here in Piqua. Public relations are the most enjoyable and easiest way to get information out to the community and see the biggest impact. We do articles in the quarterly flyers, have an annual educational program with the Junior High School that interacts with the students, have the ability of local access cable shows, have informational flyers for the public, and we have an open door policy for individuals to come in and meet us face-to-face with any questions they may have. The ability to communicate to the public leads to the ability to have them be our eyes and ears, since the stormwater department has a staff of one, that being me. Public input is a valuable resource.

We are always addressing any spill or illicit discharge with the same level of concern, regardless of size or severity. We conduct pre- and post-construction review of new developments to insure that proper protocol by contractors is being adhered to for stormwater site preservation. Just as important is holding those same standards for our own city employees and the projects they are doing. Going out to sites to see the projects and seeing firsthand what is happening is key to controlling a successful stormwater program.

The other side of the equation is dealing with an aging stormwater infrastructure system, and maintaining it to a healthy standard. When the stormwater program began, our first goal was to get an accurate map of the system. We had a drawn paper map that was over 50 years old, and frankly, we were not sure how accurate it



River view of Piqua along Miami Conservancy Levy

was. Like most other cities, our old map was severely out dated and in need of a revamp. So we hired a consultant, and over the course of almost two years, they mapped every stormwater structure (manholes, catch basins, storm pipes) as well as recorded other essential data and implemented it into a new GIS system for us. The results were staggering. For example we originally assumed that we had between 2000-2500 stormwater structures. When the new GIS map was completed it was realized we had almost 8000 structures. The key point that I am trying to convey is that it is extremely important to know what you have.

Knowing what you have will let you then target what needs to be addressed and in what order. As mentioned above, limited budgets mean picking and choosing which project will have the biggest impact and best result for the city.

We strive to focus on making sure that damaged or dilapidated catch basins get repaired when needed. We also have our underground utility crews do annual cleaning and televising of the system to check for the integrity of the pipes. We also coordinate much of the repair with the City's annual paving schedule. We go in beforehand and make the repairs, replacing catch basins, and storm pipe before the street is redone.

To wrap up the structure portion, I think it is important to realize that planning is everything when it comes to stormwater. In 2012, we set out to do an in-depth master plan for the City. We realized that to set goals and determine what direction we wanted to go, a master plan was the necessary step needed. Without a master plan, it would have had us shooting off in different directions with no real sight of where we were heading. The master plan is still a work in progress today. We have completed a general overview of the city, targeted areas that we felt were of most concern, and have set out a 10 year plan. Also, we annually evaluate new areas of concern, continually building the master plan.

The Future

As the old adage goes, "If the wheel isn't broke, don't fix it". Ideally, I think that is the general premise of how I would like to see our stormwater program continue. Now, keep in mind I am not set in my ways, and I do believe that innovation and new methods are just as important. It has to be a healthy combination of all aspects meshing together. We already know that every five year permit cycle will come and go, and with that will be new rules and regulations. MS4 communities will adapt to those changes and meet compliance, but the key is to stay within your means and not shoot for the stars. Understanding the reality that you have to work with what you have.

I foresee that here in Piqua we will continue to focus meeting our annual permit requirements while trying to manage and repair an aging infrastructure system. We have in the past, and will in the future, continue to look for other avenues when it comes to funding projects. There is a vast world of grants that can be obtained to help ease that financial burden.

In closing, I would like to divulge what I personally feel is the greatest tool that stormwater professionals have at their disposal: public education. Reaching out to the young school aged kids is a great start. They take information home to mom and dad, and that information spreads.

It might be the hardest to convey, it might be the biggest challenge we will meet in our careers, and it might be the most unlikely. The most important tool that we have at our disposal is the people who live in the community we work for. Regardless of their age, or life path, the people of the community are our biggest assets. As I said before, they are our eyes and ears when we can't be everywhere to see every problem. They are the information givers who warn their next door neighbors that they might be effecting the environment



Watershed Article

Swift Run Lake #3 Spillway

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I really hope that this brief overview of the City of Piqua stormwater program can give you insight and possible ideas for your community. I always am engaged with new ideas, and love sharing our process. I would encourage any reader who has questions to contact me, and see what new ideas can come. Realize there is no perfect formula. There is just the reality of what works for you in your community.

