

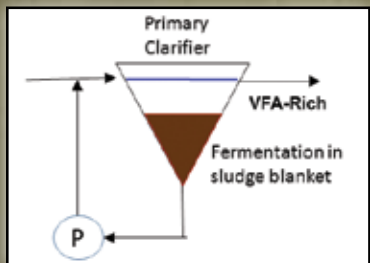


Buckeye Bulletin

Ohio Water Environment Association | Volume 88:4 | Issue 4 2015



Plant Profile - City of Athens
page 48



Knowledge-Based Practices for
Achieving EBPR Reliability
page 60



Odor Control Options
for CSO Systems
page 72



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Intern Jordan Stoll, Watersheds, and OWEA's EOFAR Program page 56



2015 Biosolids Workshop page 19

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The ideas, opinions, concepts, and procedures expressed in this publication are those of the individual authors and not necessarily those of the Ohio Water Environment Association, its officers, general membership, or staff.

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Contact Hour Information: OWEA training is submitted for contact hour approval. Free Webinars are not submitted for contact hour approval at this time.

Article Deadlines: 1st day of January, April, July, and October

Publication Dates: Spring, Summer, Fall, and Winter

Photo Requirements: Please contact the OWEA office regarding photo requirements for covers and articles.

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**FEATURES**

Kocarek Korner	7-9
Biosolids Workshop	19
WEFTEC Photo Collage	23
The People Place	26-27
Member Profile, Frank D'Ambrosia	30-31
Ohio EPA Update	34-36
Thank You 2015 OWEA Sponsors	40-41
2016 Sponsor Program	42
2016 Conference Save the Date	43
Plant Profile - City of Athens WWTP	48-51
Watershed - Seasonal Algae Succession in Lake Erie	56-57
Knowledge-Based Practices for Achieving EBPR Reliability	60-67
Odor Control Options for CSO Systems	72-75
The New OSHA Confined Spaces in Construction Standard	80-81

DEPARTMENTS

OWEA Officials	4
OWEA News	5
Calendar of Events	5
President's Message	6
WEF Delegates' Report	10-11
Section Reports	12-15
Committee Reports and Updates	16-18 20-27
Operations Quiz	20
Roll Call	28
Passings	28
Welcome New OWEA Members	29
Utility Partnership Program	29
Advertiser Index	86

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The Buckeye Bulletin is published 4 times per year by the Ohio Water Environment Association.
Individual subscriptions included with association membership.

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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

Staff Changes at OWEA

Amanda Goodwin, OWEA's Office Assistant since January 2015, has left to take a job in Oregon. We will miss Amanda and wish her well as she pursues new life adventures in the western United States.

OWEA is currently interviewing candidates for a full time office assistant position. Watch for an announcement soon about a new member of OWEA's association office team.

Judi Henrich will be transitioning to a yet unknown second encore career sometime in 2016 (date yet to be determined) and Amy Davis will take the lead at OWEA's Columbus office.

This will lead to the hiring of one or two additional team members so keep your eye out for upcoming job postings. If you or someone you know would like to work in a busy, interesting, and multifaceted small office setting for a non-profit organization, please have them contact OWEA at 614.488.5800 or info@ohiowea.org.



OWEA and NESOWEA co-hosted a booth at the NEORS Open House at the Southerly Wastewater Treatment Plant on Saturday, September 19, 2015. Working the booth from NESOWEA were Brian Bland (pictured), Nick Bucurel, and Tom Voldrich.



NEORS's Wally Waterdrop stops by for a visit with Brian Bland (NESOWEA) and Judi Henrich (OWEA) at the booth in the exhibit area.

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

OWEA CALENDAR

November 2015

- 4-5 SW Wastewater Plant Ops Workshop
- 5 NW Collections Hands-On Workshop
- 5 NE Supervisor Seminar
- 12 OWEA Watershed Workshop
- 18 OWEA Executive Committee Meeting
- 18-19 SW Plant Ops Seminar

December 2015

- 3 OWEA Biosolids Workshop

January 2016

- 8 NW Executive Committee Meeting
- 13 OWEA Executive Committee Meeting
- 21 NE Operations Seminar
- 21 SW Industrial Waste Seminar & Section Meeting

February 2016

- 10 OWEA Executive Committee Meeting
- 18 SE Section & Industrial Pretreatment Meeting
- 18 NE Industrial Waste Seminar

March 2016

- 9 OWEA Executive Committee Meeting
- 17 OWEA Government & Regulatory Affairs Workshop

April 2016

- 8 NW Executive Committee Meeting
- 14 SE Section and Plant Operations Meeting

May 2016

- 5 OWEA Collection Systems Workshop
- 11 OWEA Executive Committee Meeting
- 19 SE Section/Awards/Biosolids/Small Systems Meeting

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.
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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).



Don't let anyone tell you otherwise, being president of OWEA is not as easy as the former presidents made it look. It's not that I'm having a hard time with the position, but it is not without challenge. Maybe I am faced with different challenges due to my position in my day job at Ohio EPA. Most of the time, the goals of OWEA and Ohio EPA are in sync. However, there are those few instances when Ohio EPA is implementing a new rule or program that OWEA, on behalf of its members, might be opposing. These are the things that challenge me in my position as president.

As an example, in August, WEF and OWEA sent an email urging members to write to their U.S. legislators to oppose the Great Lakes Provision in S. 1645 (Section 428) of the US FY16 appropriation bill for the Department of Interior, Environmental Protection Agency, and related agencies. Section 428 would require the elimination of all CSOs, even if they are authorized through a Long Term Control Plan or NPDES permit. This section was proposed in reaction to the harmful algae blooms in Lake Erie. Ohio EPA has been working with communities to eliminate the impacts of CSOs and bypasses for more than 20 years through enforcement actions, long term control plans, and NPDES permits. We have put a lot of resources into solving the problems of Lake Erie. This proposed rule would help eliminate a source of nutrients to the lake. OWEA's position is that while it supports the future elimination of CSO discharges, it believes that this effort must be done in the context of prudent planning, affordable financing, and innovations in technology.

When things like this come up, the Government and Regulatory Affairs Committee, under Dale Kocarek's leadership, reviews the issue and recommends action by OWEA. For obvious reasons, I am often left out of the conversation. OWEA is a great organization that always has the best interests of its members in mind. All of us want streams and lakes that we can enjoy; sometimes the costs can be overwhelming.

The past few months have been pretty busy. Mike Frommer, Ted



Elizabeth Wick, P.E.
OWEA President

Baker, Jamie Gellner, Jane Winkler, and I spent two days focused on transitions at OWEA. Personnel changes and contact hour process changes were high on our lists of tasks. Judi Henrich has retirement on her mind, the contact hour tracking process at Ohio EPA is changing, and we need to continue a high level of service to our members. In the middle of our retreat, Amanda told us that she is exploring new opportunities in Portland, Oregon. We will certainly miss Amanda and wish her well in her new adventure. Our plan is to replace her quickly with a full time employee with graphic design skills. We also hope to bring on another employee to maintain the contact hour tracking process and other member services. Over the next 6 months, Judi will be downloading her knowledge to the new employees and Amy.

It was unfortunate that, due to low registration numbers, we had to cancel the buses that were headed to Chicago. Maybe it is something we can try again the next time WEFTEC is in Chicago. Let us know how we can make this trip more appealing.

I just returned from Chicago where I attended my first full WEFTEC. What an experience to spend five days with so many water quality professionals! It's really energizing to hear so many people be so passionate about an industry. Ohio was very fortunate to send three teams from NW Ohio and Columbus to WEFTEC for Operations Challenge. All three teams represented us very well! I am especially proud of my Ohio EPA staff, Justin Williams, Andy Gall, Walter Ariss, Ryan Gierhart, and Bowling Green operator, Joe Tillison, of the Volatile Solids team, who earned first place in Process Control and first place in Maintenance in Division II! Way to go team! If your utility is interested in putting a team together, reach out to one of these teams for guidance.

Watch your mail for upcoming workshops and section meetings. We have the Watershed and the Biosolids Workshops coming up. Each one has a full, educational agenda.

May we never lose our passion for clean water!

Elizabeth Wick, OWEA President

elizabeth.wick@epa.ohio.gov

Elizabeth Wick, P.E., is currently the Manager of the Division of Surface Water in Ohio EPA's Northwest District Office, where she has worked for the past 28 years. In addition to being a Professional Engineer, Elizabeth holds a Class 3 wastewater operator license and is a member of the Select Society of Sanitary Sludge Shovelers (5S). She has a Bachelor of Science degree in Chemical Engineering from the University of Toledo.

Elizabeth resides in the Bowling Green, Ohio area with her husband Dave. They have four boys. One son has graduated from college and owns his own business. Three sons are currently attending the University of Toledo where they are majoring in engineering and recreational therapy. Elizabeth enjoys spending time with her family (especially her granddaughter), camping, hiking, and just hanging out around a bonfire.

2015-2016 Executive Committee Meeting Schedule

November 18, 2015	Wednesday	OWEA Office/Columbus
January 13, 2016	Wednesday	OWEA Office/Columbus
February 10, 2016	Wednesday	OWEA Office/Columbus
March 9, 2016	Wednesday	OWEA Office/Columbus
May 11, 2016	Wednesday	OWEA Office/Columbus
June 26, 2016	Sunday	The Bertram/Aurora

PUTTING INNOVATION IN PERSPECTIVE

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

Frequented Places

As we age, it is likely that we agree that our views, perspectives, and tastes often change. A good example is TV shows. When I was young, I liked the show *The Beverly Hillbillies*. Now if I see this show for more than a second, I can't turn the channel fast enough.

Also, places once familiar may become distant and no longer hold allure, while others unimaginable in youth, become familiar - even comfortable. One of those places for me is Highland Park Cemetery in Cleveland. It is there that I go to visit the grave sites of my parents, grandparents, and other relatives. I never visited there as a child as it was not my parents' desire.

The cemetery, founded in 1904, covers 160 acres and has over 132,000 interments. In my navigation of the small curvilinear lanes leading to Section 14, I pass an interesting monument in the center of a roundabout. It is within a few hundred feet of my destination.

The curious monument has a simple, dignified elegance. It is in the shape of a small obelisk surrounded by a courtyard. The entire area is framed by a hedge to give it added distinction. Openings in the hedge provide an unobstructed view from a distance.

The sign on the front of the monument says: *Resting in this Memorial Plot are 61 persons who perished in the St. Clair-Norwood Area Fire Disaster October 20, 1944.* Underneath are the names of the victims.

The War Economy Transforms America

To understand the East Ohio Gas Company Fire Disaster, one must consider it in the context of the robust wartime economy during the last full year of World War II. In his October 15, 2014 article entitled "*The Day Cleveland Exploded: 70 Years Later, the Unthinkable Disaster of the East Ohio Gas Company Explosion*", author Eric Sandy of the *Cleveland Scene Magazine* describes "*Cleveland as the fulcrum for innovation as the US marched into Europe and the Pacific.*" Demand for products, services, and material was at unprecedented levels as full employment was

reached. Sandy reported that Cleveland was the fifth largest holder of war related business in the nation. The focus was on the war. It was an opportunity for entrepreneurs and *leaders of innovation*.

In 1941, the East Ohio Gas Company (East Ohio) purchased land near the Slovenian neighborhood around St. Clair Avenue and E. 55th Street and erected three above ground spherical tanks over 50 feet in height. East Ohio found that by storing liquid gas at -257 degrees F, they could store 600 times more gas on site than with traditional gas phase storage. Fuel, and in particular gas, was needed for factories and the war effort.

During the next three years many wondered if there was too much gas being stored too close to a population center. East Ohio's well scripted message of innovation and energy security in America was coupled with other messages of safety. To be fair, East Ohio did have a monitoring and inspection program.

A Tragedy Unfolds

At 2:40 PM on Friday October 20, 1944 the unthinkable happened. A leak developed in Tank #4. Somehow this leak - gas phase vapor hugging the ground - was ignited. This created a massive explosion and fireball. Flames and smoke were seen 2,800 feet into the atmosphere, visible from Chagrin Falls twenty miles away. Shortly after, an adjacent tank, weakened by the first explosion, blew up. The first thought of an eye witnesses was that Cleveland was being bombed. Within minutes, liquid gas was entering sanitary sewers, coming up in houses and igniting the entire neighborhood with temperatures of 3,000 degrees F. No one was ever able to accurately determine the exact sequence of events.

All told, there were a total of 130 deaths from the explosion. Seventy three of these victims were East Ohio Gas Company employees. Many in their homes in the Slovenian neighborhood never knew what happened, and in a matter of minutes the entire neighborhood was gone. There were many stories of heroism of neighbors and first responders to rescue potential victims in a matter of minutes. It was fortunate that schools were in session and children were away from the neighborhood. An hour later, things would have been much different.



Aftermath of the Tank Wreckage following the East Ohio Gas Company Explosion of October 20, 1944 (Ohio History Connection)



Aftermath of the East Ohio Gas Company Explosion of October 20, 1944 (Cleveland Public Library Photograph Collection)

A total of 61 victims were burned so badly they were never identified. They were laid to rest under the monument in Highland Park Cemetery in a mass funeral on November 14, 1944. Each victim was provided a casket, flowers, and hearse through donations. Mayor Frank Lausche decreed that no other funerals were to be held in Cleveland that day. (The next year, Lausche became Ohio's 55th Governor.)

Failure Is Not an Option

We have all heard about the sad state of affairs regarding our water and sewer infrastructure. The American Society of Civil Engineers rates water and sewer infrastructure nationally at about a "D." Our elected representatives have heard this many times. To be fair, they agree that issues of science based regulation, long term sustainable funding, and affordability be addressed in a comprehensive manner. (Please note that details of this discussion are very complicated and go far beyond this column.) However, based on what I have learned through WEF, productive discussions in Congress are hampered by a slow economic recovery, the large national debt, increasing EPA regulations, deep political division among parties, and the continued threat of government shutdowns and patchwork budgets. This has kept focus on addressing today's problems only.

The frequent response that I hear is *innovation* is the answer. Yes, to be certain innovation is one solution, as we have also heard that *necessity is the mother of invention*. However, the current crisis is different from what faced East Ohio Gas in the early 1940s. Our current crisis is based on the fact that many of our systems have been in continued operation since the 1890s. A true life in excess of 125 years - and counting - is a far cry from the "20 year useful life" used in the old USEPA Construction Grants Program in the 1980s. The demand for water and sewer service - needed by every living person on earth - never ceases. Another problem is that many of our water and sewer utilities are buried, and it is easy to forget about them. The East Ohio Liquid Gas Storage Tanks were always visible on the horizon. Unfortunately, when they failed, some were not surprised.

Perhaps the best statement I heard was in a panel discussion on April 16, 2013 at the Water Summit sponsored by WEF at the Ronald Reagan Office Building. One member quoted a statement from retired NASA Engineer Gene Krantz - popularized in the

Tom Hanks movie *Apollo 13* "*Failure is not an option.*" Utilities will do what it takes to keep systems working, so that the public health is not compromised.

He was not dramatic, just matter of fact. It was the quiet deliberate response that impressed me the most. It was not "gee" whiz technology or cool software, but an attitude of steely resolve and sacred trust by utility managers and their staffs to do whatever it took to protect the health and welfare of their customers.

The Need for a Paradigm Shift

During this Summit, utility leaders discussed how they cope with this problem to keep systems working. Many talked about needing to focus on short term needs rather than longer term planning to keep critical assets in operation. They have become resourceful in managing their organizations more efficiently than ever before and justifying rate increases using business case analysis to forecast essential assets, which must not fail.

Recalling more details from the 2013 Infrastructure Summit, several on the panel called for a paradigm shift in the relationships between the regulated community and EPA, and specifically to get away from the consent order-fixed deadline schedules, which force funding in a short time frame to achieve compliance as quickly as is possible. This approach, which I call the *traditional approach*, tends to often create an "*us versus them*" adversarial relationship rather than partners united in a cause. So the question on the table was this: if there is not going to be new sources of funding, a new business relationship is needed to permit a utility to maximize the value of investment for maximum results. With mutual agreement between the regulator and regulated community, mutual trust should follow.

The panel supported the *Integrated Planning Framework*, which involves a myriad of professionals including engineers, community planners, landscape architects, roadway engineers, and the public. Devising solutions involves rebuilding neighborhoods on a small scale basis, one at a time, and looking at all water including sewage and stormwater holistically. Yes, this takes considerable time to complete, but the end results are promising with reductions in wet weather discharges from combined sewers and MS4s into the water environment, ground water recharge, and more green space to address urban "heat island" affects. In addition, there is the added benefit of beautification and restoring public pride in our communities. During my visits to Capitol Hill on the Fly Ins, all legislators on both sides of the aisle support the Integrated Planning Framework.

In Closing

The East Ohio Gas Fire Disaster was a horrific event, much more graphic than I like to tell in my column. It left such an impact on Cleveland that it is recalled frequently on its anniversary, which was the 71st in October. Growing up in the Cleveland area I learned of this story from my father over fifty years ago. Driving past the monument frequently and stopping to read the plaques, this tragedy is never far from my mind. I also wanted to provide our readers with an example of a utility failure, with a few similarities to the water and sewer industries. I also wanted to provide a story about infrastructure failure different from roads and bridges.

I believe that the times enshrouding the East Ohio tragedy were in part borne of unique times that will never be repeated. In the years that followed, the neighborhood was rebuilt and some returned to the old neighborhood in new homes as community pride was high.



Members of the 2013 Ohio Fly in Group at the Ronald Reagan Office Building Lobby on April 16, 2013 following the WEF Infrastructure Summit, from Left to Right: Dale Kocarek, Doug Clark, Judi Henrich, and Dan Sullivan (2013-14 OWEA President)

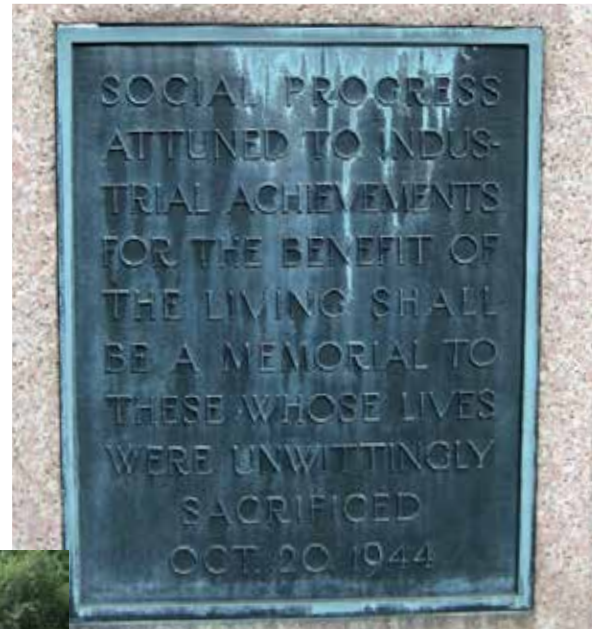
But the fact remains that infrastructure does age and wear out. This must be understood by every person. Despite all of the *tools in the toolbox*, the aging process impacts every living, mechanical, and physical being and thing. To my knowledge there is nothing in the *toolbox* to make time stand still.

The front of the East Ohio Gas Explosion Monument in Highland Park Cemetery lists the names of the victims. The other side of the monument states:

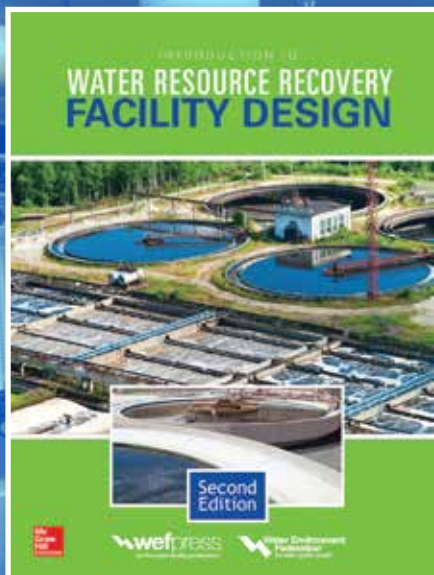
Social progress attuned to industrial achievements for the benefit of the living shall be a memorial to those whose lives were unwittingly sacrificed, October 20, 1944.

We must learn from our past. Based on what I heard during the 2013 Infrastructure Summit in Washington DC, and from my own experiences, we have many wise and skillful water industry leaders in our professional community. On behalf of myself, OWEA, and the citizens that you serve - I say THANK YOU!

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Bronze Plaque on the East Ohio Gas Explosion Memorial in Highland Park Cemetery, Cleveland Ohio



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Dale Kocarek



Tom Angelo



Tom Fishbaugh

A Time of Transition

WEFTEC marks the beginning of WEF's calendar year. This is when the WEF presidents pass the gavel, this year from Ed McCormick to Paul Bowen. This transition was made during WEF's Awards Ceremony on September 29, 2015. In contrast our OWEA "year" is different and runs typically from late June of one year to June of the following year. In addition to changing the WEF President there are also changes to the Board of Trustees (BOT) and WEF House of Delegates (HOD). Jenny Hartfelder of the Rocky Mountain WEA, who visited our annual conference this year and was Speaker of the House four years ago, is now the WEF Vice President.

The HOD is led by the Speaker of the House, which also changes. Duyen Tran of the Arkansas WEA assumed the position as Past Speaker and Jamie Eichenburger of the Rocky Mountain WEA ascended to current HOD Speaker. Last year the HOD Policy and Procedures were modified to give the Past Speaker a more active role in the organization to maintain continuity. This is the same kind of challenge that we face in OWEA when one president is replaced by the next.

This is the beginning of my third and final year of my term on the HOD as an Ohio representative. Sadly, Doug Clark is leaving the HOD. But we welcome Tom Fishbaugh as our Junior Delegate. I will remain as OWEA's Senior Delegate.

Doug is leaving the OWEA Board and WEF House of Delegates with a legacy of service and dedication. Doug has served on the OWEA Executive Committee since 2005 and followed me through the Chairs. We were always partnered together and learned and grew through the years. This formed a bond, which is one of the benefits of joining WEF. We enjoy a close friendship and he was a trusted advisor to me as President and as Chair on the Government and Regulatory Affairs Committee. Our personalities and skill sets were different but complementary, which made us a good match for the organization.

Replacing Doug as OWEA's third delegate is Tom Fishbaugh. The next three years will be Tom's second tour of duty in WEF. Many will remember that Tom was the OWEA President in 2000 and served as a "Director" (renamed Delegate about 8 years ago) between 2002 and 2005. Since that time, Tom has remained very active in the organization. He brings a lot of experience to the position of Delegate.

WEF HOD Committees

The WEF HOD has four committees, plus one newly created committee, which are considered to be part of WEF Leadership:

- ◆ Budget Committee
- ◆ Steering Committee
- ◆ WEFMAX Committee
- ◆ Nominating Committee
- ◆ Outreach Committee (new)

Last year I was the Secretary of the Steering Committee, which I greatly enjoyed. The Steering Committee is an interface between the HOD and BOT on matters of policy and direction. This year I am the Vice Chair of the Nominating Committee, which is entrusted to help recruit and place HOD members on committees based on interest and aptitude. The real work for that committee begins in April and May during WEFMAX and in July when the nominations are submitted.

This year, a new committee was created: Outreach. The Outreach Committee is an outgrowth of the MA Leadership Work Group, which was very successful. The purpose of the Outreach Committee is to continue the legacy of the MA Leadership Work Group, but also serve as a communication vehicle for the HOD. Tom Angelo is on the Outreach Committee.

WEF HOD Work Groups

After a certain amount of deliberation, of which I was a part, Speaker of the House Jamie Eichenberger decided on the following workgroups based on the direction and perceived interest of our members:

- ◆ Innovative Utility Management
- ◆ Membership
- ◆ Voice of Water (VOW)
- ◆ Stormwater

All of these work groups were selected on the basis of relevancy to our industry and to increase WEF membership. With the exception of the Voice of Water, all of the previous work groups have been sunsetted. WEF determined that work was substantially complete, duplicated elsewhere, deferred for now, or promoted to a Committee (MA Leadership Work Group to the Outreach Committee). I am the Vice Chair for the Value of Water (VOW) and Stormwater Workgroups. I wanted to remain on the VOW work group because I feel that its message dovetails with the Water Advocacy initiative of WEF's Government Affairs Committee, of which I am also a member.

