

Buckeye Bulletin



**WEFTEC OPS
CHALLENGE**
pg. 74-75





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The Buckeye Bulletin (BB) is the official publication of the Ohio Water Environment Association, Inc., a not-for-profit corporation founded in 1926, dedicated to the improvement of water quality in Ohio and the continuing education of water professionals. It is one of the top five member associations of the Water Environment Federation.

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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WHAT'S INSIDE?

OWEA Officials	 4
Calendar of Events	 5
Welcome New OWEA Members	 5
President's Message	 6-7
2018 Award Winners	 7-12
2018 Sponsors	 13
Fireside Chats - Carnel Felton	 14-16
Watershed	 17-19
Why Automation Can't Wait	 20-22
Changing of Data Collection	 23-25
The People's Place	 26-28
Utility Partnership Program	 29
Ohio EPA Update	 30-31
Plant Profile - SWCWSD	 32-35
Tartan Fields WWTP Upgrades	 36-38
Sinking Caisson Method	 39-41
Into the Future of Water Utilities	 42-43
Environmental Engineering Program	 44-45
Roll Call	 45
Ohio's Nutrient Puzzle	 46-47
YP: Bridging the Experience Gap	 48-49
WEF Headquarters	 50-51
Final Clarifiers Design	 52-57
Chemical Precipitation	 58-63
Office Offerings	 64
WEF/OWEA Membership	 65
Kocarek Korner	 67-68
WEF Delegates' Report	 69
Section Reports	 70-72
Committee Reports and Updates	 72-81
2019 Call for Papers	 73
Operations Quiz	 74
Advertiser Index	98



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SAVE THE DATE

- DECEMBER 6, 2018** **BIOSOLIDS**
NATIONWIDE HOTEL & CONFERENCE CENTER

- MARCH 6, 2019** **ONE WATER GOVERNMENT AFFAIRS**
NATIONWIDE HOTEL & CONFERENCE CENTER

- MAY 2, 2019** **COLLECTIONS**
NATIONWIDE HOTEL & CONFERENCE CENTER

- JUNE 24-27, 2019** **2019 TECHNICAL CONFERENCE**
SAWMILL CREEK RESORT

Career Opportunities

No charge for job seekers.

No charge to post a position if you or a fellow employee are an OWEA/WEF member.

\$170 for a 30 day posting if not a member.

\$170 for a Professional Membership

We encourage you to join OWEA and reap all the benefits of membership. Same price as a posting!



Are you a social media guru? Find out how you can become part of OWEA's social media team. Email us at info@ohiowea.org

Welcome New Members

July 2018 - September 2018

- | | | | |
|------------------|-------------------|------------------|-------------------|
| Joshua Anders | Brad Frank | Julie McGill | Chris Sharrock |
| Monica Backs | Michael Garner | Rich McGillis | Joseph Shaw |
| Kendall Bales | Steve Goubeaux | Amelia Mioranza | Hari Srilakshmi |
| Dave Baran | Brooklyn Harris | Zachary Morley | Harry Stark |
| Brian Barbey | Keith Heidecorn | Larry Morris | Carl Stevens |
| Ryan Barth | Zachary Herrmann | Michael Norman | Heidi Strobl |
| David Baxter | Benjamin Imburgia | Tyler Ohnmeiss | Brian Tamulewicz |
| Matous Becker | Sanaiya Islam | David Paquette | Yasushi Terao |
| Matthew Bennett | Cameron Kanney | Dinh Pham | Sheamus Togher |
| Louis Burnoski | Rachel Kendig | Scott Pifher | Bryan Trail |
| Katherine Byrnes | Emily Kerber | Mike Reeks | James Turner |
| G. Chen | Samuel Kloss | Mathew Repasky | Christine Umerley |
| Kristen Conroy | Kotaro Kojima | Jessica Rogers | Renee Vansickle |
| Kevin Cox | Jamason Lawrence | Yelena Ruban | Steven Wagner |
| Dennis Craig | Suibing Liu | Joe Rustic | Jake Whited |
| Chad Davis | Qiuli Lu | Peter Schafer | Trenton Williams |
| Josiah Denson | Mark Mabry | Marie Sell | |
| Sean Driscoll | Aaron Mann | Michael Shaeffer | |

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

President's Message

There is a lot going on in the World right now. I am writing this just before the midterm elections. The political ads are nonstop, and I am seeing debate all over my social media sites on how our Country should be led. As the Father of two daughters getting ready to enter the workforce, I worry about how they will be treated. I had a chance to process my worries one beautiful morning on a run. That is where I generally do my best thinking. What I have decided is that for me, it is no longer just enough as a male leader to hold yourself to a high standard in how you treat women. It is time to do the little things. To speak up when you see a co-worker or friend discriminated against, ogled, or disrespected. It is no longer enough not to just be a guy that does not give the creep factor, but to call out guys that do. I did not create the phrase creep factor, but I bet the ladies reading this message know exactly what I mean. I cannot change the world, or the culture, but I can be someone in my corner of the world that tries to live up to the standard Jesus set at the well, or with Martha and Mary. I can be the male leader who tries to let people know it is not ok when



Fred Smith
OWEA President

you do not meet this standard. We can never meet that standard, but we can certainly try. I will do my best to meet this standard.