Devon Alexander, Stormwater Coordinator, City of Piqua Dalexander@piquaoh.org_937-778-2059

UTILITY COMMITTEE INVITATION

by Nicholas Domenick, Chair

Calling All Utilities

Utility Committee Chair, Nick Dominick, invites fellow utility professionals to join the OWEA Utility Committee. This committee will facilitate conversations for those who operate and manage facilities, allowing for candid conversations, helpful idea sharing, and trouble-shooting suggestions. The Utility Committee will also continue OWEA's popular "Lunchtime Webinar" series, bringing timely topics to OWEA's audience in an affordable (\$0) and convenient (lunchtime viewing) manner.

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Nicholas Domenick, Chair City of Columbus, *njdomenick@columbus.gov*







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Technical Article - Pump Drive Efficiency

BROADER DEFINITION OF PUMP-DRIVE SYSTEM EFFICIENCY PROMPTS MUNICIPALITIES TO RECONSIDER DRIVE OPTIONS

by Gary Garson, Vice President of Engineering, Dynamatic

Since the early 1990s, electronic, variable frequency drives have become the commonly prescribed means of variable speed control, often for good reason. Compared to hand-manipulated, mechanical valves and dampers, variable frequency drives can bring significant cost advantages to a broad range of motor control applications.

That said, "variable frequency" is not the only method of controlling "variable speed." There are other options when it comes to variable speed drive specification. In addition to mechanical and variable frequency drives, electromagnetic eddy-current drives can, for certain applications, be a more cost-efficient method of variable speed pump control. It all depends on the application and definition of pump-drive system cost efficiency.

Defining Efficiency

Mark Twain once wrote, "the difference between the right word and the almost right word is the difference between lightning and a lightning bug." Just as "variable frequency" is not the same as "variable speed," the right definition of cost efficiency is important when calculating pump-drive systems costs. When cost efficiency is narrowly defined as "energy efficiency," a broader range of costs can go unmeasured. (See **Figure 1** on next page)

Governed by today's most urgent economic reality, a fully informed variable speed drive specification is not limited to a pump system's energy usage costs, but also encompasses initial capital costs and ongoing ownership costs. A return on investment cannot be properly measured without the inclusion of these three cost variables.

Capital Costs

Capital costs include application engineering, product procurement, system installation and commissioning. For VFD installations, costs can mount in each of these areas due to system complexity and required ancillary components, such as for controlled harmonics and drive system air conditioning. Even so, for many smaller horsepower pumping applications, VFD capital costs will be highly competitive, if not lower than electromagnetic, eddy-current drives.

It is among the larger horsepower pumping applications, beginning around 100 HP, where eddy-current drives offer capital cost savings compared to VFDs. Substantially higher capital cost savings can be achieved in medium voltage applications (2300 volts AC to 4160 volts AC), where the cost of an eddy-current drive can range up to 65% less than the cost of a variable frequency drive. This can mean an outset savings of hundreds of thousands of dollars, possibly millions, on the purchase of larger drive systems.

In addition, from a plant floor installation standpoint, electromagnetic variable speed drives can be significantly smaller than comparable horsepower, medium voltage VFDs, so they can take up considerably less space.

Energy Costs

The operating efficiency of an electromagnetic, eddy-current drive increases relative to the normal operating speed of a motor.

This makes the drive well suited to most wastewater pumping applications, which typically require controlled speed within the range of from 75% to 100% of the motor's rated speed. In contrast, the operating efficiency of a variable frequency drive decreases across this range. (See **Figure 2** on next page)

In addition, VFD related energy costs can be incurred due to the necessary integration of ancillary system components, such as for harmonic dampening and the air-conditioned cooling of larger AC drives.

Ownership Costs

In many wastewater plants, eddy-current drives that were first installed decades ago continue to perform reliably today, outlasting generations of VFDs by as much as 6:1.