Dale Kocarek, Senior WEF Delegate, dale.kocarek@stantec.com (provided WEF Delegate Update)

Tom Angelo, Junior WEF Delegate, tangelo@munitreat.com

Tom Fishbaugh, Junior WEF Delegate, tafishbaugh@wsos.org

WEFTEC 2015 Makes History with Record-Setting Attendance and Exhibition

The September 2015 event marks the largest conference and exhibition in WEF's 88-year history. Record-setting attendance and exhibition numbers - 25,048 registrants and 1,033 companies using 311,600 net square feet of exhibit space - has made WEFTEC 2015 the largest and most successful to date. The Water Environment Federation's (WEF) 88th annual technical exhibition and conference was held Sept. 26-30 at McCormick Place in Chicago, Ill.

Chicago was the site of the first annual meeting that would evolve into today's WEFTEC and continues to be a popular destination for what has become the world's largest annual water quality conference and exhibition. Currently rotating between Chicago and New Orleans, WEFTEC was last held there in 2013 - an equally successful event that set the previous attendance and exhibition records.

"For more than eighty years, WEFTEC has been the world's leading forum for water quality management. It's the place to innovate, exchange knowledge, and connect with experts from across the continent, and around the world," said WEF Executive Director Eileen O'Neill. "The record-breaking success of this year's event is a testament to the value, diversity, and depth for which WEFTEC is known and respected."

Planning for next year's event in New Orleans is already underway. Submissions for the 2016 Call for Abstracts will be accepted through December 1, 2015 and 295,000 square feet of floor space has already been reserved for the award-winning exhibition. WEFTEC 2016, WEF's 89th annual technical exhibition and conference, will be held Sept. 24-28 at the New Orleans Morial Convention Center in New Orleans. Registration and housing will open in spring 2016. For the latest details visit www.weftec.org.

For more information about the WEFTEC 2016 Call for Abstracts, please contact speakers@wef.org. For more information about exhibition and sponsorship opportunities, please contact weftecsales@wef.org.



WHAT'S THE VALUE OF WATER?

When nature calls, you want open stalls.

Most of us never think about what happens to the water we flush. Luckily, we don't have to. Pumps, treatment plants, and pipes remove and clean wastewater so it can be returned to the environment or safely reused.

Clean water systems are one of the greatest public health achievements in history, but they're aging. They need investment to continue delivering life's most essential resource. All day, every day.

Water—Essential. Reliable. Invaluable.

Learn how water works for you. Visit TheValueofWater.org.

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COALITION

Presented in cooperation with the Value of Water coalition



SWOWEA

Roger Rardain, President

The Southwest Section held a meeting on September 17. Our attendance was outstanding at 108 individuals earning 3.25 contact hours. Lesourdesville Water Reclamation Facility and Butler County Water and Sewer hosted, with lunch and technical sessions at the Barn N Bunk in nearby Trenton OH. I would like to extend my thanks to the hosts and organizers for their hard work on this very successful event.

As fall approaches, the Southwest Section moves into a busy season.

Our scheduled events include:

- ◆ The SWOWEA Young Professionals and Watershed committees hosted two free tours (with one contact hour each), October 14th in Hamilton OH. The first tour was at the City of the Hamilton Water Reclamation Facility and the second tour at Synergy Flavors. PPEs, including close-toed shoes, hard hat, and safety glasses were required. Following the Synergy Flavors tour, the group met at Ryan's Tavern for Happy Hour, sponsored by HNTB.
- ◆ Fall Operator Education Day was held October 23rd at the Montgomery County Environmental Services facility. The Plant Operations Committee offers this one day class twice a year as a review prior to the Ohio EPA operator certification exams. I would like to take this opportunity to thank the Plant Operations Committee for continuing to do an excellent job on assisting operators to study for the exams.
- ◆ 14th Annual SWOWEA Plant Operations Seminar, November 18, Manor House in Mason OH. We will have a meet-and-greet with vendors on the evening of November 18th, with the seminar on November 19th. After the holidays, we will return to Manor House in Mason on January 21, 2016 for our Annual Industrial Waste Seminar and Section Meeting.

For more details about these and other events, please visit the SWOWEA website at www.swowea.org or view our latest Southwest WAVE. It is a great resource for the membership!

Each year, the SWOWEA Executive Committee searches for qualified candidates to be nominated from our Section for both OWEA and WEF awards. These awards will be announced at the Annual OWEA State Conference in June. Given the number of members in the Southwest Section there are many highly qualified candidates, which should result in multiple award winners from the SW Section. Let's show the rest of the state what we have accomplished, but we need your help in finding these candidates! Please go to the SWOWEA website Awards Page and review the various OWEA and WEF Awards, then submit a candidate for



Roger Rardain and Jason Tincu leading the SW Section Meeting

consideration. Due to the length of time needed for the selection process, proposed candidates need to be submitted as soon as possible.

Roger Rardain, roger.rardain@ci.fairborn.oh.us



NWOWEA

Roberta Acosta, President

The Northwest Section is wrapping up a very busy year of training, networking, and fundraising! On October 14th, we held our fall Section Meeting at the Lucas County Water Resource Recovery Facility in Waterville, Ohio. Our appreciation goes out to Mickey Shank and his staff, who did an excellent job preparing the facility for this meeting. The meeting included a plant tour and technical sessions covering a variety of topics including the impacts of the ice jam on the facility, a nutrient reduction pilot project currently being undertaken by the City of Perrysburg, green infrastructure for storm water management, and an update on the status of our beloved Lake Erie. Thank you to our presenters as well! These presentations can be found on the NW Section's website. The meeting also included our annual Water for People Pancake Breakfast Fundraiser. A big "Thanks!" to Doug Borkosky and his team of experienced cooks for making this year's event another great success! I also had the privilege of presenting Joe Tillison the past president's plaque for his outstanding service and leadership to the Section in 2014-2015.

We also held our semi-annual Operator Education Day on October 30 at the NW District Ohio EPA Office in Bowling Green. Thanks to Frank D'Ambrosia and his team of veteran operators and trainers for organizing and teaching this event. I would also like to extend a special appreciation to Frank for all his time and effort over the years in service to the NW Section and as Chair of the Personnel Education Committee. Frank is retiring next year and will be stepping down as Chair. If you are interested in volunteering, this is a great opportunity to start! Feel free to contact me or any of the other Executive Committee Officers for more information.

Each year, the Executive Committee seeks qualified candidates to be nominated for both OWEA and WEF awards. This is a great way to recognize individuals that provide outstanding service to their customers, employees and the organization. I know we have many of these deserving individuals in the Section and we need your help to find them! Check out the awards section of our website for information on the various awards or contact Michelle Mix, Awards Chair at michelle.mix@epa.ohio.gov. We will need nominations no later than December 15 for this upcoming year. Also, don't forget about the annual safety award! This is a self-nominating process so don't be shy about letting others know about the great work you are doing to maintain both worker and customer safety. Future events are currently being planned. Upcoming event information will be posted on the Section website at www.ohiowea.org. Feel free to contact me or any of the NW Executive Committee Officers with your thoughts, questions, comments or suggestions.

Roberta, Acosta, rjacosta@wsos.org



NW Section's Annual Pancake Breakfast for Water for People



NW President Robert Acosta and Past President Joe Tillison



Lucas County's Mickey Shank receives NW appreciation plaque



SEOWEA

Brandon Fox, President

The SEOWEA Executive Committee has been busy with activities and planning for the upcoming 2015-2016 events.

The first event of the year was a very successful Friends and Family night with the Columbus Crew on August 22nd. With 156 people in attendance, it was the largest F&F function we have ever held. Attendees got to experience an awesome environment, good food and entertaining fútbol, or soccer to the lay person. This event followed two successful years with the Columbus Clippers. There are already plans in place for 2016 with a potential visit to the Columbus Bluejackets or a repeat of the Crew. We would like to thank our sponsors for making this event possible.

GOLD

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Advanced Drainage Systems, Inc.

AECOM

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CT Consultants, Inc.

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ms consultants, inc.

Smith Environmental

Strand Associates, Inc.

YSI

BRONZE

360water, Inc.

Alloway

Baker and Associates

BissNuss, Inc.

Delaney & Associates, Inc.

DHDC Eng Consulting Services, Inc.

Donahue Ideas

Great Lakes Environmental Center

Hanson Pressure Pipe

The Henry P. Thompson Company

MASI Environmental Laboratories

OHM Advisors

quasar energy group

Resource International, Inc.

Southern Sales Company

Victaulic

On September 22nd, 12 people attended the Lab Analyst Committee meeting in Marietta at Microbac. The LAC is planning one more event this year in Zanesville. More details will be coming soon.

Our first Section meeting of the year was held on October 15th in Columbus with a tour of the Scioto River Greenway Project followed by a business meeting at the Boathouse. Thanks to all the presenters and attendees.

Looking ahead to 2016, the SE EC has a tentative schedule to mark your calendars. More details to follow:

- ◆ February 18th - Industrial Treatment Meeting
- ◆ April 14th - Plant Meeting
- ◆ May 19th - Biosolids/Awards/Small Systems Training

continued on page 14



Tour of the Scioto River Greenway Project on October 15, 2015



Brandon Fox and family at the Crew game on August 22, 2015



Brenda VanCleave and kids enjoying a summer night of Crew soccer

Additionally, if you would be interested in hosting a section meeting or committee function, please let me or an SE EC member know. We are always looking for new and exciting sites to visit. Likewise, if you have interest in becoming more involved in a committee or on the SE Executive Committee, let us know because there is substantial personal and professional growth one can gain from being involved in this great organization. I would like to thank all of you for supporting our SE Section events and as we look forward, I encourage all members to invite someone new to an upcoming SE Section meeting. Additionally, always feel free to share ideas about how we can better serve our membership. If we can do things better, we would like to hear about it. Hope to see you at a function soon!

Brandon Fox, bdfox@columbus.gov



NEOWEA

Tom Voldrich, President

The NE Section is rolling out its fall program in fine fashion. We visited Lake County's Madison TWP facility on September 24th followed by lunch and afternoon of technical presentations with 3 contact hours. The day couldn't have been nicer. We have recently switched our fall plant tour (an outdoor event) and meeting and Supervisory Seminar (an indoor session) for comfort sake. It worked out well with attendance of 115 and temps in the 70's. The accommodations at Geneva State park and the food were excellent. Members enjoyed hearing about the history of the plant and numerous changes that had taken place over the years. Burgess and Niple and the Lake County together showcased the latest upgrade to this facility. The retrofit featured a clever conversion to biological phosphorus removal improvements, final clarification and numerous other upgrades to accomplish an expansion from 3 to 5 MGD. Well done! Congratulations and thanks again to Director Rick Martin, Superintendent Scott McGlothlin, and staff of Lake County Department of Utilities for a great project and hosting our meeting.

I had the pleasure of helping at the OWEA booth at the September 19th NEORS open house at the Southerly plant. If you are heading up an outreach or public education committee, I would encourage participation in such local utility programs. It was remarkable how many people, from kids to the elderly, who came out to learn. I was able to talk to a lot of young folks about our organization, education, career, scholarship and networking opportunities. Getting involved with community activities like this is definitely worthwhile, as it helps encourage others to consider a water related profession, consider membership in OWEA, and/or learn about important clean water habits.

By the time you are reading this we will have had our fall clambake social at the Grantwood Country Club in Solon on October 10th. Looking forward to a night of good food and fun with friends. We expect around 50 attendees this year.

Next up was our Supervisory Seminar on November 5th at the Furnace Run Metro Park at the Brushwood Pavilion. This was a free seminar, providing 3.0 continuing education credits for wastewater certification. Snacks and beverages were served. Thank you to our speakers:

- ◆ New Electronic Business Services, James Roberts, *Ohio EPA*
- ◆ Ohio Ethics Law, Susan Willeke, *Ohio Ethics Commission*
- ◆ Leading Warren's WPC, Ed Haller, *City of Warren, Ohio*

We have rolled out a new look for the NE Section website. Please check it out. Jim Cooper bravely included his email address to receive feedback. (jim.cooper@arcadis-us.com) We sure would appreciate your comments so don't be shy.

Tom Voldrich, tvoldrich@ctconsultants.com



NE Section taking a tour of Lake County's Madison TWP facility



Superintendent Scott McGlothlin of the Lake County Dept of Utilities



The tour continues at Lake County's Madison TWP facility



Check out the new NE website; nesowea.org

Are You Using the Term Water Resource Recovery Facility?

The Water Environment Federation is encouraging the use of the term "water resource recovery facility" instead of "wastewater treatment plant." WEF changed the terminology to better focus on the products and benefits of treatment rather than the waste coming into such facilities.

CERTIFICATION BOARD UPDATE

by Kathy Richards, Director

Laboratory Analyst Certification Renewal 2016-2017

It's that time again! Your current wastewater laboratory analyst certificates will expire on Dec.31, 2015. Renewals are on a two-year cycle and all certificates are on the same cycle. If your certificate is dated 2014 or earlier you will need to send in your updated information along with payment of \$25.00. The renewal forms have been mailed. If you did not receive yours, we may not have your most current contact information. This year you can log on and renew electronically at http://www.ohiowea.org/lab_analysts.php. Please send any changes of address or questions to certifications@ohiowea.org. Keep in mind that your application must be postmarked prior to January 31, 2016 to avoid paying the \$95.00 reinstatement fee!

Kathy Richard, certifications@ohiowea.org

Renew Your Laboratory Analyst Certification

Renewal Deadline is January 31, 2016

Renew online at
http://www.ohiowea.org/lab_analysts.php



LABORATORY ANALYSIS COMMITTEE

by Denise Seman and Melodi Clark, Co-Chairs

Happy fall! Crisp air, apples and pumpkins abound . . . time for turkey, football, and a fire in the fireplace. Hope everyone has had a good year, and is settling in to enjoy the upcoming holidays. Don't forget your renewals (operator and lab). The Plant Ops and Lab Analysis workshop was held on October 21 and 22, and was well attended. If there are topics you would like to see at this event next year, please let us know.

SW LAC – Jim Davis and Karen Tenore

On July 16th the SW LAC meeting was held at YSI. Thirty-five people attended earning 4.75 contact hours. The SW LAC committee wants to thank YSI for hosting an LAC meeting every year for the past seven years. This is a lot of work on their part and we greatly appreciate all of it!

Our fall meeting was held on October 8th at Cincinnati MSD. Forty-one attendees earned 2.5 contact hours and took a facility tour of the Mill Creek Treatment Plant.

Next year's meeting dates are not yet set. Check the Buckeye Bulletin, the WAVE, and your email for the dates and times.

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

SW LAC 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

NE LAC – Bev Hoffman

The NE LAC had a great turn out for our last meeting on June 19th. Dan Button from U.S. Geological Survey talked about "Pharmaceuticals in the Streams" and Heather Kirkpatrick discussed "Everything You Ever Wanted to Know about TKN". Our next meeting is planned for November, at the Lake County Training Center. Please watch for further information regarding this event. If anyone has a topic they would like to have presented at our meetings, please let me know.

Beverly Hoffman, nesowealac@gmail.com

NE LAC Committee Members:

Beverly Hoffman, nesowealac@gmail.com
Marie Simon, marie@northcoastlabs.com
Lisa Feigle, lisaf@gcdwr.org
Amy Starky, ajstarkey@co.stark.oh.us

SE LAC – Melodi Clark

The Southeast LAC had a wonderful 3rd quarter meeting that was hosted by Microbac Laboratories in Marietta, Ohio. We had a great turn out! I want to thank Dave Vandenburg, VP of Microbac, for hosting. We had a great tour of their 31,000 square foot lab. I would also like to thank Gary O'Brien of O'Brien's Safety Services, LLC for presenting on SDS and Chemical Hygiene plans. These were two awesome topics and covered a lot of what we have all had questions about with the changes being implemented. We are looking to have one more meeting before the end of the year, potentially with City of Zanesville hosting. If you have any ideas on topics or locations for our last meeting of 2015 please let me know.

Melodi Clark, mlclark@columbus.gov

NW LAC – Bridget Shiets

Next meeting is planned for January 29th at City of Bellevue WPC. Watch for upcoming details.

We had a meeting on August 5th at Ottawa Metro Park in Lima, Ohio, with free registration made possible by Alloway Labs. Attendees heard presentations on *The How, What and Why of Priority Pollutants* by Eric Nygaard, Ohio EPA; *The Importance of Reading Your NPDES Permit* by Kim Riddell, Alloway; *A Hands-On Exercise in Field Sampling and Handling* by Alloway staff. A wonderful lunch was provided by Alloway Labs and the meeting ended with a tour of the Alloway facilities in Lima for those attendees who wished to travel to lab. Attendees earned 3 contact hours.

Bridget Shiets, wwtpLab@cityofbellevue.com

Lab Analysis Committee Contact Information**State Co-Chairs**

Denise Seman, 330.742.8820, dseman@youngstownohio.gov
Melodi Clark, 614.645.1239, mlclark@columbus.gov

Northeast Chair

Beverly Hoffman, 440.446.4228, nesowealac@gmail.com

Southeast Chair

Melodi Clark, 614.645.1239, mlclark@columbus.gov

Northwest Chair

Bridget Shiets, 419.419.7514, wwtpLab@cityofbellevue.com

Southwest Co-Chairs

Jim Davis, 937.496.7051, davisji@mcOhio.org
Karen Tenore, 937.333.1845, karen.tenore@daytonohio.gov

**Join Your Section's Lab 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.

THE CHANGE IN THE SEASON BRINGS CHANGE IN SAFETY REQUIREMENTS

by Mike Welke, Safety Committee Chair

While we enjoy autumn for all its colors, crisp cool mornings, warm sunny afternoons, and dark cool evenings, somehow the day light keeps getting shorter and shorter. We know that winter is fast approaching. As with the changing season, there are safety issues we should look at, such as fall and slip hazards, PPE (Personal Protective Equipment), and safety guards.

Fall and Slip Hazard

As we know winter's cold temperature bring along ice and snow, we should look for areas of concern that can be addressed before there is a problem. Remember where there was ice last winter and think of what should be done to prevent it from happening again, such as low lying areas in walkways where water could freeze. Even a thin layer of ice can be dangerous around these walkways at your facilities.

The correct thing to do is to apply an epoxy nonskid floor paint to these areas. Or to make sure that some ice melt is kept nearby so it can be put down over the area. Also make sure that water does not puddle or stand in these areas.

PPE (Personal Protective Equipment)

PPE's are not just to protect us from hazards in the workplace but also to protect us from the elements. Along with the PPE's are tools to help assure a safe workplace. Examples of these PPE's for the elements are coats, hats, gloves, and shovels.

Proper coats, hats, and gloves should be used when exposed to these cold temperatures. If your facility requires hardhats, winter liners should be provided that can be properly secured into the hard hats with chin straps so the hardhat won't fall off. Some facilities provide winter safety coats for their personal. You should inspect

your coat to make sure all zippers or snaps work, and that there are no tears in the coat. If any problems are found, correct the issues or replace the coat.

Inspect all equipment that will be used in winter conditions, such as shovels. Make sure that the handle is not cracked or weakened. Check the shovel front blade to make sure it has a clean edge on it and it is not bent. Replace these shovels if these conditions are found.

Safety Guards

Make sure all chain and sprocket safety guards are properly secure and in place. Doing this now will not only make the facility and the employees safer, but it will save you from having to fix or install them in the cold later on. Check all hand rails around your tanks, especially near the walkways. Make sure the rails are secure and any openings have the safety chains on them.

This was just a few of the things to consider as the season changes. As always, review your facilities safety policy and procedures. Alert your safety personal of any safety issues you notice. Let's all enjoy the changes in the seasons and the safety requirements that these seasons bring.

We also encourage your facility to apply for the OWEA Safety Awards and Safety Certificates at www.ohioweia.org.

If you would like to become involved with the OWEA Safety Committee, please contact me.

Mike Welke, City of Warren
Safety Committee Chair
mwelke@warren.org

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 (3) 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 sign-in 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 1, 2016. Application available at <http://www.ohioweia.org/safety.php>.

Ohio Water Environment Association 2015 Safety Award



Application filing deadline is March 1, 2016

Application available at

<http://www.ohioweia.org/safety.php>

If you have questions, contact:

Mike Welke, Safety Committee Chair
City of Warren, mwelke@warren.org

GOVERNMENT AFFAIRS COMMITTEE UPDATE

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

As we enter into a new year for the Ohio Water Environment Association (OWEA), the Government and Regulatory Affairs Committee is in a rebuilding mode. The goals that I wish to establish for the coming year are as follows:

- ◆ Participate more actively and proactively in researching proposed legislation at the State and Federal levels. This will require more research and writing. I am going to lean on organizations such as WEF and NACWA for assistance in this. In the past we have joined with AOMWA as our views on many matters are nearly identical.
- ◆ Following the lead of WEF, I wish to engage in the formulation of position papers on different topics. I learned something recently with the proposed legislation in the Federal 2016 Appropriations Bill on the elimination of blending and CSOs in the Great Lakes. I, on behalf of the organization, was not in favor of this legislation due to cost and implementation concerns. However, I was also reminded that our organization stands for *clean water*, so what exactly is it that we are against? That gave me pause. To help address issues like this in the future for the benefits of our members, I wish to develop short white papers to clearly define our position. These papers will be vetted

through the committee and then the Executive Committee (EC) for approval. This will also give us the opportunity to respond to the press if called upon to articulate our position.

- ◆ To foster additional opportunities for our members and especially Young Professionals, I wish to encourage our four sections to either start a Government and Regulatory Affairs Committee or become more active with me at the State. As the adage goes: *the harvest is plentiful, but the workers few*. There is much opportunity for meaningful involvement in OWEA, and it is my job and the job of the OWEA Executive Committee to find places for those ready, willing, and able.
- ◆ John Owen and I are in the midst of planning our next Government and Regulatory Affairs Workshop, which will be held on March 17, 2016. I wanted to push the event back into mid-March to avoid the winter weather storms that have plagued Ohio and the Eastern United States. If anyone has a topic that pertains to government affairs, and utilities management, please feel free to contact John or me.

Dale Kocarek, Chair
dale.kocarek@stantec.com

Call for Abstracts - 2016 Government and Regulatory Affairs Workshop, March 17, 2016

Abstracts Due By December 1, 2015. The workshop will be held at the DoubleTree Columbus-Worthington

Submit Abstracts Online at http://www.ohiowea.org/call_for_abstracts.php. Questions? - Contact 2016 Program Chair John Owen, john.owen@epa.ohio.gov. Speakers shall submit a copy of their presentation to OWEA at least 48 hours prior to the workshop and bring a back-up copy on a thumb drive.

The GRA Committee is looking for papers on the following topics of interest:

1. Case studies of successfully implementing of Long Term Control Plans
2. Current updates to nutrient water quality standards (i.e. nitrogen and phosphorus, Ohio vs. other States)
3. Control of dissolved inorganic pollutants (i.e. TDS, chlorides, sulfates)
4. Case studies Involving nutrient removal compliance strategies
5. Nutrient trading case studies
6. NPDES permits and satellite communities
7. Low cost strategies to optimize wastewater treatment
8. De-centralized treatment alternatives and strategies
9. Case studies involving balancing green technology and NPDES compliance
10. 208 Water Quality Planning and impacts at the local levels (counties and municipalities)
11. Antidegradation

PUBLIC EDUCATION UPDATE

by Kevin Stilwell, Chair

In the first year of the OWEA Public Education and Outreach Funding Assistance Request Program, we have been able to fund over \$3000 for students to gain valuable knowledge in the waste water industry. We have assisted in research programs, sending students on field trips, and even to WEFTEC. This is a great resource available to educational programs throughout the state of Ohio.

We hope to continue growing this program, as the future generations learn about our great industry. Please visit the OWEA Public Education Committee web page for more information.

We are also looking to grow our committee. If you are interested and have a passion for public education for any age group, please contact me so we can educate the future.

Chair, Kevin Stilwell, P.E., kstilwell@raconsultantsllc.com

Biosolids Specialty Workshop Schedule

Agenda as of 10/21/15. Subject to change.

Earn up to 6 Contact Hours

7:45-8:15

Registration
Light Continental Breakfast
Visit with Exhibitors

8:15-8:30

Welcome and Opening Remarks
- *Jamie Gellner, Hazen and Sawyer*
Residuals Committee Chair

8:30-9:15

Restoring Ecosystem Function in Degraded Urban Soil Using Biosolids, Biosolids Blend and Compost
- *Dr. Nick Basta, OSU*

9:15-10:00

City of Columbus Deep Row Hybrid Poplar Program Update
- *Heather Curtis, City of Columbus*

10:00-10:15

Break in Exhibit Area

10:15-11:00

Thermal Hydrolysis: The Ins and Outs, Ups and Downs
- *Matthew Van Horne, Hazen and Sawyer*

11:00-11:45

High Performance Anaerobic Digestion: Co-Digestion and Thermal Hydrolysis
- *Dave Parry, CH2MHILL*

11:45-12:45

Lunch Buffet
Nationwide Conference Dining Room
Visit with Exhibitors

12:45-1:30

NEORSD's Southerly Renewable Energy Facility: Evaluation of Performance after One Year of Operation
- *Steve Janosko, NEORSD*

1:30-2:15

Biosolids Dewatering Alternatives
- *Dan Fronhofer, BDP*

2:15-2:30

Break in Exhibit Area

2:30-3:15

Land Application Rates for Manure
- *Kevin Elder, Ohio Dept of Agriculture*

3:15-4:00

Hydrolysis Process Converts Dewatered Biosolids into a Liquid Class A Product for Low Cost Land Application
- *Bill Mullin, Lystek International Inc.*

Exhibitor Opportunities Available

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<input type="checkbox"/> OWEA/WEF Member (or with new membership added)	\$125	
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PLANT OPERATIONS UPDATE

by Kim Riddell and Joe Tillison, Co-Chairs

We would like to thank the OWEA Executive Committee for sending all three Ohio WEA teams to WEFTEC this year in Chicago to represent Ohio in the national competition! Since Ohio has over 2000 members and has gained a 3rd Delegate to WEF, we are also able to send a 3rd team from Ohio to compete in the Operations Challenge event at WEFTEC. OWEA covers the expenses for the winning teams travel to WEFTEC each year and this year they again sent three teams! THANK YOU on behalf of the Plant Ops Committee and the Ohio WEA teams!

The committee held its annual Plant Operations and Laboratory workshop on October 21-22, 2015 at Nationwide Hotel and Conference Center. There were great presentations on plant optimization, how the EPA utilizes the data that you report, preventative maintenance, power savings, industrial operations, emergency planning, funding and other OEPA updates. The lab committee provided concurrent sessions for Day 2 and they were also well attended as usual! The committee is already putting some great ideas together for 2016 so please plan to put money back in your budget to attend.

If you are interested in putting a team together for Operations Challenge, becoming a member of the committee, or assisting as a judge / volunteer for Operations Challenge, please contact Kim Riddell or Joe Tillison. If you are an existing team or considering having a team in 2016, we encourage you to contact us soon to get on the schedule to use the equipment OWEA has for practice. The practice schedule fills up quickly and we don't want you to miss out on that time with the equipment! Call early!! We are here to help you out!

Mark your calendars for the 2016 Plant Operations activities:

- ◆ 2016 Operations Challenge Competition at the OWEA Annual Conference
June 27-28, 2016 at the Bertram Hotel and Conference Center in Aurora, Ohio
- ◆ 2016 Plant Operations and Laboratory Workshop
October 26-27, 2016 at the DoubleTree Columbus-Worthington, Ohio

Kim Riddell, kim.riddell@alloway.com, 419.234.4507

Joe Tillison, JTillison@bgohio.org, 419.354.6274

Ohio Teams' Results at the 2015 Operations Challenge in Chicago

- ◆ The BG/OEPA Volatile Solids won first place in Division II in both the Process Control and Maintenance events. Their scores for these events were the best in the entire competition (all 44 teams), ahead of all of the Division I teams. The Volatile Solids finished in 6th place overall in Division II. Congratulations Volatile Solids!
- ◆ The Northwestern Water & Sewer District Dirty Deeds were extremely competitive in several of the events and paced 6th in Division II in the Collections event.
- ◆ The City of Columbus Outfalls had a great competition and placed 14th in the Maintenance event.

TEST YOUR KNOWLEDGE – TAKE THE OPERATIONS QUIZ

1. What provides the basis for federal regulation of wastewater treatment in the United States?
 - a. Federal Code of Regulations
 - b. Code of Environmental Regulations
 - c. Clean Water Act
 - d. Discharge Monitoring Program
2. A valve that allows wastewater to flow in one direction only is a _____.
 - a. Gate valve
 - b. Piston valve
 - c. Global valve
 - d. Check Valve
3. An air-gape device is used to do what?
 - a. Ventilate the sewer system
 - b. Prevent excessive vibration in sludge piping
 - c. Prevent cross contamination in potable water systems
 - d. Detect the level in a lift station
4. An incubator used for the CBOD5 test should be kept at what temperature?
 - a. 44.5°C
 - b. 20.0°C
 - c. 100°C
 - d. 32.0°C
5. What organisms should predominate in a balanced, good settling mixed liquor?
 - a. Flagellates and amoebas
 - b. Stalked and Free Swimming ciliates
 - c. Rotifers
 - d. Nematodes

Answers noted below.

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

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



Volatile Solids - Ohio EPA-NWDO & Bowling Green
(l-r) Justin Williams, Walter Ariss, Ryan Gierhart, Joe Tillison, and Andy Gall



Dirty Deeds - Northwest Water and Sewer District
(l-r) Brian Martikan, Tom McGrain, Jarred Myers, Todd Saums, and Claude Barringer



Outfalls - City of Columbus
(l-r) William (Tucker) Randles, Todd Logan, Shawn Nixon, OVIVO Rep, Jason Spencer, and Robert (Bobby) Hood



It's time to put your team together for 2016.

**You can compete to win a trip to
next year's WEFTEC in New Orleans,
September 24-28, 2016!**



2015 Workshop Dates

Watershed Workshop - November 12, 2015, OSU's Ohio Union

Biosolids Workshop - December 3, 2015, Nationwide Conference Center

2016 Workshop Dates

Government and Regulatory Affairs Workshop - March 17, 2016, DoubleTree Worthington

Collection Systems Workshop - May 5, 2016, DoubleTree Worthington

Plant Operations/Lab Analysts Workshop - October 26-27, 2016, DoubleTree Worthington

Watershed Workshop - TBA

Biosolids Workshop - December 1, 2016, DoubleTree Worthington

Interested in presenting at an OWEA Workshop? Visit http://www.ohiowea.org/call_for_abstracts.php



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WATER FOR PEOPLE UPDATE

by Alicia Adams, Water For People Co-Chair

The Ohio Water For People Team recently collaborated with the City of Columbus and the City of Westerville on the 1st Annual Race for Global Water, which was held on October 3rd. Nearly 120 runners/walkers participated, plus an additional 20 volunteers and 13 committee members were all part of making the event a success!

Special Thank You's go to the following:

- ◆ **Bic Boyles** (City of Columbus) - instrumental in bringing the event to fruition. Without her dedication to the charity, this event would not have been possible!
- ◆ **Dr. Rick Westerfield** (City of Columbus) - addressed the crowd before the event and thanked all the committee members.
- ◆ **Richard Lorenz** (City of Westerville) - addressed the crowd before the event and started the race.
- ◆ **Hunter Kelly** (City of Columbus) - MC'd the event and gave background information regarding what Water For People is all about!
- ◆ **Afaf Musa** (CDMSmith) - OWEA Chair and responsible for recovery food and sponsorship signage.
- ◆ **Cindy Jacobsen** (T&M) - coordinated all volunteers and the tee-shirts.
- ◆ **Stephanie Kunze** (OHM / So Happy Hearted) - photographed the event and handled the PA system.
- ◆ **Summer Hawkins** (City of Columbus) - coordinated the event logistics and arranged for the bollards to be put down so everyone was safe running across the dam.
- ◆ **Amy Riegler and Sandi Varney** (Greater Cincinnati Water Works and OAWWA Water For People Chair) - coordinated the Water For People informational signage displayed along the course.
- ◆ Additional thank you's to the rest of our committee - **Brian Hammerle and Joe Capan** (City of Columbus), as they provided guidance and much needed support in the planning of the event

Here are some statistics you may not know:

- ◆ Women and girls haul water for an average of 4 hours per day in the developing world - that's time that they are not going to school, work, or just being a kid and playing!

- ◆ More people in this world have cellphones than toilets.
- ◆ 50% of water pumps break after the first 2 years, sending people back to collecting water from dirty rivers and lakes.
- ◆ 1.8 billion people lack access to clean water.
- ◆ 2.5 billion people (more than a third of the world's population) lack access to a toilet.
- ◆ Nearly 90% of the global causes of diarrhea are estimated to be attributed to unsafe drinking water, inadequate sanitation, and poor hygiene.
- ◆ Hygienic practices, such as washing hands with soap, can reduce the risk of diarrhea by at least 35%.
- ◆ More than 3.4 million people each year die from water related diseases - that's nearly the population of state of Louisiana.
- ◆ A child dies every 21 seconds from a water-related illness.

Water For People is taking big steps to solve the world's water crisis - permanently. Their goal is to have complete world coverage for **Every** family, **Every** school, and **Every** clinic. They are teaming up with **Everyone** to make this difference last **Forever**. Water For People brings together local entrepreneurs, civil governments, and communities to establish creative, collaborative solutions that allow people to build and maintain their own reliable and safe water systems. They don't just address the symptoms of the problem; instead they prevent it from happening again in the future.

The road to permanent water coverage for **Everyone Forever** is challenging, but if we invest more now to create sustainable and replicable water and sanitation infrastructure, we can achieve incredible outcomes - more children in school, more employed individuals, more families healthy and thriving, and more communities collaborating and growing. From there, the impact continues to ripple out on a national and global scale.

If you are interested in becoming involved to help support the mission, the Ohio Water For People Group is continuously planning future fundraising events. Feel free to contact me or Afaf, and we'll work with you to get you involved.

We're a handful of people out to change the world, but we can't do it alone. Join us!

Alicia Adams, Co-Chair, aadams@munitreat.com
Afaf Musa, Co-Chair, musaab@cdmsmith.com



Richard Lorenz (City of Westerville) and Richard Westerfield (City of Columbus) welcome the racers on a cool October 3rd morning.

Top Finishers and Times

Men

Fred Smith - 23:20
Scott Ballenger - 23:30
Ryan Ballenger - 23:30

Women

Denise Weaver - 23:58
Elizabeth Ehret - 25:18
Stacia Eckenwiler - 25:58



Racers cross Hoover Reservoir dam, led by the ultimate winner, Fred Smith (OWEA SE Section Delegate and CDM Smith Sr Project Manager.)

THANK YOU 2015 GLOBAL RACE FOR WATER SPONSORS

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YOU WANT ME TO WHAT, LEAD?

by Jason Tincu, Brown and Caldwell

So whether you're a building attendant, entry level operator, maintenance mechanic, design engineer, or the utility manager of a large system, you should all feel a sense of urgency to lead. And no, we're not insinuating that you should go about and boss around your colleagues and co-workers with a swollen head and an attitude - because that's not being a leader! We're speaking more in the context of knowing and owning your work role, being a role model and a compassionate co-worker, leveraging resiliency and optimism, and looking for ways improve and enhance work flow, the workplace, and your core business.

"To lead" (verb) is defined as...

- ◆ to go before or with to show the way; conduct or escort
- ◆ to conduct by holding and guiding
- ◆ to influence or induce; cause
- ◆ to guide in direction, course, action, opinion, etc.

So why is the concept of 'creating a culture of leadership' so important? Many corporate and academic arms state that leadership is the most vital attribute to fuel organizational success. Leadership is a way of being you, regardless of your position or role. It's about being responsible and accountable, regardless of the results, and communicating throughout the process. It's a mindset that values contribution to the organization's cause and loyalty in the process. It's about creating value and being part of a movement. It allows employees to create and own things. Leadership is not a position or title. It's a mindset!

There is nothing more impressive than seeing someone master an art . . . and FEEL GOOD about it . . . whether it's analyzing and performing Process Control, dismantling a sludge pump, presenting legislative requests to an elected body, or designing one of the most innovative structures in the industry! Organizations that are successful find ways to hire quality people and then get out of their way so they can produce and create! This process helps to create a culture of leadership.

Another important aspect of leadership is being a compassionate co-worker, regardless of your position. In order to create a culture of leadership, employees must have empathy and compassion for one another. We've all worked around 'That Guy' that KILLS (in a good way) everything that he does . . . but won't give the time

of day to a co-worker who is clearly in need of some compassion, conversation, empathy, or a quick hand on a job. 'That Guy' soon loses credibility from the surrounding group due to the fact that his 'selfish motives' have been uncovered. In comparison, we should look to be the person who is able to sense when someone is in need and puts things aside to assure that they are tended to. As they say, success takes help because failure we can do alone! Empathy in the workplace is a prerequisite for creating a culture of leadership.

It's not about the number of times that you get knocked down. It's about how many times you get up for another shot! Success doesn't come easy; whether it's learning a new task, taking a new position, or evolving and improving your internal practices and operation. In today's society, so much light is shone on being a "Monday Morning Quarterback" or criticizing someone's efforts who is attempting to try something new or improve things out of their own will and initiative. Instead of criticizing, how about getting involved and seeing how a combined effort might lead to success? Resiliency and optimism are key factors in creating a culture of leadership.

Lastly, and we know what all you doubters are thinking, it takes a commitment from 'top brass' on down in order to create a culture of leadership. Management and supervisors should be trained in leadership techniques and urged to get out of the way of employees so they can produce! Many times in organizational settings, public or private, folks get caught up in the protectionism lane . . . and rather than empowering and encouraging employees, they try to hold them down to make sure that they 'don't shine brighter than me'. High performing organizations are able to break down these walls and celebrate successes as an organization!

So how do you get started?

At the personal level:

- ◆ Know your role
- ◆ Own your work
- ◆ Ask questions and get involved
- ◆ Help each other out
- ◆ Try new things
- ◆ Be optimistic

continued on page 27

The People Place

OWEA's leadership has opted to begin a new Buckeye Bulletin article series focusing on the people side of our industry, hence the title: *The People Place*. Traditionally, the Buckeye Bulletin comes loaded with mountains of technical pieces: plant profiles, industry trends, regulatory insight, project overviews, etc., which, without proper 'people-care', would not be possible!

After all, your organization can only be as successful as the health, wellness, and productivity of your people and culture. Focus areas planned for this series are topics such as leadership, management, health and wellness, succession planning, work/life balance, recruiting/retaining, change management, knowledge transfer, career laddering/branding, etc.

We hope you enjoy this series as much as we are excited to bring it to you! If you are interested in submitting an article or specific focus area, please contact Jason Tincu. Thank you!

Jason Tincu, SW OWEA Delegate, jtincu@brwnncald.com



YOUNG PROFESSIONALS

by Alicia Adams, Chair, and Ashley Williston, NE YP Chair

Fall Highlights: Northeast Section's Fantastic YP Activities

This quarter, the NE YP Chair Ashley Williston wanted to provide the Buckeye Bulletin readers with a real northeast Ohio YP success story. Her name is Jordyn Stoll. Jordyn is currently a sophomore at Cleveland State University where she is double majoring in Environmental Science and Biology. Last April, Jordyn was fortunate to meet Paul Solanics, the director of the Solon Water Reclamation Department and NESOWEA Executive Committee Vice President, at Cleveland State's Earth Day celebration. Jordyn is the President of the Student Environmental Movement on campus and was there presenting on rain barrels. Paul Solanics was working an OWEA booth at the event, and discussed with Jordyn the internship opportunities available with the City of Solon's WRF.

Since May, Jordyn has been working with Paul and his staff as an intern and has learned an incredible amount about the water industry from this opportunity. Jordyn works in the lab and runs BOD, Phosphorous, Total Solids, Total Suspended Solids, Ammonia, Conductivity and Alkalinity testing on the plant and various industrial water samples. She also helps Joe Koelliker, Solon's lab analyst and industrial pretreatment coordinator, conduct industrial inspections and sample various industrial effluents to determine if the industries are following the local and EPA limits set. From this experience she has learned how to run all of these tests and why they are important. She has also learned proper data handling and the significance of chain of custody paperwork.

This September, Paul and Jordyn were able to attend WEFTEC! With Paul's help and mentoring, Jordyn was able to use her WEF Student Membership for free admission and was fortunate enough to receive a \$250 grant through the OWEA to help with most of the expenses. Jordyn commented how the exhibit hall was absolutely amazing; she never realized how competitive the equipment manufacturers and developers were in the water industry. While at

WEFTEC, Paul and Jordyn attended a handful of technical talks on various research that is being done in the field; she found the tech sessions to be very informative and interesting. Jordyn was able to attend the Ohio mixer and meet a variety of people; including Elizabeth Wick and Ted Baker, OWEA's current President and President-Elect. WEFTEC was a really great networking and learning experience for Jordyn!

In this issue of the Buckeye Bulletin you will also see that Jordyn wrote the Watershed article titled "*Seasonal Algae Succession in Lake Erie and its Implications to Cyanobacteria Blooms*". (see page 56) The topic she covered was how algal communities succeed over the seasons and how this, among other factors, is contributing to the cyanobacteria blooms in Lake Erie. She wanted to cover this because it's a hot topic that she feels most people don't fully understand. She mentioned the nutrient aspect, which seems to be everyone's focus, but wanted to also explain some of the other key variables that contribute to the blooms as well. She thinks it's important to understand this so that more people feel prone to help prevent it from occurring in the future.

Since meeting Paul in April, Jordyn's knowledge of the water industry has grown tremendously. Before attending CSU's Earth Day she had never heard of OWEA's Young Professionals, and now she is working closely with Ashley Williston and Paul Solanics to continue NESOWEA's partnership with CSU. Jordyn has great ambition to make the environment a better place. She is currently working with her group at CSU to coordinate beach cleanups along Lake Erie and on an event for building rain barrels. The NESOWEA YP group is so excited to support Jordyn's efforts with the Student Environmental Movement and CSU!

To sign up for the NE YP email list to hear about upcoming events and other YP information, email Ashley Williston, NE YP Chair, ashley.williston@burgessniple.com.

Alicia Adams, Municipal Treatment Solutions, LLC
aadams@munitreat.com, 740.627.0431

At the organizational level:

- ◆ Engage an interested cross section of your workforce including top executives to develop a leadership strategy and begin to nourish and govern a culture of leadership
- ◆ Align leadership strategies and program development with your mission, vision, and goals
- ◆ Focus on identifying hurdles, culture change, and empowerment
- ◆ Implement your own leadership program
- ◆ When in doubt, research similar organizations and situations

Regardless of your current situation, know that the success of your organization lies in YOUR hands and the IMPACT that you make

on a daily basis. The fate, health, and wellbeing of our society is relying on us (whether they know it or not) to provide quality, cost-effective services so that the remainder of our society can thrive! Know that what you do each day provides value to your customers, citizens, and stakeholders.

**So be PROUD of what you do
and go LEAD!**

Jason Tincu,
SW OWEA Delegate
Senior Technical Consultant,
Brown and Caldwell
jtincu@brwnccald.com





ROLL CALL



J. Aaron Lecklider, P.E., a professional engineer with more than nine years of experience, has joined RA Consultants, LLC in their Columbus, Ohio office.

As a Civil Engineer, Aaron's diverse project experience includes the modeling of sanitary sewer and water distribution systems, stormwater and sanitary collection system design assessment and analysis, and sanitary and stormwater

pumping stations design and analysis.

In addition to his work in the water/wastewater field, Aaron has also worked on commercial and municipal development projects ranging in size from less than an acre to more than 40 acres.



Chris Kushner, sales engineer for the Henry P. Thompson Company, will be responsible for operations at the recently opened Northern Ohio office.

Since graduation from Ohio University in 1989, Chris has been in the municipal water and wastewater industry. He started out as a manufacturer's representative spending 10 years with McLaughlin & Associates, followed by nearly 10 years

as the Midwest Senior Sales Manager for manufacturer JWC Environmental.

Chris took an opportunity to work again for a local distributor and accepted a position with Buckeye Pumps in January 2011, heading up their municipal department. Chris' move to HPT was prompted by the recent sale of Buckeye Pumps.

"The timing of this move to HPT is ideal. I'm excited to be a part of the team with their company history, respect in the industry, knowledgeable employees, and reliable products sold. I look forward to this next step in my career path and helping keep our waters clean." says Kushner.

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

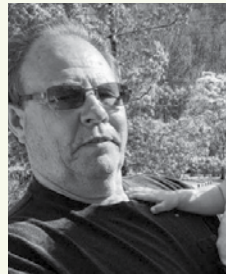
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PASSINGS



Michael Dale Shaw, 68, of Portsmouth, passed away, July 19, 2015. He was born April 5, 1947 in Scioto County. Mike was a Class Four Registered Sewage Operator for the State of Ohio, one of only four in southern Ohio. Shaw had been a member of the Ohio Water Environment Association since 1992. He was retired from the City of Portsmouth, a former employee of the Village of Piketon, and

was currently working for the City of Ironton. He was also the owner and operator of B&S Operations. He enjoyed drag racing and loved his little, red corvette. Mike was also very proud to be an organ donor.

Mike is survived by his wife Beverly Daubert Shaw, who he married on March 5, 1972 in Chillicothe; a daughter, Cathleen Ruth (Raymond) Franklin of Portsmouth; and a granddaughter, Raelyn Ruth Franklin; plus many other family members.

Membership Rates

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

2015 Member Rates	WEF Portion	Ohio Portion	Total
Professional & Academic	116	27	143
Operations	62	19	81
Young Professional	47	14	61
Student	20	5	25
Executive	295	27	322
Corporate	350	50	400

2016 Member Rates	WEF Portion	Ohio Portion	Total
Professional & Academic	133	27	160
Operations	71	19	90
Young Professional	47	14	61
Student	20	5	25
Executive	295	27	322
Corporate	350	50	400

WEF has raised the WEF portion of the 2016 professional, academic, and operations membership rates.* The OWEA Executive Committee voted not to raise the Ohio member association portion of the rate for 2016.