Central to the design of an eddy-current type drive is an electromagnetic clutch that is highly tolerant of fluctuations in power quality. Unlike VFDs, electromagnetic drive systems produce virtually no harmonic noise into a plant's electrical system or onto the utility grid. The drives have few wear-prone parts, which are relatively low cost to purchase and replace. Service and repairs can often be done by on-staff maintenance.

Drive Operation

The electromagnetic, eddy-current variable speed drive system consists of a constant speed AC induction motor and an electromagnetic clutch, governed by a small digital controller. The AC motor runs at its optimum rated speed and the electromagnetic coupling (clutch) is used to vary the output speed.

By regulating voltage to the clutch coil, a magnetic flux field is generated in the gap and distortion of the flux field creates torque. Output speed is governed by the digital control. The feedback signal from a tachometer is compared to a reference signal within the controller to maintain accurate speed within 0.5%. This closed-loop speed system typically uses less than 1% of the total AC input current to the motor.

Today's electromagnetic, eddy-current variable speed drives are available with simple yet versatile digital control options for simplified pump-drive system programming. The new controls can be retrofit to existing drives, and they are compatible with PLC and SCADA system integration.

<u>Summary</u>

As wastewater facility superintendents are rediscovering, they do have options when it comes to modern pump-drive system solutions. In addition to variable frequency drives (VFDs), electromagnetic eddy-current drives are proven for their durability, reliability and longevity. Moreover, depending on the application, these drives can be the most cost efficient choice, when specifications are based on a complete examination of costs.

Gary Garson, Vice President of Engineering, Dynamatic gary@dynamatic.com



Pump Drive Efficiency - Technical Article





Figure 1 - How it works: Electromagnetic drive technology



Figure 2 - Electromagnetic drive vs VFD - kWh usage for 500 hp, 800 rpm motor

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Wastewater Improvement Project Profile

THE VILLAGE OF BAY VIEW SELECTED BY USDA FOR ITS 2014 EARTH DAY PROJECT

by Roberta Acosta, Ohio RCAP

The Village of Bay View is located on beautiful Sandusky Bay on Lake Erie in Ohio's Erie County. Dating as far back as the 1970's, the Village of Bay View and Erie County officials have been aware of the unsanitary conditions in the village and bay as a result of improperly treated human waste being discharged from failing onsite systems that serve residents. These systems primarily discharge to the bay via field tiles or the Village's storm sewer system. These discharges are directly responsible for impairment of the Sandusky Bay, which drains directly into Lake Erie. Both Sandusky Bay and Lake Erie are plagued by some of the largest and most toxic algae blooms in the country, causing significant health hazards to residents and negatively affects tourism in the area.

Recently, in collaboration with the Erie County Commissioners, a proposed 7 million dollar wastewater improvements project received almost 6 million dollars in direct loan and grant funding from USDA Rural Development and was selected as 2014's Earth Day project in Ohio. USDA hosted the groundbreaking ceremony on April 22, 2014 which was attended by Tony Logan, State Director of USDA along with Village, County and other USDA officials, as well as U.S. Representative Marcy Kaptur, State Representative Chris Redfern and a representative from Senator Rob Portman's office. A number of local residents were in attendance as well.

The proposed project includes the construction of a new gravity sewer wastewater collection system to serve Bay View and the adjacent unincorporated community of Bay Bridge. Wastewater will be conveyed via force main to the City of Sandusky for treatment through an existing service agreement between the City and the Erie County Department of Environmental Services. The total project cost is estimated at \$6,978,000. In addition to the USDA award of \$3,035,000 in loan funds and \$2,911,900 in grant funds, the project has received a STAG grant, which was secured through US Representative Marcy Kaptur's office for \$500,000. The Village is currently pursuing additional funds through the State Competitive Community Development Block Grant Program. If approved, an additional \$500,000 in construction grant funds and \$100,000 in low to moderate income homeowner connection assistance funds will be made available to the project, which will serve approximately 851 individuals and 17 commercial and institutional customers. Project construction is anticipated to begin late Spring 2015.