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

WELCOME NEW MEMBERS

July 2015 to September 2015

Pamela Arange	Sheri Foster	Katherine Kulp	Amy Ritts
Jason Belcher	Eric Fox	Aaron Leow	Caitlin Ruza
Rob Berner	Stacy Hobbs	Dana Maselli	Gene Shock
Cindy Biacofsky	Mark Hornyak	David Mast	Jonathan Sickels
Chet Bolender	Herbert Johanson	Ben McGraw	Jordyn Stoll
Tommy Brennan	Stephen Johnson	Jon Miner	Devi Sundaravadivelu
Gerald Checco	Anastasia Johnson	Keerthisaranya Palanisamy	Andrew Undicelli
Brien Croff	Kelly Jutte	Mark Papke	Katie Whitmoyer
Steven Darmofal	Tim Kelly	Anthony Putrino	Brian Yates
Scott Dean	Nikita Kesav	Zoqhaib Rachid	Brad Zimmers
Ashley Elston	Robert Kirkley	Pratyusha Reddy Reddy	
Rita Finy	Anthony Klimek	Madison Rice	
William Fischer	Justen Kosmowski	Andrew Richardson	

**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

OWEA's WEF Utility Partnership Program Member Utilities

Avon Lake Municipal Utilities	City of Mansfield	City of Twinsburg
City of Canton WRF	City of Marietta	City of Warren WWTP
City of Celina	City of New Philadelphia	Clermont County Sewer District
City of Cleveland	City of Newark WTP	Fairfield County
City of Columbus DPU	City of Solon	Northeast Ohio Regional Sewer District
City of Fairborn	City of Steubenville	Southwest Licking Community W&S Dist.
City of Harrison	City of Toledo DWR	
City of Lakewood	City of Troy	

The WEF Utility Partnership Program (UPP) is designed to allow Ohio utilities to join WEF and **OWEA** while creating a comprehensive membership package for designated employees. Utilities can consolidate all members within their organization onto one account and have the flexibility to tailor the appropriate value packages based on the designated employees' needs. Key Benefits Include:

- UPP is fully customizable, based on the needs of each utility, and a WEF team member will be on-hand to walk each utility through the enrollment process.
- ALL members at the utility will be enrolled, with synchronized begin and end dates, on ONE invoice, for an easy one-time per year payment.
- All members, who were already WEF members, retain original membership number, credit for all years of membership, and remain a full-voting WEF member.
- **ALL employees** at the UPP utility will be eligible for membership registration rates at WEFTEC, as well as the early-bird rate for Premium and Standard WEFTEC registration at any-time throughout the registration period. **ALL employees at the UPP utility will also be eligible for member rates for the OWEA Technical Conference and Exposition, OWEA Workshops, and events.**
- All employees at the UPP utility will be eligible to register for a WEFTEC Exhibition-only pass at NO-Charge.
- WEFTEC registrations can be included in the UPP Membership transaction, at the time of enrollment or can be grouped and submitted closer to WEFTEC.
- UPP also includes a special, NO-Charge membership for Public Officials designated by the Utility, at their discretion.
- Up to five new WEF/**OWEA** members can be added by the utility each year, at no charge for the first year of membership.
- UPP utility will be eligible for distributor pricing on all WEF products and services – that's 40% off list pricing. In addition to traditional items this discount also extends to online learning in the new WEF Knowledge Center.
- UPP members will be eligible for special discounted registration for other WEF Conferences and events.



To learn about the benefits for your utility
visit <http://www.wef.org/UtilityPartnership/>

Contact Amy Davis, amydavis@ohiowea.org, 614.488.5800
or Laila Sukkariyyah, lsukkariyyah@wef.org, 703.684.2458

“BEAUTIFUL MUSIC”

WILLIAM D. HATFIELD AWARD CROWNS A CAREER FOR AN OHIO OPERATOR

by Jack Powell, Photos by Amy Voigt

Like a master musician, a wastewater treatment plant superintendent must make sure everything works in harmony - from equipment to operators. That's what Frank D'Ambrosia has been doing successfully for 11 years as superintendent at the Village of Archbold (Ohio) Wastewater Treatment Plant.

Since March 1, 2004, this easygoing former music teacher and traveling musician has overseen a major expansion at the plant, 40 miles southwest of Toledo. He has also ensured that the 2.5 mgd facility meets all federal and state environmental regulations, kept the collections system functioning, and made sure his operators get the training they need to keep their certifications. Such diligence has earned D'Ambrosia a rewarding career and an industry lifetime achievement award.

In 2014, D'Ambrosia received the William D. Hatfield Award from the Ohio Water Environment Association (OWEA). The award recognizes outstanding performance and professionalism over a career.

The awards program said, “Frank D'Ambrosia truly embodies what it means to be a consummate wastewater professional.” Citing how he organized and taught the NWOWEA's semiannual Operator Education Day, which prepares operators to take state wastewater certification tests, the writeup mentioned that D'Ambrosia has opened the plant to host many hands-on workshops for area operators and “routinely provides training to employees in many areas, including digester operations, secondary system DO control and proper procedures for taking readings on sludge blankets, grit removal procedures and lab analysis.”

As for D'Ambrosia's reaction, “I was very surprised,” he says in an accent that gives away his New Yorker background. “It's quite an honor and one that reaffirms my belief that wastewater has been a great career that I've had the good fortune to pursue for the last 35 years.”

Expansion Experience

D'Ambrosia started work life as a music teacher. Later, while touring with a five-piece band (see *A Tale of Two Careers*), he



*Frank D'Ambrosia, Superintendent
Village of Archbold
Wastewater Treatment Plant*

met his wife, Susan, who had family in Defiance, a city of 16,500 in northwestern Ohio. In 1979, D'Ambrosia found a job at the city wastewater treatment plant, which “went from work-and-a-paycheck to a career.”

“A year later, we went down to south Florida, where I worked for about a year and a half,” says D'Ambrosia. “I first worked at a 2 mgd wastewater facility for a private utility and got my Class A wastewater license. Then I moved to the Broward County Wastewater Treatment Plant just north of Miami. When I started there the facility was under construction to expand from 20 mgd to 60 mgd. While in Florida, I gained a lot of valuable knowledge that I brought back to Defiance.”

D'Ambrosia worked his way up from operator to assistant superintendent and experienced a plant expansion from 4 mgd to 6 mgd. He then moved to Archbold, a village of 4,300. Along the way, he got his Class III certification in wastewater.

The Archbold plant underwent a \$6 million upgrade in 2006-07. The renovation increased capacity from 1.75 mgd to 2.5 mgd with 5 mgd peak flow. It also added a grease removal system, new final clarifiers, a new ferrous chloride storage tank, new chlorination and dechlorination systems, a new process monitoring and control system, and a new operations building. The project also included modifications to a tertiary lagoon to create an overflow basin that retains diverted influent over 5 mgd.

Today, the plant's activated sludge process treats an average daily flow of 1.6 mgd and removes 96.8 percent of TSS, 99.1 percent of CBOD, 92.4 percent of ammonia and 90.5 percent of phosphorus. Effluent discharges to Brush Creek, which flows into the Tiffin River, a 55 mile-long tributary of the Maumee River. Class B biosolids are applied to farm fields.

During the renovation, D'Ambrosia worked closely with the city's engineering team and with Jones & Henry Engineers of Toledo. Five years ago, D'Ambrosia and his team added two biosolids lagoons, bringing the total to five and providing a year's storage. In 2013, the facility added an air diffusion system to its



Frank D'Ambrosia (l) at Archbold plant, (m) with plant operator Randy Volkman, (r) in the lab.

"Communication up and down is very important. So is delegating — letting people take ownership of their work and become part of what's being done, rather than wait to be told what to do."

FRANK D'AMBROSIA

wet-weather retention lagoon, keeping solids suspended until the water is treated. Last spring, the plant added a larger and more efficient grit removal, washing and dewatering system.

The Right Touch

Orchestrating these projects, while maintaining 40 miles of sewer lines, nine lift stations and an industrial pretreatment program, requires a deft touch and strong management skills. D'Ambrosia displays those qualities in abundance, says Dennis Howell, Village Administrator.

"Frank is an interesting guy," says Howell. "He has a lot of interests and talents, including being a fine musician, and he's very knowledgeable and astute in the wastewater field. Everybody has a lot of respect for Frank. If you can't get along with him, it's your problem. Frank fits in with our vision of being proactive in keeping our wastewater operators trained and their skills sharp."

Of the plant's seven operators (one a nearly full-time lab technician), five have Class III certifications and one has a Class I certification. Three know how to operate the plant's combination cleaning truck to vacuum the sewer lines. D'Ambrosia sees that they get the continuing education they need to keep their certifications, learn new technologies and maintain plant equipment.

"I do my own training," says D'Ambrosia. "Through NWOWEA, I set up a half-day of training that we invite people in the community to come to. Plus, I do training with the operators, such as bringing in chlorine people to talk about chlorine application. Also, through the Ohio WEA, I set up a review session twice a year for young operators planning to take the wastewater certification exam. We have three sessions that day. I teach the basic wastewater course and have experts who teach advanced wastewater and do a review of the collections system."

Everybody has a lot of respect for Frank. If you can't get along with him, it's your problem. Frank fits in with our vision of being proactive in keeping our wastewater operators trained and their skills sharp."

DENNIS HOWELL

Praise for Training

The operators are grateful for the education D'Ambrosia provides and for his collaborative management style, which encourages them to take responsibility and run with good ideas. They credit him with keeping morale high and fostering a team environment.

"He's a real good boss who lets us do what we need to do to get the job done," observes Mike Short, assistant superintendent and maintenance chief. "Frank gives us free rein and doesn't micromanage," says Short, a Class III operator and 28-year plant veteran. "Frank is excellent when it comes to getting us training. If we get an email message about a program, say a motor or pump class, he'll let us go, juggling the schedule so we'll have people here to run the plant. We can go pretty much anywhere in Ohio. It's an asset to everybody."

Randy Volkman, a Class III operator who has been at the plant for 19 years, adds, "Frank is an easy guy to work for. When we have bigger projects, we tell him and he gives us the green light to proceed. He's very supportive and gives us every chance to get the training we need to do our jobs better."

For D'Ambrosia, it's all part of being a good leader, as is a strong work ethic. That means getting in at 6:30 a.m. in the morning, checking the SCADA system, overseeing lab tests and addressing issues, from balky equipment to a homeowner with a backed-up sewer.

"Communication up and down is very important," he says. "So is delegating - letting people take ownership of their work and become part of what's being done, rather than wait to be told what to do. It's what makes the job rewarding."

This article first appeared in the August 2015 edition of Treatment Plant Operator magazine, published by COLE Publishing, Three Lakes, Wisconsin. It is reprinted by permission

A TALE OF TWO CAREERS

Frank D'Ambrosia's career in clean water had the most unlikely of starts. Growing up in New York City, D'Ambrosia wanted to be a music teacher. He went to a Catholic high school in Brooklyn, earned a bachelor's degree in music education from Queens College and earned some credits toward a master's degree.

"I taught music in the New York school system in the mid-1970s, but after only a year, the city had to lay off 5,000 teachers," he says. "If you were teaching less than eight years, you got laid off." Always resourceful, D'Ambrosia formed a five-piece band with some other unemployed teachers. Called Frequency, and later Touch, they played Top 40 songs and covered groups like Steely Dan, Pablo Cruise and Foreigner. D'Ambrosia played the keyboard.

After successful gigs at various New York resorts, the band moved to hotels and lounges along the East Coast, from Boston to Miami. One night, while playing at a bar in Jacksonville, Florida, D'Ambrosia's future wife, Susan, came in and liked what she heard. Soon the couple started dating. Shortly thereafter, they moved to Defiance, Ohio, her hometown, and D'Ambrosia's three-year music career ended. He began putting down roots and working at the wastewater treatment plant.

Does he have regrets? "Wastewater certainly has been a good career for me," D'Ambrosia says. "The more I got into it, the more I saw that there was advancement and that I could make a good career for myself. Plus, you're doing something that's good not only for the environment but also for people in the community. Every day you have a chance to learn something new. There's always something different going on, so yes, I definitely think it's a good career choice for young people."

While running the Archbold plant, D'Ambrosia still keeps his musical chops, playing clarinet and saxophone as well as piano. He performs on weekends with community groups, at churches, and with the Defiance College Jazz Band.



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MERGING OFFICES PUTS OHIO EPA IN BETTER POSITION TO HELP COMMUNITIES AND BUSINESSES

by Ohio EPA Office of Outreach and Customer Support (OCS)

Ohio EPA wants customer service to be one of the first thoughts that comes to mind when the Agency's name is mentioned. Many businesses and communities, large or small, eventually will interact with the Agency in some way.

For decades, an Ohio EPA office focused on helping small businesses navigate state and federal environmental rules and regulations and the paperwork that goes with permitting and compliance. Other Ohio EPA offices offered financial and technical support programs, from financing water and sewer infrastructure to reducing waste and increasing recycling.

Ohio EPA has merged services to create a "one-stop shop" for businesses and communities needing compliance, technical and financial assistance. Several years ago, the process began when the state's Division of Recycling and Litter Prevention was moved from the Ohio Department of Natural Resources into Ohio EPA's Office of Compliance Assistance and Pollution Prevention (OCAPP). This spring, the Agency's Division of Environmental and Financial Assistance (DEFA) merged with OCAPP to provide a wider variety of services and better customer assistance. "I believe this merger will enhance the way we serve our customers and improve our own internal operations. We will be better positioned to help even more regulated entities with a greater level of service," said Ohio EPA Director Craig W. Butler.

The new office retains the DEFA name and houses several of the Agency's core programs that focus on compliance assistance and community development. DEFA's services include:

- ◆ Administering two state revolving loan fund programs that help communities construct and maintain drinking water and wastewater infrastructure. In the past 25 years, these funds have loaned more than \$7.2 billion with loan amounts ranging from a few thousand to more than 100 million dollars;
- ◆ Providing technical assistance to help small community wastewater plants improve operations and efficiency;
- ◆ Providing funding for recycling, litter cleanup and scrap tire management activities (includes identifying market development opportunities for recycled materials such as glass, plastics, rubber, and construction and demolition debris);
- ◆ Helping thousands of small businesses annually comply with environmental regulations through on-site assistance, help completing forms, training events, plain-English publications and other services;
- ◆ Helping entities identify and implement pollution prevention measures that save money, improve performance and benefit the environment; and
- ◆ Recognizing the outstanding efforts of businesses, communities and other entities making a commitment to environmental stewardship through Ohio EPA's Encouraging Environmental Excellence (E3) program.

"The new DEFA will have a more proactive approach in reaching out to Ohio's businesses and communities to share information

about our services," Director Butler said. "It is important to me that our regulated entities not only understand what resources are available, but that we make ourselves available to guide them through the process of getting help so that we can more fully meet their needs."

Three main offices comprise the new DEFA: the Office of Compliance Assistance and Pollution Prevention (**OCAPP**), Office of Financial Assistance (**OFA**) and Office of Outreach and Customer Support (**OCS**). **OCAPP** will continue to focus on compliance assistance, pollution prevention and statewide recycling market development. **OFA** will administer the Water Pollution Control Loan Fund (WPCLF), Water Supply Revolving Loan Account (WSLRA) and the recycling and litter prevention grant program. **OCS** is a newly created office that will take a proactive approach in reaching out to Ohio businesses and communities, providing information about Ohio EPA's services and guidance.

"This reorganization effort has required a significant level of planning and the implementation process to fully bring everything together will take some time," Director Butler said. "However, I am confident that bringing these resources together under one division not only will improve our responsiveness, but also increase the level and range of services we can provide."

More information on the new DEFA is available at <http://www.epa.ohio.gov/defa/EnvironmentalandFinancialAssistance.aspx>. Details and examples on some of the services we provide are described below.

OFA- State Revolving Loan Funds: **An Affordable Solution for Ohio Communities Needing Infrastructure Improvements**

When the Village of New Boston sought help to develop an affordable solution to its combined sewer overflows, one of the resources it turned to was DEFA's Water Pollution Control Loan Fund (WPCLF) Program. DEFA provided technical, environmental and administrative assistance to the village to assure the development of a combined sewer overflow (CSO) control plan. Construction is successfully underway with critical hardship financing from the WPCLF Program and other funders. By working through the WPCLF, not only did New Boston come out with a cost-effective and environmentally sound CSO control plan, but saved approximately \$5 million over market rate financing for the first two phases of sewer separation work.

The Northwestern Water and Sewer District (NWWSD) owns and operates the water systems that serve large portions of Wood County. NWWSD is engaged in a long-term improvement program to correct problems related to age and design that put a clean, safe, plentiful water supply at risk in some areas. For a number of years, NWWSD has utilized the Water Supply Revolving Loan Account (WSRLA) Program as a source of low-interest funding, and has completed numerous projects with a significant savings to its ratepayers.

These are just two examples of the many public entities that have benefited from these two state revolving loan fund programs.



Northwestern Water and Sewer District

Started in the late 1980s and late 1990s under the Clean Water Act and the Safe Drinking Water Act, the WPCLF and WSRLA programs offer below-market interest rate loans for planning, design and construction. The loans carry a range of interest rates, depending on financial need. Both loan programs recently began offering special assistance for projects targeted at nutrient reduction and treatment.

Through DEFA, technical assistance also is available with comprehensive funding packages that will help applicants achieve and maintain compliance. In addition to traditional loans for publicly owned wastewater infrastructure improvements, the WPCLF also offers funding assistance for nonpoint source pollution control projects, storm water activities, and the restoration and preservation of high quality aquatic resources.

For more information about the WPCLF and WSRLA programs can assist your community, please visit epa.ohio.gov/defa/ofa.aspx.

OFA - Recycling and Litter Prevention Grants Support Ohio Businesses and Communities

Ohio EPA is responsible for implementing statewide waste reduction, recycling and market development, scrap tire and litter prevention programs. Through DEFA, Ohio EPA administers a competitive grant program to support these efforts and, in 2015, the Agency awarded close to \$4 million to support 82 recycling and litter prevention activities throughout the state. Highlights include:

- ◆ 32 Community Grants totaling approximately \$1.5 million to expand curbside recycling programs and infrastructure upgrades at several material recovery facilities.
- ◆ 41 Litter Management Grants totaling \$600,000 to support litter prevention efforts in communities and expand or establish new tire amnesty collection operations. By providing funds for the tire amnesty efforts, approximately 344,100 unwanted and unused tires will be removed from the waste stream.
- ◆ Eight Market Development Grants totaling more than \$1.2 million to expand recycling activities related to construction and demolition debris, plastics, glass, and electronic waste.

How Litter Prevention and Recycling Grant Dollars Make a Difference in Communities

The Perry County Soil & Water District received a \$5,000 grant to clean up an illegal dump site that was discovered on a piece of newly purchased historic green space. The grant will cover expenses associated with cleanup supplies and equipment.

The city of Toledo received a \$40,000 grant to collect unused and unwanted tires, including a free drop-off option for homeowners. Through these efforts, the city expects to collect 40,000 tires.

How Recycling Grant Dollars Support Business Growth and Development in Ohio

The City of Dayton, on behalf of Quality Farms, LLC, was awarded a grant in the amount of \$232,509.43 to purchase equipment to de-package, crush and bale aluminum, glass, and plastic from non-sellable beverage products.

The first of its kind in Ohio, Quality Farms reclaims non-sellable beer, wine, soda and other beverages acquired from brewers, wine producers, distillers, bottlers and distributors in a landfill-free, zero-waste process. It recovers the glass, aluminum, plastic, cardboard and other components from non-sellable beer, wine, soda and other beverages, and transfers the liquid to an Ohio-based biodigester. Quality Farms currently employs 12 employees and expects to hire an additional four employees to run a second shift.

- ◆ One Scrap Tire Grant totaling \$350,000 to support new technology that will process tires more efficiently and produce an end product for both the automobile industry and athletic installation market.

The next recipient could be your organization! For more information, please visit epa.ohio.gov/ocapp/grants.aspx.

OCAPP- Small Business Can Get On-Site Help to Understand Regulatory Requirements

Free and confidential on-site compliance assessments are one of the services DEFA's Office of Compliance Assistance and Pollution Prevention (OCAPP) offers to small business owners (100 employees or less).

An on-site compliance assessment can help businesses understand the operating requirements, permitting and other paperwork procedures that must be followed under our state's environmental rules. Recommendations provided by OCAPP staff will give businesses a better understanding of how to operate and make improvements to maintain compliance with regulations.

Small business owners who have received an on-site visit often have had little or no experience with Ohio EPA. These businesses usually need help with environmental regulations, including completing permit application forms.

The OCAPP staff conducts the compliance assistance visits under the program's confidentiality procedures. This means that information gathered during the on-site visit will not be shared with Agency inspection or enforcement staff. Additionally, there is no charge to the company for the on-site visit.

Small businesses that have already participated in the program have said that they were glad they contacted OCAPP and received assistance.

To talk with our staff about a site visit at your company:
<http://www.epa.state.oh.us/ocapp/ComplianceAssistanceandPollutionPrevention.aspx#113152689-contacts>

continued on page 36

What Are Small Business Owners Saying About OCAPP's Services?

"I wanted to take a moment to THANK YOU! for all of your help. You helped us in becoming compliant in our new business. Your time spent with us really educated us on our environmental impact. Any business is difficult to begin, but when educated, it lessens the difficulties. We now can start the "growing process" without the fear of not understanding lengthy and difficult rules. OCAPP and you are a tremendous program! You guys keep up the good work!"

- An Automotive Business

continued from page 35

OCS - Office of Outreach and Customer Support is Your Connection to Environmental Assistance Specialists and Resources

The newly formed OCS connects customers in need of environmental assistance to the people and resources that can make that happen. OCS is the “front door” to the Agency’s services and its staff travel across the state to provide Ohio communities and businesses the information they may need and connect them with relevant resources in an efficient and effective way.

OCS publishes a quarterly electronic newsletter and easy-to-understand technical publications. The division *listserv* subscribers receive a monthly email update with information on deadlines, training events and new publications. Moreover, OCS coordinates DEFA’s free webinar training series and Ohio EPA’s Compliance Assistance Conference. Speakers are available to present an overview of DEFA services at meetings and conferences. You can contact OCS for help with industry-specific needs and challenges. The division coordinates special assistance initiatives that bring together technical and funding experts to help address environmental challenges for businesses and communities.

Please email outreach.defa@epa.ohio.gov if you are interested in any of these services, or to receive the quarterly electronic newsletter and monthly email updates. Subscribe to our electronic listserv: <http://ohioepa.custhelp.com/ci/documents/detail/2/subscriptionpage>.

Please call (800) 329-7518 our compliance assistance hotline, or (614) 644-2798 with funding assistance questions, or ask for OCS, Monday through Friday 8 a.m. - 5 p.m. or go to our website at: www.epa.ohio.gov/defa for more information.

We look forward to hearing from you!

Ohio EPA Office of Outreach and Customer Support (OCS)

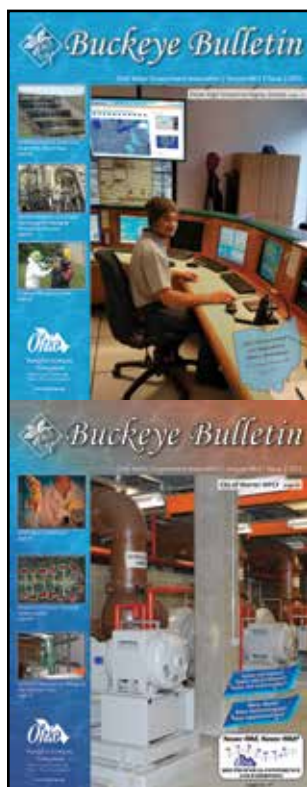
Ohio EPA eBusiness Center for Operators

Ohio EPA’s Division of Drinking and Ground Waters (DDAGW) is now accepting electronic applications through the Ohio EPA eBusiness Center. In fact, operator exam, renewal, reciprocity, third party certification and contact hour course approval applications can all be submitted through the eBusiness Center.

Using the eBusiness Center is currently optional for most Operator Certification program applications, such as operator renewal applications and payments. However, reciprocity and third-party certification applications are now only being accepted electronically, and DDAGW’s intent is to eventually require all Operator Certification program applications and payments be submitted using the eBusiness Center exclusively. In 2016, starting with the operator certification exams, the exam applications will only be accepted electronically. Deadlines for those exams are in early February 2016.

If you haven’t done so already, use your Core Person ID number to set up your account. Your Core Person ID number is the middle seven digits of your operator certification number. If you do not have a valid certificate, you may still have a Core Person ID number. Please contact our office to inquire. A PIN will need to be requested for your account by submitting a notarized PIN request. Once you have established your account and PIN, you can renew by following the instructions on our website at epa.ohio.gov/ddagw/opcert.aspx under the tab labeled “eBusiness Center.”

For assistance, please contact the Ohio EPA Operator Certification Section, weekdays from 8 a.m. to 5 p.m., at 1-866-411-OPCT (6728).



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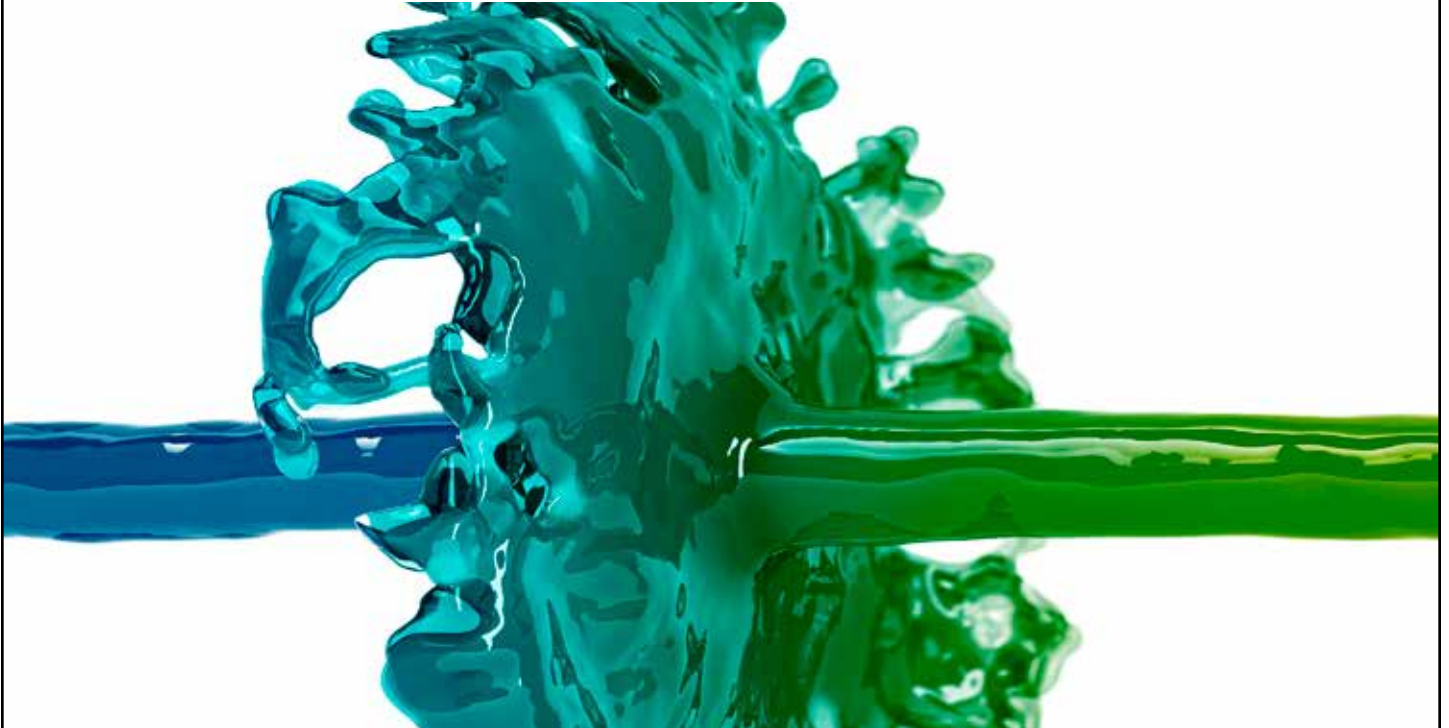
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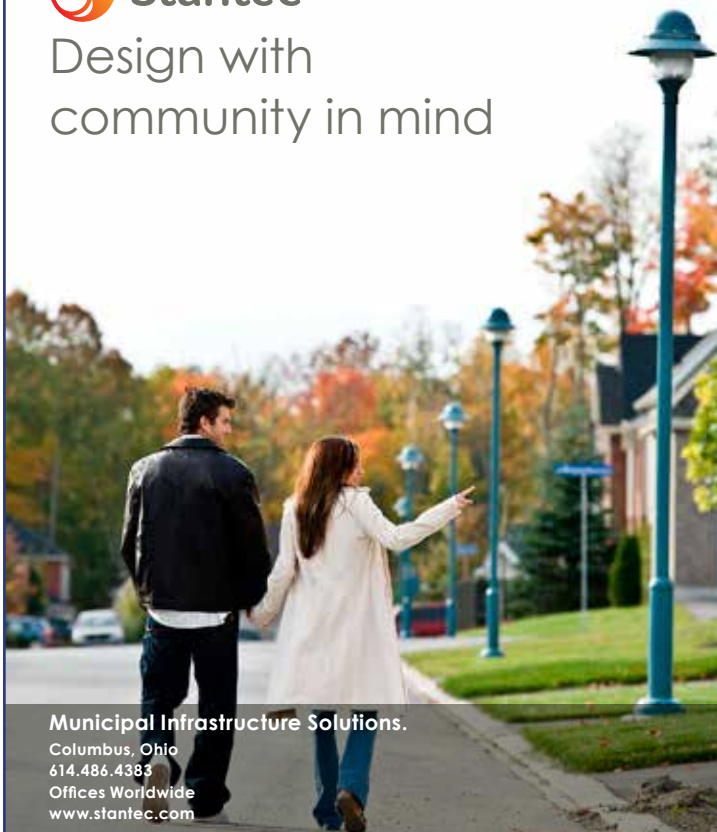
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CITY OF ATHENS WASTEWATER TREATMENT PLANT

by Scott W. Stearns, P.E., BCEE, and Phil Bzdusek, P.E., Ph.D., Strand Associates, Inc.

The City of Athens owns and operates a wastewater treatment plant (WWTP) that provides service to residences, businesses, Ohio University, industries, and public institutions within the city of Athens. The City of Athens wastewater collection system components date back to the 1800s. When the system was first installed, it was a combined system that discharged directly to the waterways. The combined system continued to discharge to the waterways until 1954 when the WWTP was constructed. The City currently services an area consisting of approximately 7.6 square miles. The City owns and operates a collection and conveyance system that consists of gravity collection and intercepting sewers, 20 pumping stations, and force mains. The majority of the gravity collection system is clay tile, with some PVC and ductile and cast iron piping.

History of the WWTP

The City of Athens WWTP was constructed in 1954 and included an influent pumping station and control building, primary clarifiers, aeration basins, secondary clarifiers, anaerobic digesters, and sludge drying beds. In the 1970s plant capacity was increased by doubling the capacity of the primary clarifiers, aeration tanks, and secondary clarifiers. Other improvements in the 1970s project include: grit removal, disinfection with chlorine gas, an additional primary anaerobic digester, a return activated sludge (RAS) pumping station, a blower building, and a vacuum filter building. In the 1980s and 1990s, plant improvements included increased influent pumping capacity, installation of an equalization tank, diffuser replacement in the aeration basins, increased capacity of the RAS pumps, conversion of the anaerobic digesters to aerobic digesters, and the replacement of waste activated sludge (WAS) pumps. In the 2000s, a new blower building and aerobic sludge holding tanks were installed.

The current liquid treatment facilities include influent pumping, aerated grit removal, manual bar screening, primary clarification, aeration, final clarification, gaseous chlorine disinfection, and gaseous sulfur dioxide. Biosolids treatment include aerobic digestion of primary and waste activated sludge. Stabilized liquid biosolids are land applied by a contractor.

Goal of the Project

The City's goals for the project were to: construct facilities to treat projected flows and loadings; repair or replace existing structures,

processes, and equipment; address off-site odor concerns and be a good neighbor; improve the ability to accept septage and hauled waste; reduce operations and maintenance efforts; and identify and plan for future nutrient limits.

Issues and Solutions Identified for the WWTP

Due to the diligence of the City of Athens WWTP staff, the fully treated effluent from the WWTP consistently met National Pollutant Discharge Elimination System (NPDES) permit limits for the period from 2007 to October 2010 (immediately prior to the Preliminary Design Report). However, there were significant improvements identified at the plant that would improve process reliability, replace existing antiquated facilities or processes, and reduce odors.

Preliminary Treatment and Influent Pumping

The Pump and Control building houses the WWTP superintendent's office, the operator laboratory, the lunch room, and locker room facilities. The influent pumping station is a wetwell/drywell-type station with the influent pumps located in the basement of the Pump and Control Building along with the primary sludge and WAS pumps. The influent wetwell is located adjacent to the Pump and Control Building and is open to the atmosphere with no odor containment or control system. The elevated concrete slab above the wet well was severely deteriorated due to hydrogen sulfide corrosion. The aerated grit tank, manual bar screen, and grit/screenings dumpster were located in close proximity to the Pump and Control Building.

To improve the environment, meet the space needs identified, and to reduce odors from the plant, a new Preliminary Treatment Building was constructed. The Preliminary Treatment Building includes a bifurcated influent wetwell with three dry pit centrifugal pumps. The wetwell and controls were designed to allow operators to drain their new tanks at a controlled rate while still maintaining normal influent pumping operations. The influent pumps convey raw wastewater to a 1/8-inch opening step-type fine screen and screenings washer with an emergency manual bar rack. Grit is removed with a vortex-type grit removal system and grit is



Screening Equipment - Before



Screening Equipment - After

washed in a vortex concentrator. Septage receiving facilities include an automated acceptance station along with segregated storage facilities to allow for metered flow to be introduced to the forward flow. The influent wetwell, all channels, and primary clarifier weirs are covered and odorous air contained and treated through a biological odor control unit housed in the Preliminary Treatment Building.

Following grit removal, flows are metered with a parshall flume and split between the new primary clarifiers and equalization basin. The splitter box includes a downward opening weir gate that modulates to meet the operator-adjustable desired flow to the primary clarifiers; remaining flow is directed to the equalization basins.

Primary Clarifiers

The existing rectangular primary clarifiers with chain and flight mechanisms were between 40 and 60 years old, were relatively shallow, and were hydraulically modified to maximize capacity, which minimized freeboard and caused operational problems. Sludge was manually drawn from the clarifiers with manually operated telescoping valves; a process that was operator-intensive and was the source of significant odors.

For these reasons, the design team considered either complete elimination of the primary clarification process or new primary clarifiers. Since the primary clarification process removes approximately 30 percent BOD₅, the aeration tanks would need to be increased in size to handle this additional load. The cost of new primary clarifiers was approximately the same as increasing the size of the aeration tanks, and plant staff was more comfortable with maintaining the primary clarifier process, especially with the anticipated septage receiving loadings.

Two new circular, 70-foot diameter, 12-foot side water depth (SWD) primary clarifiers with scraper-type mechanism were constructed. Primary sludge is removed with three air operated diaphragm pumps, and scum is routed to a decant structure adjacent to the Preliminary Treatment Building. The primary clarifier weirs are covered and odorous air contained and conveyed to the odor control unit in the Preliminary Treatment Building.

Aeration Tanks

The existing aeration tanks were being operated in contact-stabilization mode because of poor settling in the existing secondary clarifiers. The aeration tanks had adequate capacity

for projected flows and loadings. Hydraulic bottlenecks were identified and corrected, inoperable gates replaced, and corroded concrete repaired. Provisions were made to allow for expansion of the aeration tanks, should more strict ammonia permit limits be implemented.

Secondary Clarifiers

The existing rectangular secondary clarifiers with chain and flight mechanisms were between 40 and 60 years old, and were quite shallow (10-foot five-inches and 8-foot 9-inches, respectively) compared to current design standards and were performing poorly. Sludge was manually removed from the clarifiers with telescoping valves and discharged to the RAS wetwell, where it was returned to the activated sludge tanks. For these reasons, it was determined to replace the secondary clarifiers.

Two new circular 90-foot, 15-foot SWD secondary clarifiers with direct-suction sludge removal mechanisms were sized for future reduced loading rates, should ammonia removal be added to the NPDES permit. Three Centrifugal RAS pumps are directly piped to each clarifier to allow for precise sludge blanket control, and scum is routed to a decant structure adjacent to the Preliminary Treatment Building. RAS is routed to a new splitter box that was constructed to accommodate potential future aeration tank expansion.

Ultraviolet Light Disinfection

The existing disinfection system consisted of a contact tank and gaseous chlorination and gaseous dechlorination. Due to the age

continued on page 50



Grit Removal - After



Grit Removal - Before



Grit Removal - After



Primary Clarification - Before



Primary Clarification - After

of the equipment and the proximity of these facilities to public spaces, ultraviolet light (UV) disinfection was selected. The UV system consists of two banks. Under average daily flows, only one bank of bulbs is required for disinfection with the second bank activated with peak flows. Post-aeration of the wastewater was added to allow operators flexibility in meeting their effluent dissolved oxygen permit limits. Following post-aeration, fully treated wastewater is metered and sampled prior to being discharged to the Hocking River.

Pump and Control Building Modifications

Since influent pumping, primary sludge pumping, and WAS pumping were all moved to the new Preliminary Treatment Building, space was made available in the Pump and Control Building for new purposes. The entire building was remodeled to include a new lunch room, supervisory control and data acquisition (SCADA) room, new locker room space, and conference room space. A skylight was added where the influent pump roof hatch was located and transparent block on the ground floor of the building allows ambient light to reach the remodeled basement spaces.

SCADA System

A new SCADA system was included. The new system is a distributed programmable logic controller (PLC)-based system with call Supervisory Control Centers (SCCs) located with each motor control center (MCC) and major piece of equipment, such as the UV disinfection system. System control is accomplished with the PLCs and operator interface is accomplished using human-machine interface (HMI) Intellution IFIX software.



Primary Sludge Withdrawal - Before



Primary Sludge Withdrawal - After

Site Improvements

The site is located near the Hocking River and has an earthen berm designed for flood protection. As a part of the project, the new clarifiers were designed to act as part of the flood protection berm system. Because significant portions of the clarifiers and other cast-in-place concrete structures were above-grade, form-liners were included to improve plant aesthetics.

Energy Efficiency Measures

Processes were selected, in part, based on minimizing energy consumption. All new motors on pumps and equipment were specified as premium efficiency. All lights are high efficiency and the exterior lights are LED. The mechanical system in the Pump and Control Building utilizes water source heat pumps using treated effluent. The treated effluent is pumped to the Pump and Control Building, routed through a strainer and heat exchanger, and then discharged. A separate water loop is pumped to several water source heat pump units throughout the building.

Project Costs and Funding

The bid cost of the project was \$15,714,139 and is anticipated to be complete by December 2015. To date, change orders are less than 1% of overall construction costs. The project was funded by Ohio Environmental Protection Agency Division of Environmental and Financial Assistance (OEPA DEFA). The DEFA funding package included an interest rate adjustment to account for the total costs of adding septage receiving facilities to the project, as an added value to the surrounding area. Essentially, the DEFA Septage Receiving



Final Clarification (secondary clarifier) - Before



Final Clarification (secondary clarifier) - After



Disinfection - Before



Disinfection - After

Program was able to add \$1 million in septage receiving-related facilities to the project at no additional cost, as compared to the base project.

Treatment Plant and Project Stats

- ◆ Design Average Flow - 4.8 mgd
- ◆ Total Suspended Solids - 45 mg/L weekly, 30 mg/L monthly
- ◆ CBOD₅ - 40 mg/L weekly, 25 mg/L monthly
- ◆ Dissolved Oxygen - 5 mg/L minimum
- ◆ Fecal Coliform - 2,000/100 ml weekly, 1,000/100 ml monthly
- ◆ pH - 6.5 minimum, 9.0 Maximum
- ◆ Contract Bid - \$15,714,139
- ◆ Change Orders - <1%
- ◆ DEFA Program Grant/Loan Reduction - \$1,000,000

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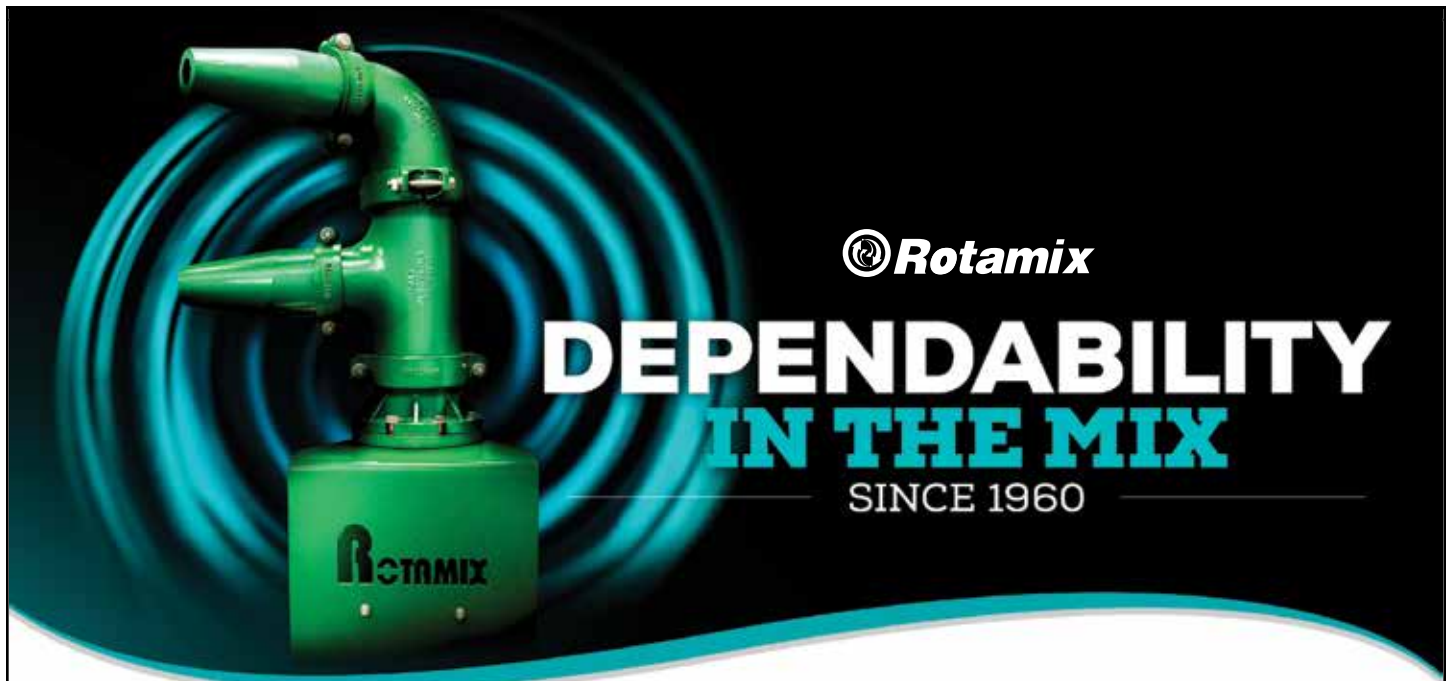
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Odor Control - New



Septage Receiving - New



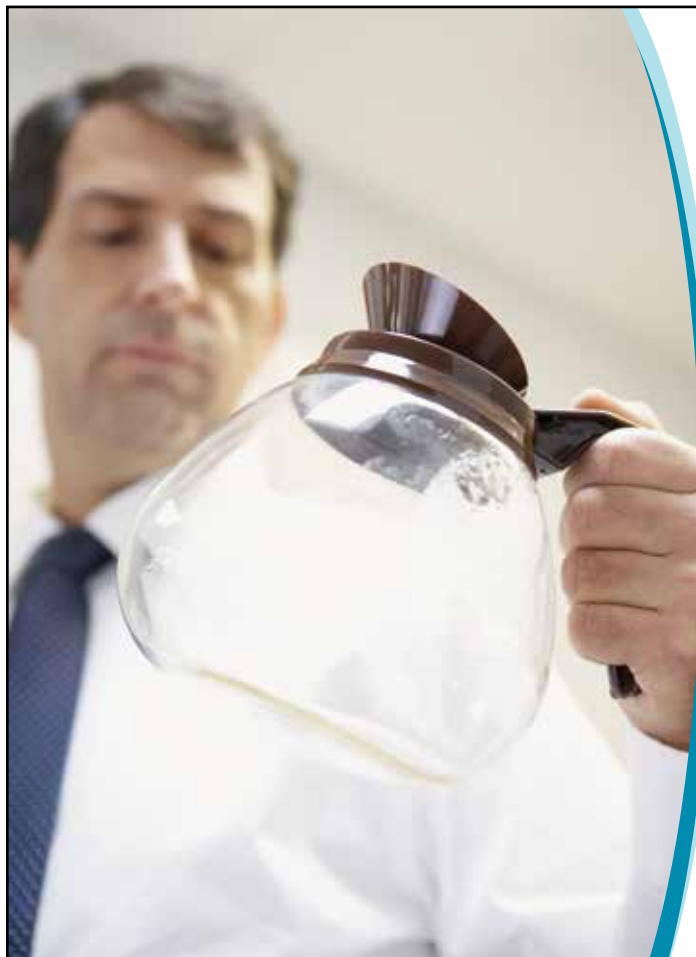
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SEASONAL ALGAE SUCCESSION IN LAKE ERIE AND ITS IMPLICATIONS TO CYANOBACTERIA BLOOMS

by Jordyn T. Stoll and Dr. Julie A. Wolin, Cleveland State University

Seasonal algae succession? Though this term sounds like a common medical condition, it actually describes the complex and dynamic process of how the algal communities change throughout the seasons in Lake Erie. The succession is driven by many factors, including nutrient availability and limitation, temperature, and light attenuation. These three variables change due to seasonality, lake stratification, and ecosystem engineers such as quagga and zebra mussels. Understanding how these interactions occur can help one understand why toxic cyanobacteria blooms are common in late summer and perhaps what we can do to control them.

Lake Erie is the shallowest of the Great Lakes and stratifies during the summer and winter seasons in the central and eastern basins. The lake also mixes during the fall and spring, deeming it dimictic. This occurs due to the physical property of warmer water floating on top of colder water as a consequence of density differences. Due to this, patterns of nutrient influx and nutrient limitation, as well as oxygen availability and anoxia can be predicted.

In the winter, the lake commonly freezes over, preventing mixing from wind and storms. Water of roughly four degrees Celsius falls to the bottom of the lake, or hypolimnion, where it will stay until mixing occurs in the spring. Dinoflagellates such as *Ceratium* are common under the ice during this time and certain chrysophytes and diatoms can grow in late winter when light levels under the ice are sufficient.

In the spring the ice melts and that water, as well as run off from rain events, sinks to the bottom of the lake, causing upwelling of the benthic waters. This very important mixing incorporates valuable nutrients and oxygen into all levels of the lake. Diatoms such as *Aulacoseira* often bloom during this time due to the availability of silica, nitrogen, and phosphorus from mixing and from tributary inputs. After mixing, the lake begins to stratify again, locking the nutrients and oxygen into the various layers. Diatom populations subside as turbulence and silica levels decline.

In late spring and early summer, green algae replace diatoms as the dominant group and predators of green algae such as cladocerans are very abundant. These healthy, normal algae use the nutrients provided by the spring mixing until they become limited by nitrogen by mid to late summer. This gives cyanobacteria the perfect opportunity to flourish, as will be described later. In lakes highly rich in nutrients, the dominance of green algae can be very short-lived, resulting in a rapid succession to cyanobacteria by late June.

Nutrients are very important in lake systems, for they determine what is capable of growing and to what degree. Nitrogen and phosphorus are the two main nutrients that environmental scientists focus on, but there are a handful of other nutrients that are also critical to consider, including silica. Various species require differing levels of nutrients to thrive. Based on the nutrients available, one can predict what types of algae will flourish, which can be useful when trying to understand why a something such as *Microcystis* is blooming in the western basin. *Microcystis*, among other cyanobacteria, are the type of algae that produce the

neurotoxin known as microcystin when they are stressed. Some cyanobacteria possess cells known as heterocysts that are capable of transforming biologically unavailable nitrogen to available nitrogen for the colony to use. Nitrogen is commonly a limiting nutrient to algal communities, but it is not limiting to certain cyanobacteria due to this unique ability. *Microcystis* cannot fix nitrogen and is stressed under low nitrogen levels, but it can take advantage of any nitrogen that becomes available through storm water run-off or nitrogen fixation by other cyanobacteria. This is a large contributing factor as to why *Microcystis* blooms in the late summer, when nitrogen is commonly low in the system.