Roberta Acosta, Ohio RCAP rjacosta@wsos.org Photo Credit: Heather Hartley, USDA



Bay View Shoreline



Erie County Commission President Bill Monaghan



Bay View Wastewater Improvement Groundbreaking



WNWO interviews Congresswoman Marcy Kaptur

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Technical Article - Grit Particle Settling

GRIT PARTICLE SETTLING – REFINING THE APPROACH

by Pat Herrick, Adam Neumayer, and Kwabena Osei - Hydro International

Introduction

Grit system design is heavily influenced by factors affecting the settling behavior of the targeted grit particle.¹ As such, the classic correlations of sedimentation for discrete solids, Stokes' or Newton's Law, are commonly used to guide design. To simplify the design process, it has been common to assume that grit is spherical with the density of silica sand. Unfortunately, grit particles are rarely ideal spheres with the assumed textbook density of 2.65 for silica sand. Less than ideal characteristics are frequently measured or observed.^{1,2} By utilizing well established sedimentation theory corrections from other fields of engineering, these correlations can be refined to provide a useful tool to improve grit system design.

Grit particle settling is principally determined by size, density, homogeneity and shape with some industry accepted assumptions regarding the characteristics of the fluid. This can be seen in the particle settling velocity equation below as determined by Newton's Law.³

$$V_{p} = g(\rho_{p} - \rho_{w})d_{p}^{2} / 18\mu = g(sg_{p} - 1)d_{p}^{2} / 18\nu$$

Size is most typically measured in terms of the mean diameter. In the last few years, density and shape implications are also being considered as a key aspect of grit behavior.² It has been observed that particle density and shape do not align with traditional assumptions which necessitates the refinement of sedimentation calculations. Further, grit can be affected by attached materials such as fats, oils, and grease which impact the settling velocity.⁴ Below (see **Figure 1**) are pictures of individual clean silica sand grains and similar sized grit particles (see **Figure 2**). It can be seen that the clean sand particles have a more rounded shape while the grit particles are more heterogeneous, angular shaped, and appear to have other materials attached to them.



Figure 1. Clean silica sand as shown through digital imaging particle analysis



Figure 2. Wastewater grit as shown through digital imaging particle analysis. Samples obtained at Muddy Creek WWTP, Cincinnati, OH

The net effect of the various deviations from "idealized" characteristics can be accounted for by measuring the true settling velocity of the grit particles. **Figure 3** shows the nominal physical size versus the equivalent settling velocity of grit particles. This is often referred to as the Sand Equivalent Size (SES). SES is described as the equivalent sand particle having the same settling velocity as the slower settling endemic or native grit particle. The SES concept is discussed in more detail elsewhere.⁵ The diagonal black line in **Figure 3** indicates the expected settling velocity appears to be impacted more significantly by the deviations from the ideal characteristics. It is expected that this effect will diminish as the ratio of surface area to volume decreases with increasing particle diameters further to the right of the chart.



Figure 3. Physical size of grit particles vs. Sand Equivalent Size (SES) settling velocity

Stokes' Law

Stokes' Law is a common tool for estimating the settling velocity of grit particles, based on the assumption of laminar flow. It has been found to be accurate where Reynolds numbers are less than 1.² A review of the Reynolds number for grit particles in the typical design range of 50-500 micron for wastewater grit removal systems, shows that the impact of transitional flow begins to affect particle settling above the 100 micron range resulting in a departure in predicted accuracy using Stokes' Law.