Another factor that contributes to how algal communities change is light attenuation. Algae require light to photosynthesize and the deeper the light penetrates the water, the larger the habitat for the algae to live in. Also, the hypolimnion commonly holds more nutrients for algae to use, but typically cannot be used because the light does not reach the benthos. Due to the introduction of Dreissenidae (i.e. zebra and quagga mussels) light penetration has become significantly deeper in Lake Erie.

Dreissenidae are filter feeders and feast heavily on green algae and diatoms, making Lake Erie more clear and therefore allowing light to penetrate further into the water column. Not only is clarification increased, the mussels also deposit nutrients in the benthic area before and after consumption as pseudofeces and feces. In some cases, the light penetrates to the benthos where nutrients from the sediments are available, creating a perfect niche for benthic algae. Also note that zebra and quagga mussels preferentially consume most algae, but not cyanobacteria. In fact, most lake predators prefer any algae over the cyanobacteria which is yet another contributing factor as to their extremely high abundance in late summer.

Algae require light and specific nutrients to maintain homeostasis and flourish. As the lake changes throughout the year, new niches open in which different types of algae are more adapted to thrive. Lake stratification and mixing greatly contribute to nutrient availability, which then contributes to determining the type of algal community present. The introduction of quagga and zebra mussels has changed the lake from a pelagic to a benthic ecosystem in some areas and has decreased the competition for cyanobacteria by mainly consuming other algae, and therefore contributed to an increase in cyanobacteria blooms. Cyanobacteria are more adapted to bloom in low nitrogen conditions, which means controlling phosphorus and nitrogen in Lake Erie is the way to control the cyanobacteria blooms.

I would like to thank my professors at Cleveland State for informing me of what happens in our backyard, with a special thanks to Dr. Julie Wolin.

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Lake Erie MODIS Imagery, 10/06/2011, noaa.gov



Lake Erie MODIS Imagery, 08/23/2015, noaa.gov



Julie Wolin, Huntington Beach Oct. 8, 2011



Jordyn Stoll, Watershed Article Author and EOFAR Recipient

Jordyn T. Stoll
OWEA Public Education and Outreach Funding Assistance Request (EOFAR) Recipient
Attended the Water Environment Federation Technical Conference (WEFTEC)
Chicago, Illinois, September 27-30, 2015

Thank you so much for granting me the opportunity to attend such a monumental event in the world of water. Attending WEFTEC was an experience words can not describe. What I learned from the experience is not something one can learn in a classroom or from Google. The exhibits at WEFTEC were truly quite amazing. I never realized how many variations and options there are to perform the same operation. For example, there were at least ten companies exhibiting how to dry wastes with either presses or centrifuges. It was also amazing to me how much funding goes into creating the displays and running the demonstrations for how the technology works.

The technical talks were very detailed and specific. I attended four different talks about various subjects, such as the microbial assemblages in digesters. I find it very neat that WEFTEC gives researchers the ability to present their research to people that can actually use it and apply it in their field.

The networking capabilities that WEFTEC offered to me were absolutely outstanding. I met dozens of very influential people, including Elizabeth Wick, the President of the OWEA. I also had the opportunity to have dinner with Ted Baker, the President Elect. Some of the engineers and consultants also took Paul Solanics and I on a wonderful boat tour and to dinner. It was interesting talking to them about what exactly they do and how it applies to the municipality where I work.

All in all, I learned how large the water industry is and how much research is being done to improve it. I learned the importance of networking and how the connections are made between developers and consumers. It was a really terrific experience for me and I'm very thankful I was given the opportunity to attend the event.



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KNOWLEDGE-BASED PRACTICES FOR ACHIEVING EBPR RELIABILITY

by Samuel Jeyanayagam, PhD, PE, BCEE, Vice President/Senior Principal Technologist, CH2M HILL

Introduction

Phosphorus (P) is one of nature's paradoxes. It is essential to life on earth and in scarce supply, yet destructive to the aquatic environment when present in excess. An increasing number of water resource recovery facilities (WRRFs) in Ohio are facing imminent P limits. The two commonly used P removal approaches are chemical P removal and enhanced biological P removal (EBPR). The focus of this article is EBPR, which reduces chemical use and sludge production while making P recovery feasible. However, it is more complex and entails many interrelated processes. Consequently, a knowledge-based approach is needed to ensure EBPR reliability. This article reviews the current state of knowledge and presents seminal information to empower operators and designers to make informed and knowledge based decisions.

(Terminology: The term substrate signifies food. In the case of heterotrophs, organic matter represents food. Ortho-P is mostly soluble P; the two terms are used interchangeably. Keeping with WEF directive, wastewater treatment plant is referred to as water resource recovery facility, WRRF)

Process Principles

Srinath (1959) was the first to report the phenomenon of 'luxury' P uptake in activated sludge experiments. But it took industry giants of the caliber of Levin and Shapiro, Fuhs and Chen, Barnard, Nicholls, Rensink, and others to shed light on the EBPR mechanism. While much is known about key process requirements, our knowledge is far from complete and we are continuing to learn about this unique process. What we know is that EBPR is mediated by specialized heterotrophs that, under certain environmental conditions, have the ability to remove P in excess of their metabolic requirements. These organisms, collectively called Phosphorus Accumulation Organisms (PAO), are always present in the activated sludge microbial community and normally remove cBOD like ordinary heterotrophs. In purely aerobic systems, PAOs have to compete for available food with several other organisms. As a result, they obtain only a small fraction of the substrate (cBOD) and their growth will be very small. This explains why PAOs are not found in large numbers in secondary activated sludge systems. In order to stimulate their growth and enable EBPR, it is necessary to:

- Subject the PAOs to anaerobic conditions. Anaerobic means devoid of an electron acceptor such as dissolved oxygen (DO) or nitrate.
- Surround the PAOs with adequate supply of 'food' (rapidly biodegradable substrate) in the anaerobic zone. Observations have shown that for PAO selection to occur, the readily biodegradable COD in the anaerobic zone must exceed 25 mg/L.
- Fuel the process by alternatively exposing PAOs to anaerobic and aerobic environments to enable the cyclical storage and consumption of certain storage products within PAOs.

A simplified illustration of the EBPR mechanism is presented in **Figure 1 below**, which also shows the fate of the various soluble constituents in the bioreactor (bulk liquid) and storage products within the PAO.

Anaerobic Zone

In the anaerobic zone, PAOs take up volatile fatty acids (VFAs) and store them as poly-b- hydroxyalkanoate (PHA), a high energy carbon product. The energy needed for this is provided by the cleavage of energy-rich polyphosphate (PP) granules, which the bugs previously stored in the aerobic zone. The cleavage of PP results in the release of ortho P to the bulk liquid. PAOs release approximately 1 mg P/L in order to sequester 2.0 mg/L VFA (as COD). In addition, magnesium and potassium are also released in the approximate molar ratio of P:Mg:K of 1:0.33:0.33 to maintain electro-neutrality. At the end of the anaerobic zone, PAOs would have exchanged a significant amount of the stored PP to take up most of the available VFA to build their PHA pool (that is, low VFA and high soluble P in the bulk liquid; high PHA and low PP stored within PAO).

Aerobic Zone

As the mixed liquor enters the aerobic zone, PAOs are enriched with PHA and the bulk liquid is high in ortho P. The resulting driving force triggers PAOs to exchange PHA for P. Recall PHA is derived from VFA and is a carbon substrate. A fraction of the stored PHA is oxidized to provide energy for growth as well as take up P from the wastewater and restore the organisms PP pool (P is transferred from the wastewater to the PAO). The balance of the PHA is used as building blocks for new cell mass. In order to maintain charge balance, cations (magnesium and potassium) are sequestered from the bulk solution (P:Mg:K of 1:0.33:0.33). The levels of the various constituents at the end of the aerobic zone

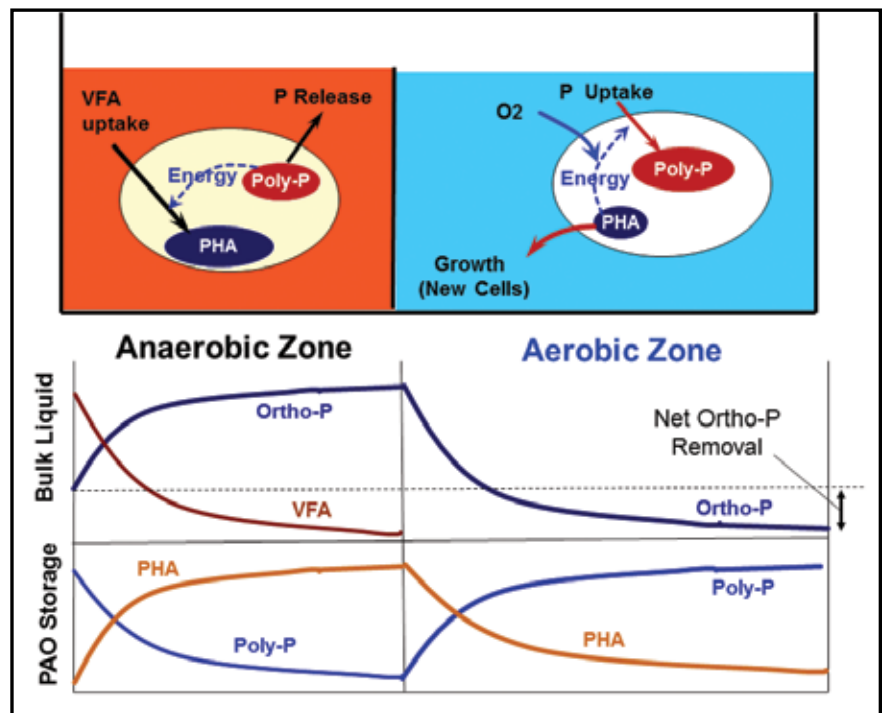


Figure 1: Simplified EBPR Mechanism and Bioreactor Profiles (USEPA)

are: low ortho P in the bioreactor effluent; high stored PP and low stored PHA in the PAOs. In the aerobic zone, PAOs do not have to compete with other bugs for the external food. Because aerobic metabolism results in significant production of energy and new cells, more phosphorus than released in the anaerobic zone is taken up (excess uptake) resulting in net phosphorus removal from the wastewater. This exchange can also occur in the anoxic zone in the presence of an alternate electron acceptor such as nitrate.

Net phosphorus removal from the system occurs when the phosphorus-rich sludge is wasted. In a secondary activated sludge process, metabolically removed phosphorus represents two percent of the VSS on a weight basis. In an EBPR system, the PAOs contain up to 38 percent P on VSS weight basis and the overall P content of the mixed liquor, considering the other bugs and inert solids, is in the 6 to 15 percent range, depending on the PAO fraction.

Clearly, EBPR process capacity is directly related to the fraction of PAOs in the mixed liquor. The relative proportion of PAOs and non-PAOs is dictated by the amount of food each obtains. While, VFA is the food source of interest, a better measure is the rapidly biodegradable substrate (rbCOD) which includes fermented COD (VFAs) and fermentable COD. The latter represents the rbCOD that can be converted to VFAs in the anaerobic zone. As shown in **Figure 2**, greater the proportion of rbCOD the PAOs are able to access relative to non-PAOs, greater will be the PAO fraction in the solids inventory, and greater the mixed liquor P content. All eventually contributing to greater P removal. The overarching objective of EBPR system design and operation is to maximize PAO growth. In a well design and operated system, PAOs can represent up to 40 percent of the active biomass (Henze, et al. 2008). See **Figure 2** below.

Design and Operational Considerations

Good design and operational practices are crucial for process reliability. This section outlines the factors that impact EBPR and how these are taken into consideration in designing and operating the EBPR system. The EBPR process is relatively complex and entails several competing and complementing sub-processes. The top six prerequisites for reliable EBPR are:

1. Feed the PAOs
2. Protect the anaerobic zone
3. Maximize P uptake in the aerobic zone
4. Maximize solids capture
5. Minimize recycle loads
6. Minimize competition

Feed the PAOs

Phosphorus accumulating organisms are finicky when it comes to food. They prefer a “menu” consisting of short chain VFAs. Acetic and propionic acids are the dominant VFAs in municipal wastewater. The minimum substrate requirements for EBPR may be expressed using various parameters as shown in **Table 1**. The cBOD₅:TP ratio provides a crude initial estimate using readily available plant data. The rbCOD basis is the most reliable. It includes both the fermented (VFAs) and fermentable COD and is used in process modeling. As shown in **Figure 3**, a plant with low VFA:TP ratio can still achieve very good EBPR if adequate rbCOD is available. This is because some of the rbCOD can be converted to VFAs in the anaerobic zone thereby adding to the influent VFAs. It should be noted that these minimum ratios refer to the bioreactor influent and include phosphorus in the plant recycle streams. See **Table 1** and **Figure 3**.

continued on page 62

Table 1: Minimum Substrate Requirement for EBPR

Substrate Basis	Substrate: P Ratio*	Remarks
cBOD ₅	25:1	Provides a rough/initial estimate. Based on typically available plant data.
COD	45:1	More accurate than cBOD. Not measured by all plants.
VFA	5:1 to 15:1	More accurate than COD. Need specialized lab analysis.
rbCOD	15:1	Most accurate. Includes fermented (VFA) and fermentable substrate. Need specialized lab analysis.

*Minimum in bioreactor influent

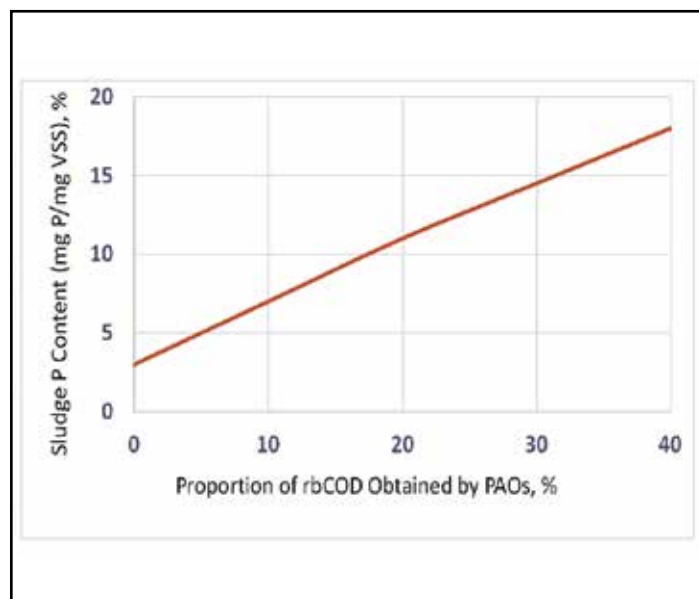


Figure 2: Relationship Between rbCOD Obtained by PAOs and MLVSS Phosphorus Content (Henze et al. 2008)

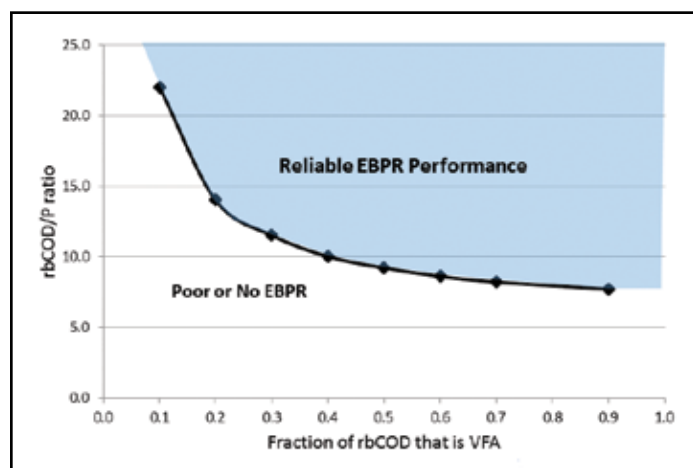


Figure 3: High rbCOD Offsets Low VFA content (Barnard, 2010)

Table 2: Alternative Sources of VFAs for EBPR		Simplified Schematic
Type	Active primary	
Basic Concept	Primary solids fermented in primary clarifiers to produce VFAs.	
Type	Off-line fermenters (Several process configurations available)	
Basic Concept	Primary solids fermented in separate tank to produce VFAs	
Type	Return activated sludge (RAS) fermentation	
Basic Concept	A portion of the RAS solids fermented to produce VFAs	
Type	Purchased chemical	
Basic Concept	Chemical feed system for acetic acid or acetic/propionic acid blend.	

If a water resource recovery facility's (WRRF) influent does not contain adequate influent rbCOD to drive EBPR, other sources of VFAs, listed in **Table 2**, should be investigated. Alternatively, chemical addition may be implemented to supplement EBPR.

Protect the Anaerobic Zone

The primary function of the anaerobic zone is to enable PAOs to uptake VFAs. This is a rapid reaction. If dissolved oxygen or nitrate is present, other heterotrophs (non-PAOs) will out-compete PAOs for VFAs and less of it will be available for EBPR. A second function of the anaerobic zone is to enable fermentation of the

rbCOD to VFAs by some non-PAOs, which is a slower reaction and often determines the size of the anaerobic zone. Since they produce VFAs, these fermenting organisms support the growth of PAOs and are beneficial to EBPR. Thus, to ensure EBPR reliability, the integrity of the anaerobic zone should be protected through design and operation. The major sources of oxygen (DO and nitrate) contamination of the anaerobic zone are listed in **Table 3** together with mitigation approaches. Because anaerobic VFA uptake is a first order reaction, the overall uptake efficiency can be enhanced by providing intra-zone baffles to compartmentalize the anaerobic zone.

Table 3: Common Sources of Anaerobic Zone Oxygen Contamination			
Source	Dissolved Oxygen	Nitrate	Potential Corrective Measure
Influent screw pump	✓		Change pump
Influent pre-aeration	✓		Eliminate pre-aeration
RAS screw pump or airlift pump	✓		Change pump
Free fall over weirs, or turbulent flow in open channels upstream of bioreactor	✓		Minimize through redesign
Internal MLSS recycle	✓	✓	Provide DO exhaust zone. Minimize DO at recycle pump inlet. Select appropriate process configuration with anoxic zone to deplete DO and nitrate. Control recycle rate.
Return activated sludge	✓	✓	Select appropriate process configuration with anoxic zone to deplete DO and nitrate.
Back flow from anoxic or aerobic zone	✓	✓	Provide inter-zone baffles. Design baffles to: eliminate backflow, maintain a forward velocity of 0.5 fps at minimum flow, & provide water level drop of 6 to 9 inches between zones. Provide free passage for scum and foam.

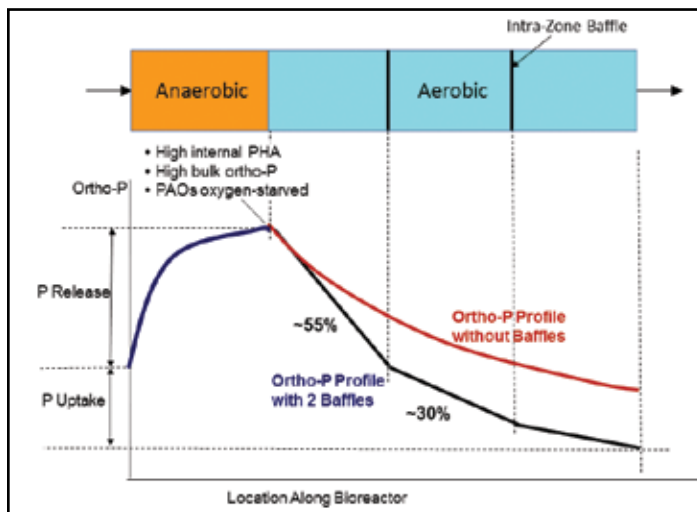


Figure 4: Impact of Intra-Zone Baffles on Aerobic P Uptake

Maximize P Uptake in the Aerobic Zone

As the mixed liquor enters the aerobic zone, two of the three conditions needed for excess P uptake are present namely, PAOs enriched with PHA and high ortho-P in the surrounding bulk liquid. Providing the third ingredient, high dissolved oxygen (> 2 mg/L DO), will trigger immediate and rapid P uptake. If the initial DO is inadequate, the maximum EBPR capacity of the system may not be realized. P uptake kinetics can be further enhanced by compartmentalizing the aeration zone using intra-zone baffles. As shown in **Figure 4**, full-scale plant data indicate that in a three-compartment aeration zone (2 intra-zone baffles), when non-limiting DO is maintained, approximately half the P uptake occurs in the first one-third of the aeration zone and up to 85 percent can occur in the first 66 percent of the aeration volume enabling low effluent Ortho-P to be reached. While P uptake can still happen in an un-compartmentalized aeration zone, the full uptake potential cannot be achieved and the effluent ortho-P will be higher. See **Figure 4**.

Maximize Solids Capture

During EBPR, the soluble P in the wastewater is transferred to and stored in the PAOs as Poly P granules. As a result the P content of the waste activated sludge (WAS) is relatively high (6 – 15% compared to 2% in secondary systems). As shown in **Figure 5**, if the effluent TSS is 15 mg/L and WAS P content is 6 percent, the corresponding effluent particulate P will be approximately 0.9 mg/L. In this case, the effluent ortho-P cannot be more than 0.1 mg/L for a 1 mg/L TP compliance. Considering daily operational variability (influent characteristics, EBPR performance, effluent TSS, WAS P content, etc.), this does not represent safe operation and the operator may need to target an effluent TSS of around 10 mg/L or less to ensure regulatory compliance. The important point is that while the biological process (EBPR) can reach close to 100 percent efficiency resulting in around 0.1 mg/L effluent ortho-P, the performance of the downstream solids separation process (final clarifier or filter) will dictate the TP level, which is of interest from the NPDES permit perspective. See **Figure 5**.

In discussing final clarifiers, it is important to address the phenomenon of ‘secondary’ P release and how it differs from ‘primary’ P release. As noted previously, ‘primary’ P release in the bioreactor anaerobic zone is accompanied by VFA uptake and storage. It is desired and necessary for EBPR. On the contrary,

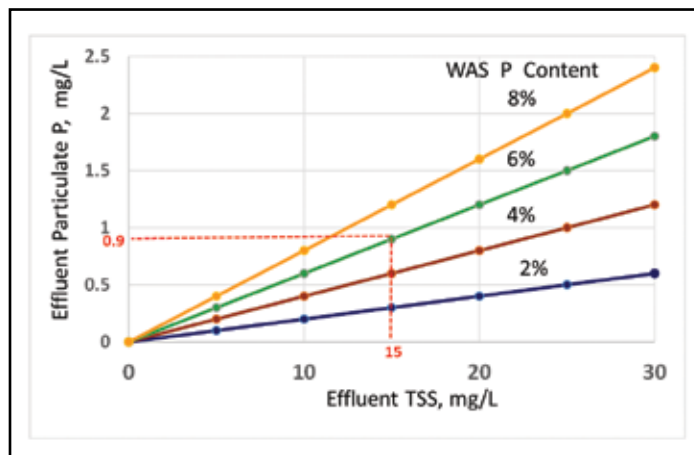


Figure 5: Correlation Between Effluent TSS and Particulate P

‘secondary’ P release occurs in the absence of VFAs and is not linked to PAO selection. As a result the released P is not taken up and this can impact the overall P removal efficiency. The most important factors that impact secondary (unwanted) P release in final clarifiers are sludge blanket depth and dissolved oxygen (DO) level. (Secondary release can also occur elsewhere in the EBPR process. This is discussed in a subsequent section.) As shown in **Figure 6**, as clarifier feed DO increases, P release is impeded. Likewise, long solids retention time (SRT) in the clarifier (high sludge blanket depth), promotes P release. In order to avoid clarifier secondary release, design and operation of EBPR systems should consider the following:

- ◆ Minimizing the operating sludge blanket depth to avoid anaerobic conditions. In large clarifiers, it is also important to ensure even sludge withdrawal and avoid areas of stagnant sludge with relatively long retention time, which can promote anaerobic pockets. Clearly, good sludge settleability characterized by low sludge volume index (SVI) is an asset. A brief discussion of sludge settleability is provided below.
- ◆ Aerating the mixed liquor before it enters the clarifier.

continued on page 64

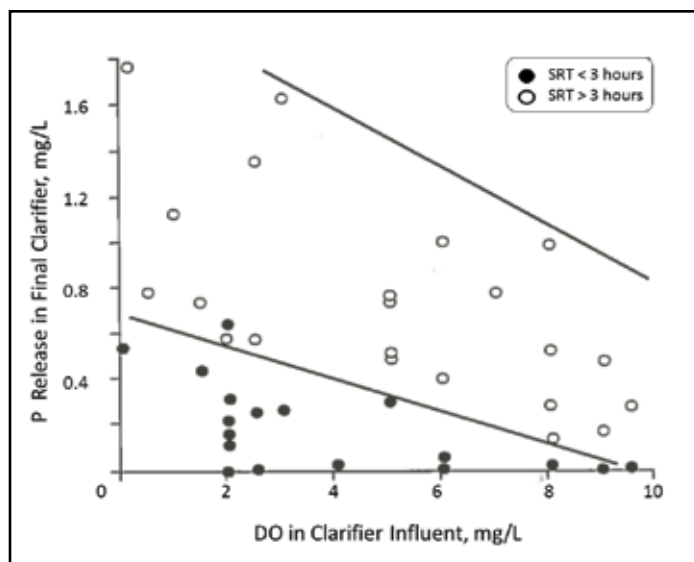


Figure 6: Clarifier P Release as a Function of Feed DO and SRT in the Clarifier

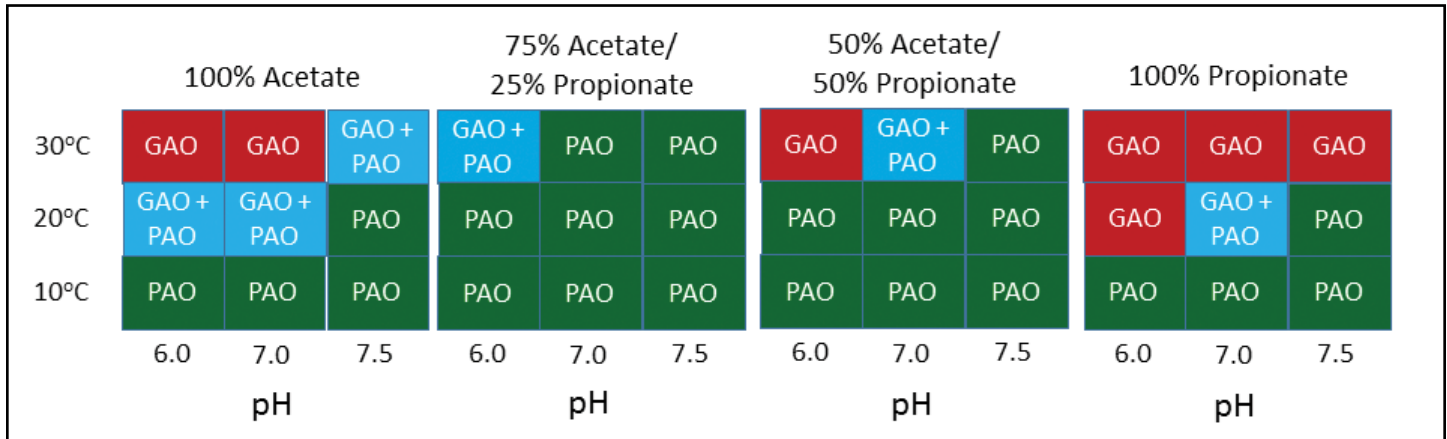


Figure 7: Population Distribution of PAOs and GAOs (Vazquez et al., 2009)

Minimize Competition

PAOs are not the only organisms that can access VFAs in the anaerobic zone. Glycogen Accumulating Organisms (GAOs), which have a metabolism similar to PAOs, can also uptake and store VFAs. But they do so by using glycogen (another storage carbon product) as the energy source. (Recall PAOs use Poly-P as the energy source and release P in the anaerobic zone.) Thus, GAOs do not exhibit the typical anaerobic P release and aerobic P uptake like PAOs. Because GAOs compete with PAOs for the VFAs without contributing to P removal, their dominance can cause poor EBPR performance.

Factors responsible for PAO-GAO competition include carbon source composition, temperature, and pH. **Figure 7** shows the population distribution of the two organisms as a function of these three variables. Conditions that promote GAO proliferation generally include pure acetic or propionic acid, moderate to low temperature, and low pH. **See Figure 7.**

While GAOs are distinct organisms, recent studies indicate that PAOs have the ability to shift to GAO-like behavior under certain operating conditions. For example, when there is insufficient PP reserves for PAOs to uptake VFAs in the anaerobic zone, they will exhibit GAO metabolism and sequester VFAs using glycogen for energy. This metabolic flexibility provides PAOs a unique survival trait. One of the areas of EBPR research is focused on enhancing our understanding of the PAO-GAO interaction and developing strategies for mitigating GAO interference.

Other Considerations

Besides the six key factors outlined above, several other considerations are integral to the design and operation of EBPR systems and are discussed below.

Substrate versus P Limitation

All wastewaters are either carbon (rbCOD) or ortho-P limited with respect to EBPR. The practical ramifications of these two scenarios are summarized in **Table 4** and shown in **Figure 8**.

Sludge Bulking and Foaming

Operational conditions required for EBPR often favor poor settling (bulking) sludge and surface foaming. Both are caused by excessive filaments. **Table 5** lists commonly used control strategies. Since some of the control methods are ineffective in controlling certain filaments, it is recommended that a microbial evaluation be first undertaken to specifically identify the causative agent(s) so that appropriate corrective actions can be implemented.

Supplemental Chemical Use

The provision for chemical addition is commonly included as back-up for EBPR. While this is a prudent practice, indiscriminate use of chemicals should be avoided. Chemical P removal will reduce the amount of ortho P available for EBPR. If steps are not taken to regain full EBPR capability, the continued chemical addition will gradually suppress PAO activity resulting in the conversion of EBPR to chemical P removal.

Table 4: Operational Impacts of Substrate and Phosphorus Limitation		
	Substrate Limitation	Phosphorus Limitation
Potential Causes	Inadequate sewer fermentation Wet weather dilution High recycle P	Upstream chemical P removal Large fraction of nutrient-deficient industrial waste High strength (rbCOD) waste
rbCOD:P ratio	Low	High
Effluent ortho P	High. Not all of the P will be removed due to insufficient substrate. P not removed will remain in the effluent	Low. Adequate substrate available to uptake all of the removable P.
Mixed liquor PAO fraction relative to non-PAOs	High. PAOs have competitive advantage & uptake as much of the available substrate first leaving very little for the non-PAOs. Substrate limitation hinders non-PAO growth.	Low. PAO growth impeded by inadequate P. Substrate uptake by PAOs limited by available P leaving excess food for non-PAOs. Non-PAOs proliferate due to substrate abundance.
Mixed liquor P content	High since PAO fraction is high.	Low since PAOs fraction is low.

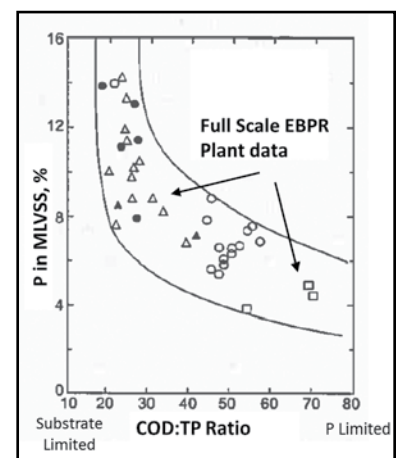


Figure 8: Effect of Influent COD:TP ratio on Mixed Liquor P Content

Table 5: Potential Bulking and Foaming Control Measures

Strategy	Bulking	Foaming
Use aerobic, anoxic, or anaerobic selector	✓	✓
Provide baffles to promote plug flow	✓	
Implement tight SRT control	✓	✓
Add nutrients	✓	
Avoid low DO operation	✓	
Provide RAS chlorination capability	✓	✓
Add polymer to final clarifiers	✓	✓
Design baffles to avoid foam trapping		✓
Apply chlorine spray directly to surface foam		✓
Practice surface wasting		✓
Avoid polymer overdosing during dewatering		✓

Sludge Dewaterability

Conversion to EBPR has been observed to cause a reduction in sludge dewaterability. This has been attributed to an imbalance in the monovalent to divalent cation ratio. When EBPR sludge is anaerobically digested, phosphorus is released together with monovalent (potassium and ammonium) and divalent (magnesium) cations. The ammonium, magnesium, and P combine to form struvite in the digester, leaving potassium in solution. As a result, the digested sludge will have excess monovalent cations (potassium). Research suggests that when the monovalent to divalent cation ratio in the sludge is greater than 2, dewaterability declines resulting in increased polymer dose and reduced cake solids. It appears that enhanced dewaterability may be achieved by implementing specific P recovery processes, such as WASSTRP® or AirPrex®, which could potentially lower the monovalent to divalent cation ratio to favorable values. The associated economic benefits include reduced operating costs associated with polymer use and dewatered biosolids hauling.

Secondary P Release

PAOs are loaded with phosphorus, which is stored internally as relatively unstable polyphosphate granules. As noted previously secondary P release is detrimental to the EBPR process and should be avoided. In addition to final clarifiers (see discussion above), unwanted P release can occur at several other locations as shown in **Table 6**.

Struvite – Nuisance or Resource?

Struvite or magnesium ammonium phosphate ($MgNH_4PO_4$) deposition/scaling is quite common at many WRRFs that employ anaerobic digestion. It can be particularly severe at EBPR plants because of significant P release during anaerobic digestion. This can lead to costly operation and maintenance problems related to equipment damage, reduced conveyance capacity, and downtime for routine cleaning. Strategies commonly used for controlling struvite scaling include:

- Adding dilution water to filtrate/centrate to minimize scaling potential
- Implementing routine pipeline cleaning with proprietary chemicals
- Feeding carbon dioxide to depress pipeline pH
- Adding chemical during dewatering to precipitate P
- Using chelating agents to prevent struvite formation
- Use oscillating electric signal to minimize scaling

Struvite (12.7% phosphate-P and 5.7% ammonia-N) is also a valuable nutrient product with high market value as a slow release fertilizer. The high P content of the biomass wasted from the EBPR system makes it amenable for nutrient recovery, especially when anaerobic digestion is used. Recent efforts have focused on harvesting struvite under controlled conditions to realize the following benefits:

- Represents sustainable P management
- Enhances EBPR reliability by reducing recycle loads
- Eliminates chemicals for recycle treatment; achieves chemical and energy savings
- Reduces solids production by eliminating dependence on chemical P removal

continued on page 66

Table 6: Common Causes of Secondary P Release and Potential Corrective Strategies

Cause of Secondary Release	Process Impact	Potential Corrective Strategies
Long anaerobic, anoxic, or aerobic hydraulic retention times in the bioreactor	Increased bioreactor influent P. Lower BOD:TP ratio. Lower EBPR removal efficiency.	Eliminate co-settling.
Co-settling EBPR sludge in the primary clarifier	Increased bioreactor influent P. Lower BOD:TP ratio. Lower EBPR removal efficiency.	Change to dissolved air floatation, gravity belt thickener, or centrifuge.
Septic conditions in gravity thickeners used for WAS thickening	Intermittent high recycled P loads from sludge operations. Lower influent BOD:TP ratio. Lower EBPR efficiency.	Equalize recycle load. Chemically treat recycle streams Chemically treat EBPR effluent
Anaerobic or aerobic digestion.	Intermittent high recycled P loads from sludge operations. Lower influent BOD:TP ratio. Lower EBPR efficiency.	Equalize recycle load. Chemically treat recycle streams Chemically treat EBPR effluent.
Unaerated storage of EBPR sludge	Intermittent high recycled P loads from sludge operations. Lower influent BOD:TP ratio. Lower EBPR efficiency.	Equalize recycle load. Chemically treat recycle streams Chemically treat EBPR effluent
Blending and storing primary and EBPR sludge	Intermittent high recycled P loads from sludge operations. Lower influent BOD:TP ratio. Lower EBPR efficiency.	Change to dissolved air floatation, gravity belt thickener, or centrifuge.
Co-settling EBPR sludge in the primary clarifier	Increased bioreactor influent P. Lower BOD:TP ratio. Lower EBPR removal efficiency.	Equalize recycle load. Chemically treat recycle streams Chemically treat EBPR effluent

Table 7: Comparison of Mature Struvite Recovery Technologies (WERF)

Feature	Ostara	Multiform Harvest	NuReSys	Phospaq	Crystalactor®	AirPrex
Type of reactor	FBR	FBR	CSTR	CSTR with diffused air	FBR	CSTR with diffused air
Point of recovery	Filtrate or centrate	Filtrate or centrate	Filtrate or centrate	Filtrate or centrate	Filtrate or centrate	Digested sludge
Recovery efficiency, %	80-90% P 10-40% NH ₃ -N	80-90% P 10-40% NH ₃ -N	>85% P 5-20% N	80% P 10-40% NH ₃ -N	85-95% P 10-40% NH ₃ -N	80-90% P 10-40% NH ₃ -N
Full-scale installations	8	2	7	3	4	3

- ◆ Achieves lower biosolids P content and potentially increased land application rates
- ◆ Minimizes struvite nuisance scaling and lower maintenance requirements
- ◆ Creates potential revenue stream from a highly marketable fertilizer product

Table 7 compares salient features of six mature struvite recovery approaches. Three of the featured technologies use completely stirred tank reactors (CSTRs) while the remaining three use fluidized bed reactors (FBRs). **See Table 7.**

Process Selection

The basic EBPR process configuration is the Anaerobic - Oxidic (A/O) flowsheet (**Figure 9**). Many Ohio WRRFs can convert to the A/O configuration simply by turning off the air to the front section

AN - Anaerobic, AX - Anoxic, OX - Oxidic

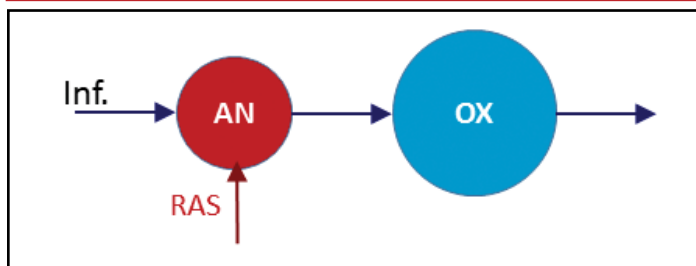


Figure 9: Anaerobic – Oxidic (A/O) Process

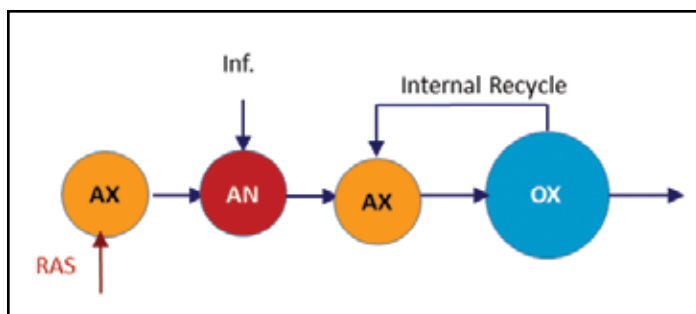


Figure 10: Johannesburg Process

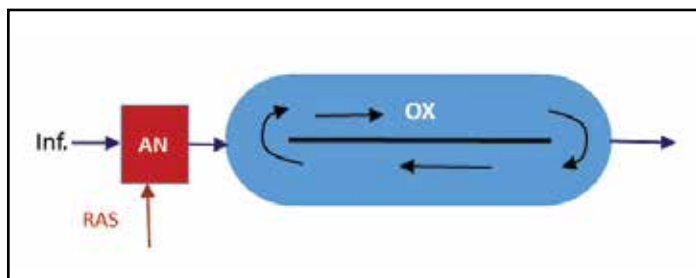


Figure 11: Oxidation Ditch EBPR Process

of a plug-flow aeration basin and readily achieve EBPR. These plants have the necessary VFAs and all that is required for EBPR to occur is an anaerobic zone. Several other process configurations have been developed to provide site-specific benefits. For example, the Johannesburg process (**Figure 10**) incorporates a pre-anoxic zone to denitrify the RAS endogenously and protect the anaerobic zone. As illustrated in **Figure 11**, it is also possible to convert an oxidation ditch to achieve EBPR by incorporating an anaerobic selector.

Achieving Low Effluent Phosphorus

As shown in **Figure 12**, EBPR can easily achieve 1 mg/L TP without effluent filters. With good settleability (low SVI) and efficient solids capture in the final clarifiers, some EBPR plants are able to go as low as 0.5 mg/L TP. However, effluent filters are often provided to ensure 0.5 mg/L TP can be reached consistently despite operational variability. The use of conventional filters can reduce effluent TP to 0.2 – 0.3 mg/L or less. Targeting less than 0.05 mg/L (50 µg/L) TP will require tertiary treatment. Tertiary treatment follows EBPR and uses physical-chemical means to polish the EBPR effluent and achieve additional P removal. Examples of tertiary treatment include chemical addition, solids separation, two-stage filtration, reactive filtration, membrane filtration, and reverse osmosis.

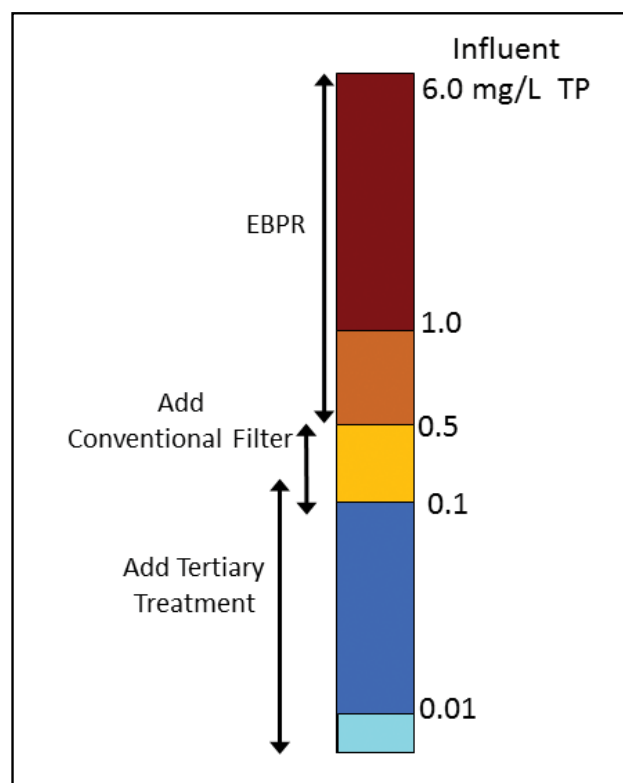


Figure 12: Effluent Phosphorus Levels Achievable

Conclusion

The EBPR process is complex and entails several biochemical reactions that must occur in the proper sequence. The process is sensitive to varying operating conditions requiring close monitoring and proactive implementation of corrective actions to avoid permit violations.

Design and operation are equally important in ensuring reliable EBPR. Design decisions should be made in conjunction with plant staff to incorporate features that maximize process flexibility, enhance operability, and minimize maintenance. Plant staff should understand the design intent and familiarize themselves with the features provided. In the author's experience, operators who combine plant knowledge with strong process know-how are able to craft creative and cost effective solutions to overcome most design deficiencies.

Since its discovery over 40 years ago, our knowledge of the EBPR process has grown exponentially aided by the industry's willingness to share information. There is more to be learned about this unique process. As designers and operators of EBPR systems it behooves us to keep abreast of developments in the field while contributing to the pool of knowledge by disseminating our success and failure stories – both are key to the learning process.

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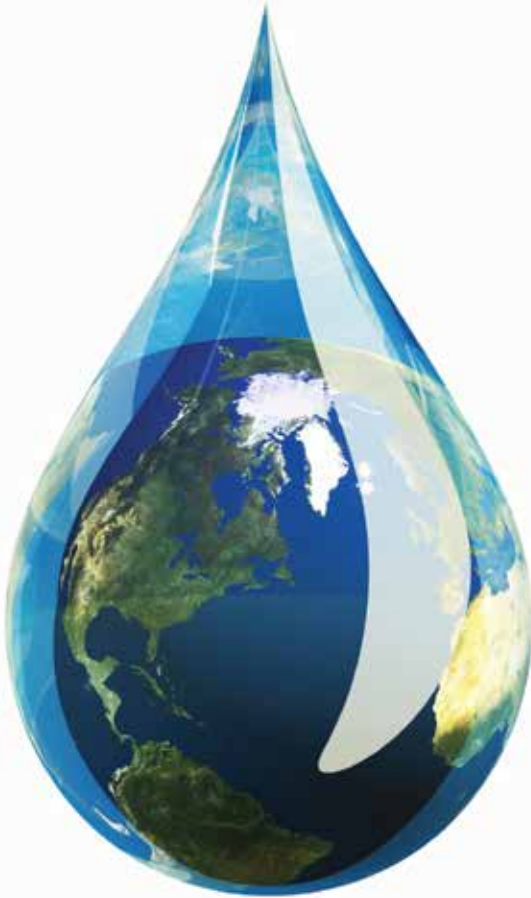
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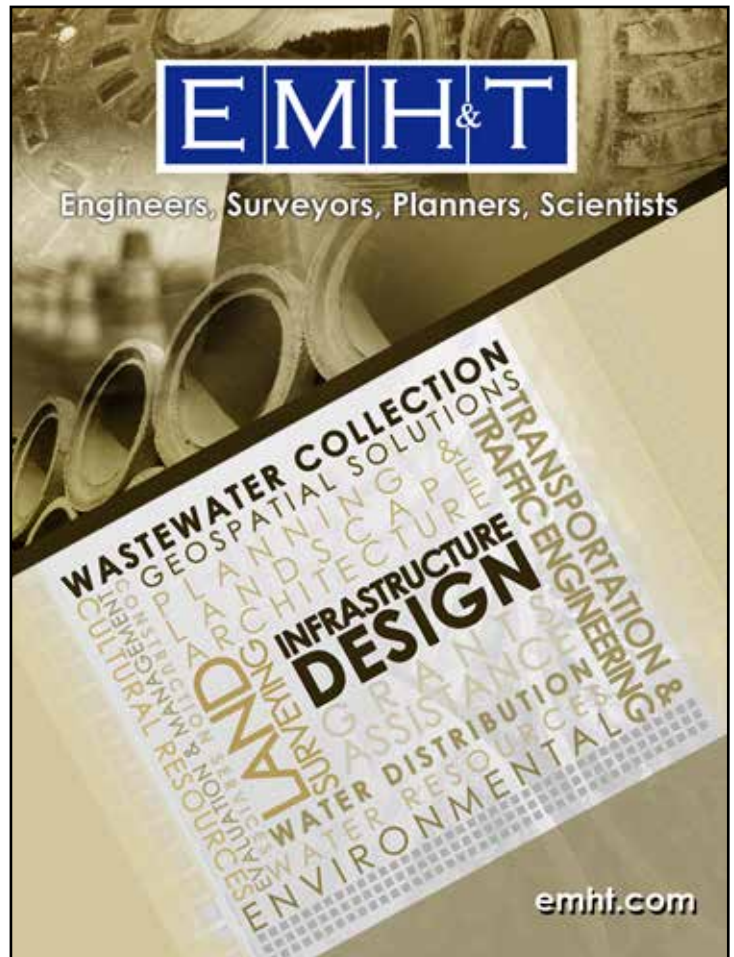
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ODOR CONTROL OPTIONS FOR CSO SYSTEMS

Mark Chiovarelli, P.E., ms consultants, inc.