				Lam	inar										Trans	itional						
d _p (μm)	50	60	70	80	90	100	105	110	120	130	140	150	160	175	190	212	250	300	350	400	450	500
N _{R final} [-]	0.1	0.2	0.3	0.4	0.6	0.8	0.9	1	1.3	1.7	2	2.5	2.9	3.7	4.6	5.3	9.3	14	21	28	36	45

Table 1. Reynolds number vs. diameter

Recommended Corrections

While a force balance requires an iterative process to determine settling velocity, it can be an irreplaceable tool by virtue of the physical characteristic corrections that can be layered in to refine the results towards real world measurements. Figure 4 illustrates the impact of eliminating common assumptions aimed at simplifying the calculation; and adding in refinements to align theory with field measurements. First, the settling velocity of a range of particle diameters is calculated using a laminar assumption (Stokes' Law).² Then the laminar assumption is removed resulting in a force balance (Newton's Law).² Subsequently, the assumption that grit/sand is a perfect sphere is eliminated and the equation is corrected for the angularity of the particles (Newton's Law with Shape Factor).^{6,7,8} Then, an adjustment is made for the density of the particle based on field observations.⁹ Finally, all refinements are combined and plotted.

Overall, **Figure 4** shows that the commonly used Stokes' Law may not be the best approach to ensure an appropriate design to capture grit particles larger than 150 micron. Focusing on Newton's Law, it can be seen that simply eliminating the laminar flow assumption in and of itself will result in a more conservative design in the critical 50-300 micron range. With each successive refinement, a level of realism is incorporated. (see **Table 2**)



Figure 4. Settling velocity refinements – settling velocity vs. particle diameter

			Settling Vel	locity (cm/s)	
	Stokes' Law	Newton's Law	Shape Factor = 2.0	Specific Gravity (SG) = 2.0	Shape Factor = 2.0 & Specific Gravity = 2.0
50 mesh (300 micron)	8.08	4.81	2.74	3.21	1.79
70 mesh (212 micron)	3.59	2.64	1.44	1.7	0.91
100 mesh (150 micron)	2.05	1.64	0.87	1.04	0.55
140 mesh (106 micron)	0.99	0.87	0.45	0.54	0.28
212 mesh (75 micron)	0.50	0.47	0.24	0.29	0.15

 Table 2. Calculated particle settling velocity

continued on page 80

Technical Article - Grit Particle Settling



Figure 5. Measured physical size vs. settling velocity equivalent size (SES) at the East Regional WWTP Montgomery County, OH

Figure 5 plots the physical size distribution of grit at a typical wastewater treatment plant as well as the sand equivalent size based on the settling velocity. It can be seen that nearly \sim 70% of the grit entering the plant is larger than 212 micron (75 mesh) based on physical size, yet only \sim 30% of the incoming grit settles as though it is larger than 212 micron. The 212 micron particle has a Reynolds number of 5.3 therefore Stokes' is not an accurate equation for settling velocity of this and larger particle sizes. Based on Newton's Law, these 212 micron grit particles are expected to settle at a rate of 2.64 cm/sec. However, when adjusted for shape and SG, the calculated settling velocity is lowered to 0.91 cm/sec or roughly the equivalent of a 106 micron particle. Therefore, in order to remove 70 - 90% of the incoming grit load the system must be designed for 106 micron removal.

In a very qualitative manner, we can layer measured settling velocity of grit particles on the calculated settling velocity chart to provide some sense of the validity of the refinements. This is shown in **Figure 6**.

What can be taken from **Figure 6** (below) is that field measurements reinforce the idea that refinements to Newton's law to account for shape and density narrow the gap between ideal theory and real world behavior. Accurately sizing a grit system can be a challenge given several variables that are often difficult to measure. Nevertheless, using widely available data on shape and density will certainly provide an increased level of reliability that a grit system will perform as anticipated.



Figure 6. Measured settling velocity vs. calculated settling velocity

Conclusions

- Grit settling velocity is significantly impacted by variability in size, density and shape. The conventional assumption of spheres with a specific gravity of 2.65 is inadequate.
- Grit particles larger than 110 micron have a Reynolds number >1 therefore, Stokes' Law should not be used in grit removal system design for particles larger than 100 microns.
- Targeting 75-150 micron particle size for grit removal system design minimizes the impact of non-idealities.
- Characterizing native grit physical particle size and settling velocity is the best means to determine grit removal system design requirements.
- In the absence of site specific characterization, regional grit gradation and settling velocity data should be used for system design.

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