Any wastewater process that includes storage, conveyance, collection, or treatment has the potential to create odors to some degree, including Combined Sewer Overflow (CSO) systems. Although there are many odor measuring parameters, by nature, odors and their nuisance are subjective to the individual. In offering a more simplistic perspective, I quote from one of my favorite Christmas movies. “One man’s toxic sludge is another man’s potpourri,” Jim Carrey comically states as the Grinch to his blindly devoted dog, Max. If you are a Jim Carrey fan I urge you to see this movie. I watch it at least twice each holiday season with my 8-year old daughter.

Odors of Concern

Many of the wastewater process odor problems emanate from the collection system, plant headworks facility, and in the solids handling facilities. When sewage becomes stagnant, it can be depleted of oxygen and create anaerobic or “septic” conditions, resulting in odorous compounds. When the microbes present in the wastewater have deficient oxygen available for respiration, other undesirable microbes known as “sulfate-reducing bacteria” thrive by using the sulfate ion (SO_4^{4-}) that is inherent in most waters as an oxygen source, producing hydrogen sulfide gas (H_2S). H_2S has an offensive rotten egg odor and is often corrosive to most materials when it is oxidized into sulfuric acid. Other typical odorous compounds include mercaptans (skunk odor quality) and amines (fishy odor quality).

It could be anticipated that CSO flows would not have a high concentration of H_2S due to the dilution of the wastewater with rainwater and runoff, combined with the expected velocity in the conveyance line which causes turbulence and introduces oxygen. However, odors are most likely generated during the storage phase until the CSO volume can be transferred back into the collection system. When the CSO flow arrives at the storage tanks, the water is agitated, liberating the H_2S from the liquid phase to the vapor phase. Likewise, when the tank is drained back into the system, odors can be created from residuals left in the tank until the next filling phase. If the tanks are not flushed and/or cleaned after each draining event, the gases are trapped in the tank’s void space during the next refilling phase unless exhausted and treated.

The longer the CSO is stored the more gases will be produced especially if some form of aeration is not provided. However, it is difficult to estimate the quantity and concentration of gases that need to be treated. To combat this issue, various technologies are available for controlling odors from wastewater facilities and collection systems.

Odor Control Options

Odor control technologies are characterized as either vapor-phase or liquid-phase treatment depending on whether the objective is to prevent future or treat existing odorous gases. Vapor-phase systems are typically employed at point-source applications such as wastewater treatment plants (WWTP) and pump stations where the gases are contained inside a building or enclosed structure and are used to treat the gases. Liquid-phase systems are generally employed in collection systems where control of both odors and corrosion are primary goals, preventing the formation of gases.

The driving force for design of vapor-phase systems is the ventilation rate for the headspace to be treated and the amount of the contaminants that may be volatilized to the vapor phase. For liquid systems, the design shifts to the volume of flow to be treated coupled with the total mass loading of the contaminants in the liquid. With either technology, reducing the number of variables is a key component in designing a system. This often becomes more challenging in collection systems with CSO storage and treatment since it’s difficult to predict flow events and gaseous concentrations. At WWTPs, enclosed processes provide a “controlled” environment with a known volume and better predicted pollutant concentration.

Vapor-Phase Technologies

Ventilation systems are utilized to maintain a negative pressure in the enclosed space and to collect and transport the gases for treatment. In occupied buildings, make-up air is supplied to ventilate the space. Ductwork is required to convey the gases to the treatment unit(s). Effective vapor-phase technologies include:

Wet Air Scrubbing

Because it can treat virtually any water-soluble contaminant, wet air scrubbing has been documented as being the most reliable and flexible vapor-phase technology. Chemical scrubbers utilize contact between an aqueous solution and the gas stream in a chamber filled with a packing material to transfer the odorous compound from vapor to liquid. In addition to the odorous compounds previously mentioned, wet scrubbing can be very effective for ammonia removal. Since this system is strictly a chemical interaction, it is not as subject to process upsets as are common with biological systems. In a basic sense, chemicals are used to “scrub” the odor producing constituents out of the gas and leaving an essentially odor free exhaust. The reliability and flexibility of the wet scrubbing system is provided by the use of chemicals and the chemical reactions, which is more of a controlled process than a biological system.



*An example of a typical wet scrubber system, documented as the most reliable and flexible vapor-phase technology.
(LOPRO® Odor Control System)*

Biofiltration

Biofiltration uses an organic medium such as compost, mulch, or peat to solubilize odor contaminants from the vapor phase into an aqueous phase. A typical system is constructed in-ground in single layer units with an air distribution system, utilizing sprinkler-type irrigation for moisture control. A bacteriological population is established on the media surface to degrade odor causing compounds such as hydrogen sulfide, organic sulfides, and mercaptans. However, biofilters are not effective at removing nitrogen-based compounds such as ammonia and amines. Control of a biofiltration system can be challenging due to the potential changes of the natural bacterial environment and the media can become unstable if not properly maintained. The media can be prone to settling and compacting which increases the headloss through the filter, thus constricting the airflow causing fugitive odor emissions. Additionally, if the media is exposed to wide swings in environmental conditions, the bacteria population can become upset resulting in odor breakthrough.

Many of the challenges listed above can be addressed through the use of a manufactured biofilter design. With engineered biofilters, media instability is reduced and control issues are limited. In contrast with natural media beds using locally available materials, the media used for manufactured units are engineered for a specific application to meet a particular composition and performance specification. These systems provide consistent and repeatable performance through a specific combination of organic media materials. Many of the manufactured units are constructed in an enclosed, modular design that provides protection from temperature and humidity fluctuations, quick and easy construction, and straightforward media replacement.

Carbon Adsorption

Carbon adsorption is the most simple of the three vapor-phase systems since it does not require a chemical storage and feed system, and there is no biological process to maintain or concerns with upsets. Using a bed of carbon-based adsorbent, carbon adsorption systems attract and adhere the odor-causing compounds as the gas stream is passed through the vessel. The rough surfaces of carbon media provide a great surface area for the contaminants to attach to while being removed from the inlet gas stream. Various

types of carbon are available offering higher H_2S capacities, which broadens the selection process depending on the H_2S level to be treated. This type of system is very effective at removing H_2S and related sulfur-based compounds, but has limited use in removing ammonia and other nitrogen-based compounds, however carbon type systems can be used independently or in combination to remove many different contaminants.

Liquid-Phase Technologies

The main driver in liquid-phase technologies is to control or prevent the formation of odorous and corrosion-causing compounds in the wastewater or react with those compounds should they be formed. Several effective liquid-phase technologies exist, all of which involve varying forms of chemical treatment. Control and monitoring of the chemical feed system is crucial in preserving an effective and efficient treatment system. These systems include:

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Oxidizing Agents

Through the injection of a strong chemical oxidizing agent to the wastewater, oxidizing agents chemically react with the dissolved sulfide, converting it to sulfate or sulfur. In addition to dissolved sulfide, other odorous compounds can be removed during the



With a manufactured biological odor control system, media instability is reduced and control issues are limited. (ZABOCS® Biological Odor Control System)



Carbon adsorption is the simplest of the vapor-phase technologies, with no required chemical storage and feed system, and no biological process to maintain. (RJMC Modular Carbon Adsorber)



BIOXIDE® Biochemical Solution is an odorless, non-hazardous, and water soluble liquid that is easy to store and safe to handle.

oxidation process. Unfortunately, some non-odorous compounds react with the oxidizer as well, requiring higher dosages than predicted. Commonly used oxidizing agents include chlorine compounds such as chlorine gas, sodium hypochlorite (bleach), and calcium hypochlorite (tablet form chlorine), as well as non-chlorine compounds such as hydrogen peroxide and ozone. The use of chemicals can pose safety issues and may have inherent confined space implications, which must be considered during planning and design. Chemical feed systems require proper control and monitoring in order to maintain a successful and efficient odor control system.

Supplemental Oxygen

Supplemental oxygen treatment promotes an aerobic environment to eliminate sulfide production, consequently making it difficult for the “sulfate-reducing bacteria” to thrive. By providing aeration or injecting oxygen into the flow stream, the biological community can remain in an aerobic state during storage periods. One system that accomplishes this is SDOX CS by BlueInGreen, which can be provided as a packaged, skid-mounted system that injects oxygen into the flow stream. They offer an on-site oxygen generation system that eliminates the need for oxygen deliveries with several options available for materials of construction and instrumentation and control.

View the Odor Control Process Comparison on page 75.

Several resources were utilized in reviewing the various odor treatment options for this article, including manufacturer representatives, equipment manufacturer engineers, and in-house staff. An evaluation of odor control provisions should be done on a case-by-case basis. Odor control may not be required for every situation due to the potential diluted nature of the CSO liquid expected during an overflow event. Although somewhat unknown, there may not be a large sewage component in the CSO, reducing the likelihood of odor associated with the process. However, if an odor control system is deemed necessary a simple, passive vapor-phase system may be the best alternative to treat the displaced air of the storage tank during filling. If odor control is assigned as a future expenditure, the tank will need passive venting above grade.

Suggested Treatment Option for CSO Tanks

Adsorbent Odor Control Systems are highly effective for removing H_2S and other compounds from intermediate municipal wastewater applications. With the use of adsorbent media, the systems do not require nutrient feed systems to maintain bacteria as required with Biofilters.

With adsorbent odor control systems, the process consists of moving foul air to a vessel and diffusing it through the adsorbent media bed. The H_2S (or other contaminants) are adsorbed and clean air is discharged to the atmosphere.

The design of an adsorbent odor control system would consist of sizing the media to treat the amount of air being displaced from the wet weather storage facility. The system would require an odor control supply fan to keep odorous air from leaking from the storage facility when it is filling. The influent fan would be designed to operate only when the storage facility is filling. Operation and maintenance would consist of replacing the media about every 10 years and maintaining the supply fan. For aesthetics, the system could be housed in a pre-fabricated structure next to the storage facility.

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The Ohio Water Environment Association has begun requesting your Core Person ID Number when you register for any OWEA event. OWEA needs your Core Person ID Number as we transition to using Ohio EPA's EBusiness site to report attendance at OWEA training events.

If you have any questions about using your Core Person ID Number at OWEA events, please contact Amy Davis, amydavis@ohiowea.org, or 614.488.5800.



Odor Control Process Comparison

Technology	Operational Complexity	Chemical Usage and Safety Concerns	Potential Advantages	Potential Disadvantages
Chemical Scrubbing*	<ul style="list-style-type: none"> Sophisticated controls and instrumentation 	<ul style="list-style-type: none"> Requires chemical supply replenishment on regular basis Requires safety protocol 	<ul style="list-style-type: none"> Highly effective at H₂S and ammonia odor removal Proven historical performance track record Available in a wide range of sizes 	<ul style="list-style-type: none"> May have significant footprint High maintenance potential Best suited for WWTP applications High profile tower design
Biofiltration*	<ul style="list-style-type: none"> Simple to operate No sophisticated controls 	<ul style="list-style-type: none"> No chemicals required for daily operations 	<ul style="list-style-type: none"> Engineered units well suited for CSO storage applications Proven historical performance track record Low-profile design Lower maintenance 	<ul style="list-style-type: none"> Not suited for higher H₂S concentrations Could have significant footprint (engineered systems reduce footprint) Lower removal efficiencies with natural systems vs. engineered Required maintenance to sustain proper conditions during non-CSO events Media replacement every 2-5 years
Carbon Adsorption*	<ul style="list-style-type: none"> Very simple to operate Very few moving parts No sophisticated controls 	<ul style="list-style-type: none"> No chemicals required for daily operations 	<ul style="list-style-type: none"> Ideal for CSO storage applications Can handle intermittent flow/loading applications Very high removal efficiency Small footprint Immediately effective upon startup Lower maintenance 	<ul style="list-style-type: none"> Not suited for higher H₂S concentrations Spent media must be regenerated or replaced
BIOXIDE® Treatment	<ul style="list-style-type: none"> Requires controls and instrumentation 	<ul style="list-style-type: none"> Requires chemical supply replenishment on regular basis, but BIOXIDE® is a non-hazardous compound 	<ul style="list-style-type: none"> Well suited for CSO storage applications. Provides corrosion control High removal efficiency 	<ul style="list-style-type: none"> May require high chemical usage Chemical dosage may be difficult to determine
Oxidizing Agents	<ul style="list-style-type: none"> Requires controls and instrumentation 	<ul style="list-style-type: none"> Requires chemical supply replenishment on regular basis Requires safety protocol, especially with chlorine gas 	<ul style="list-style-type: none"> Well suited for CSO storage applications Provides corrosion control High removal efficiency 	<ul style="list-style-type: none"> May require high chemical usage Chemical dosage may be difficult to determine
Oxygen Injection Treatment	<ul style="list-style-type: none"> Requires controls and instrumentation 	<ul style="list-style-type: none"> No chemicals required On-site oxygen generation or storage tanks 	<ul style="list-style-type: none"> Well suited for CSO storage applications Smaller footprint Provides corrosion control On-site oxygen generation eliminates deliveries High removal efficiency 	<ul style="list-style-type: none"> May require high oxygen usage Oxygen dosage may be difficult to determine.

*Requires some type of ventilation system and ductwork.

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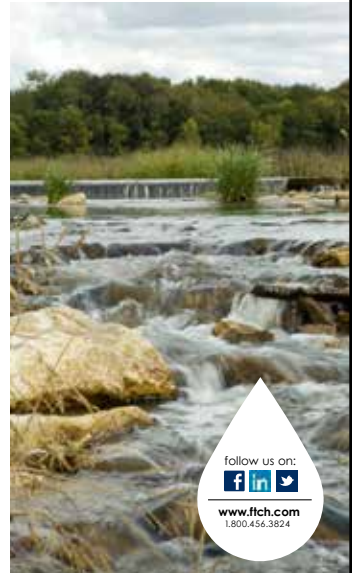
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THE NEW OSHA CONFINED SPACES IN CONSTRUCTION STANDARD

by Tom Burgess, T&M Associates

The new Occupational Health and Safety Administration (OSHA) Confined Spaces in Construction standard (29 CFR 1926, Subpart AA) incorporates several provisions to address construction-specific hazards, account for advancements in technology, and improve enforceability of the requirements. Other than these additions, the standard, which became effective on August 3, is similar in content and organization to the general industry confined spaces standard.

Construction is different than the typical general industry site in that a construction environment is continuously changing and often involves multiple employers. To address the unique nature of construction, the Confined Spaces in Construction standard places a greater emphasis on training, continuous worksite evaluation, and communication than the general industry standard. The organization, language, and most of the substantive requirements of the construction standard are based on the general industry standard.

Scope of the Standard

The Confined Spaces in Construction standard applies to construction activities at a worksite with one or more confined spaces.

The presence of a confined space on the worksite triggers a requirement for all employers to ensure that their employees do not enter a confined space except in accordance with the requirements of the standard.

Even if an employer does not have employees who will enter a confined space, they are required to share information and coordinate with other employers if they have information necessary for the protection of workers inside confined spaces or are engaged in activities that could endanger the workers inside a confined space.

Excavations

Excavations are not considered confined spaces in the construction standard. OSHA believes that overlapping standards could be unnecessarily burdensome to employers or cause confusion about the appropriate procedures to use. Excavations are best addressed by the existing OSHA 29 CFR 1926 Subpart P Excavation standard.

Entry into a confined space within an excavation is governed by the confined spaces standard. For example, the interior of a manhole or pipe within an excavation may be a confined space.

Underground Construction

OSHA 29 CFR 1926 Subpart S applies to the construction of underground tunnels, shafts, chambers, and other underground structures. To avoid confusion between different standards during the same underground construction project, OSHA treats nonstructural work performed in conjunction with initial construction of an underground space, as covered by Subpart S.

Confined Space Evaluations

Confined space evaluations are required to determine if spaces are indeed confined spaces and permit-required confined spaces. The evaluation must be performed by each employer who directs

employees who may work in the confined space. The evaluations must be performed by a “competent person,” as defined by OSHA. OSHA added this competent-person requirement because the analysis required for these evaluations necessitates some expertise.

Employers may cooperate in identifying the confined spaces and permit-required confined spaces on a worksite, but each employer remains responsible for identifying spaces that could affect employees they direct.

Information Sharing and Coordination

Information sharing and coordination duties at multi-employer worksites are important provisions of the construction standard and include requirements for the host employer (owner/operator).

Controlling contractor

The controlling contractor is at the center of the information sharing and coordination process. Before any employer enters a permit space, the controlling contractor is required to obtain relevant information about confined spaces on the worksite from the host employer and then to relay that information to each contractor entering the confined space and to contractors performing work that could foreseeably result in a hazard within that confined space.

The controlling contractor is also responsible for coordinating work in and around confined spaces so that no contractor working at the site creates a hazard inside the confined space.

After the entry employer performs entry operations, the controlling contractor must debrief the entry employer to gather information that the controlling contractor then must share with the host employer and other contractors who enter the space later.

Host employer

The host employer owns or manages the property where the construction work is taking place. The host employer serves an important role in providing information because it is likely to be most familiar with the property and the most likely to retain information about permit spaces on the property between separate



construction projects, particularly in construction involving existing facilities. The host employer is required to share information on “known” permit spaces.

All employers

Each employer is required to notify its employees’ representatives and the controlling contractor of the hazards of permit spaces and the location of those spaces.

This requirements applies to all employers who identify a permit space, even if they choose not to allow their employees to enter it.

Permit-required Confined Space Entry Program

The requirements for a permit-required confined space program and confined space entry procedures are almost identical to the general industry requirements. The construction standard also provides for alternate entry procedures and reclassification of permit-required spaces.

As part of the program, each entry employer must implement measures to prevent unauthorized entry; identify and evaluate the hazards of permit spaces before employees enter them; and develop and implement the means, procedures, and practices necessary for safe permit space entry operations.

Permit entry requires a permit, entry supervisor, attendant, and authorized entrants. Alternate entry and temporary reclassification require documentation.

Alternate Entry Procedures

Permit-required confined spaces may be entered under alternate entry procedures when the only hazard is atmospheric and can be controlled through ventilation. The alternate entry procedure requirements are similar to the general industry provision.

Temporary Reclassification

Permit-required confined spaces may be temporarily reclassified when there is no actual or potential hazardous atmosphere present in the space, and the employer eliminates all physical hazards in the space.

Employers may reclassify the space as a nonpermit space even if a physical hazard remains, so long as the hazard is completely isolated and employees cannot be exposed to it. For example, in covering agitator blades to prevent accidental contact with sharp edges, the hazard is still present in the space but isolated from contact.

Rescue and Emergency Services

The construction standard expands on the rescue requirements of the general industry standard clarifying how to assess the response and adequacy of rescue services. The employer who designates rescue services must verify that it has the capability to reach the victim(s) within a time frame that is appropriate for the permit space hazard(s) identified.

Nonentry rescue is required unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant. The employer must designate an entry rescue service whenever nonentry rescue is not selected. Whenever nonentry rescue is selected, the entry employer must ensure that retrieval systems or methods are used whenever an authorized entrant enters a permit space and must confirm, prior to entry, that emergency assistance would be available in the event that nonentry rescue fails.



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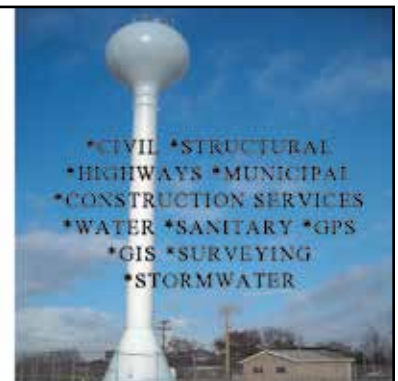
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ADVERTISER INDEX

AECOM	37
Akron Electric, Inc.....	69
Allied Pump Rentals	77
Allied Underwater Services	84
Alloway	82
Aqua-Aerobic Systems, Inc.....	53
ARCADIS.....	22
Badger Meter.....	44
Baker & Associates.....	85
BissNuss, Inc.....	85
Black & Veatch	85
B. L. Anderson Co., Inc.....	46
BNR.....	79
Brown and Caldwell.....	77
Buckeye Pumps.....	70
Burgess & Niple, Inc.....	82
CDM Smith	54
CH2M HILL.....	67
Chesley Associates, Inc.....	79
Commerce Controls Inc.....	54
CT Consultants.....	78
CTI Engineers, Inc.....	78
Delaney & Associates.....	79
DLZ	79
DN Tanks.....	86
E and I Corporation	68
EMH&T	69
Engineering Associates, Inc.....	82
Enviroscience, Inc.....	85
E-Pump.....	68
Evoqua	83
Excel Fluid Group.....	44
Fishbeck, Thompson, Carr & Huber, Inc.....	76
Flygt, a Xylem Brand	33
GDP Group.....	84
Gorman-Rupp.....	71
Hatch Mott MacDonald	78
Hazen and Sawyer	86
HDR Engineering, Inc.....	22
HNTB.....	39
H.R. Gray.....	Back Cover
HydraTech Engineered Products LLC	78
Indigo Water	44
Inovair/Pelton Environmental.....	83
Integrity Aquatic.....	32
Jacobs Engineering Group	77
J. Dwight Thompson Co	79
J.G.M. Valve Corporation	79
Johnson, Mirmiran & Thompson, Inc.....	69
Jones and Henry Engineers	76
Jones and Henry Laboratories, Inc.....	82
JWC Environmental.....	58
Kokosing Industrial	70
Lakeside Equipment Corporation	38
MAR Systems.....	47
MASI Environmental Laboratories.....	84
McMillen Jacobs Associates.....	39
Mid Atlantic Storage Systems, Inc.....	79
Mixing Systems, Inc.....	Inside Back Cover
ms consultants, inc.....	79
OHM Advisors.....	76
Penn Valley Pump Co., Inc.....	82
RA Consultants, LLC	68
RootX.....	32
Schultz Fluid Handling Equipment, Inc.....	85
Smith Environmental, Inc.....	70
Southern Sales Company, Inc.....	55
SpectraShield Liner Systems	68
Stantec Consulting Services, Inc.....	39
Strand Associates, Inc.....	84
The Bergren Associates (2).....	58,86
The Henry P. Thompson Company	58,84
Trumbull Industries, Inc.....	45
UIS SCADA, Inc.....	85
USA Bluebook	Inside Front Cover
Vaughn Company, Inc.....	52
YSI, a Xlyem Brand.....	59

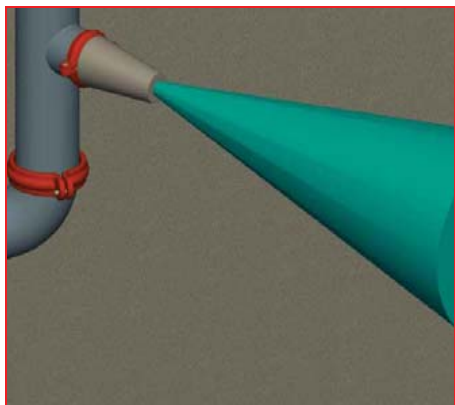
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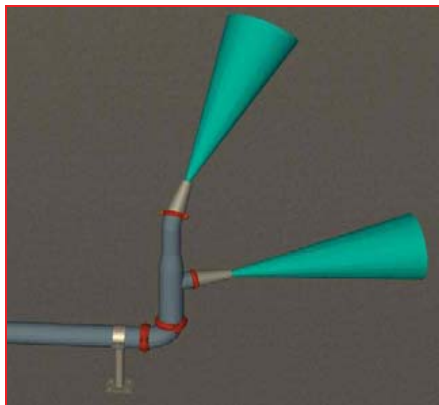
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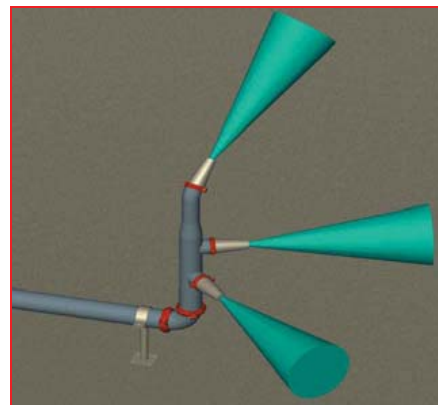
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