The Ohio Water Environment Association has a proud history of women leaders in our organization. I suggest we all start using the hashtag #WOW in all our social media posts where we highlight our wonderful women leaders in water. #WOW stands for Women of Water. There is not enough space for me to highlight all our #WOW leaders, but

I will mention a few. These #WOW leaders have been instrumental in leading OWEA. JoAnn Montgomery, who worked at the Southeast District Ohio EPA. She was a SEOWEA President in 1987-1988. Some other #WOW leaders from SE Section include former Presidents Sheree Gossett-Johnson and Laura Tegethoff. Sheree was also an OWEA President. I know there were great #WOW leaders in the other sections too. We have former OWEA Presidents Deb Houdeshell, Dianne Sumego, and Elizabeth Wick. Current OWEA Executive Committee Members Kim Riddell, Jane Winkler, Mary Ann Driscoll and Kathy Richards. Finally, the first Ohio woman to receive the WEF Arthur Sidney Bedell Award, Kathy Cook. She received this award in 1986. Be sure to send me other great examples of #WOW leaders. Not only those who have served OWEA, but all of them helping to create a better planet through clean water.

I hope everyone enjoyed the One Water Conference. Thanks again to our Committee Chairs Rob Herr, Melodi Clark, Stacia Eckenwiler, and Pat Crumley, and to the City of Columbus for hosting us. I had a great time! We are considering options for future One Water Conferences. Be sure to reach out to me with your thoughts.

Fred is a Senior Project Manager with CDM Smith in Columbus. He has a Bachelor of Science Degree in Civil Engineering from The Ohio State University and is a third-generation engineering graduate from Ohio State. Fred resides in Dublin Ohio with wife Susie. Fred and Susie have two daughters Emily (23) and Lucy (21). Emily graduated from Ohio State in May, and Lucy is attending Ohio State. Fred enjoys running marathons and drags Susie around the country to watch him race. Fred started taking ballet lessons three years ago and performed as Mr. Banks in last year's Artisan Ballet Company's production of Mary Poppins.

2018-2019

Executive Committee Meeting Dates

December 12, 2018	OWEA Office
February 10, 2019	OWEA Office
April 10, 2019	OWEA Office
June 23, 2019	Sawmill Creek

I had a chance to represent OWEA as our President at WEFTEC in New Orleans. What an experience to spend four 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 to WEFTEC for Operations Challenge. All three teams represented Ohio well! If your utility is interested in putting a team together, let me know. We also had a team from Case Western Reserve University represent Ohio in the Student Design Competition. This was Ohio's first student team to attend WEFTEC and compete in the competition. They also represented Ohio well!

The fall is a busy time for OWEA. We recently held an activated sludge treatment training, the Plant Operations and Laboratory Workshop, and the Watershed Workshop. We have the new Nutrient Workshop being held in November, and the Biosolids

Workshop in December. Each workshop has a full, educational agenda. Watch your email for upcoming details on the workshops and section meetings or visit our website.

As we enter November, it is always a good time to reflect and give thanks for our many blessings. It can be a real challenge to feel grateful in trying times like we are experiencing in this country. We have divisiveness, hatred, racism, sexism, and people not respecting other people's opinions. Through all of this, I am thankful for all of you. Water is a resource that is finite. Water is a resource that is vital to the existence of life. And all of you are out there making water a renewable resource. THANK YOU!

Don't hesitate to contact me if you have any thoughts, questions, or comments at smithfj@cdmsmith.com.

2018 Award Winners

WEF COLLECTION SYSTEMS AWARD



James Hewitt, PE
City of Akron

James Hewitt, City Engineer for the City of Akron, won the prestigious 2018 WEF Collections Award. Jim has devoted 30 years to making significant improvements to the City of Akron's collection system operations and providing industry leadership at the local, state, and national levels. He began his career at the City as a co-op student in the construction division. In 2002 he was promoted to Sewer Maintenance Superintendent where he was instrumental in establishing many practices currently used in the City's CMOM program. Following other advancements along the way, Jim was promoted to City Engineer in 2012. Jim serves as Vice Chair of the WEF Collections Systems Committee, Chair of the WEF CLC Guidance Material Task Force, and past Chair of Collections Specialty Conference Committee. As Specialty Conference Chair, Jim was integral in bringing the WEF Collection System specialty conference to Sacramento in 2013, Baltimore in 2014, Cincinnati in 2015 and Atlanta in 2016. Jim won the OWEA Golden Manhole in 2008, the NESOWEA Collections Award in 2013, the WEF Golden Manhole in 2016, and the Ohio 5S Award in 2016.

LARRY MOON AWARD



Elizabeth Wick, PE
OEPA

The Larry Moon Award is given to an OWEA member that has provided exceptional service and dedication to the organization. It's selected each year by the President and is given in honor of Larry Moon – a legend in the history of OWEA.

Elizabeth has been an active OWEA member for over 30 years during her professional career with Ohio EPA. She currently serves as Manager of the Division of Surface Water in the NW District. Elizabeth served on the NW section executive committee and as their president in 2000-2001. She served on the OWEA State Executive Committee and served as OWEA President in 2015-2016. She continues to serve as publication chair for OWEA's Buckeye Bulletin, which is recognized nationally for format and quality (OWEA is one of the few organizations that still does their publication in house). Throughout her career, she's been an advocate for OWEA, expertly doing this while also remaining true to her role as a regulator. In addition, she has continued to advocate for significant involvement in OWEA from Ohio EPA.

2018 Award Winners

F.D. DEAN STEWART AWARD



Jeff Hall
City of Columbus

The F.D. Dean Stewart Award is presented to an individual for his/her efforts in plant operations, maintenance, and especially for his/her keeping of records and reports of operations.

Jeff began his wastewater career at the Columbus Southerly Wastewater Treatment Plant in 1981. He retired from Southerly in 2016 after almost 36 years with the city of Columbus. He also worked for Cincinnati MSD at the Mill Creek Wastewater Treatment Plant. Jeff is currently working for the Delaware County Regional Sewer District as Operations Manager at the Alum Creek WRF. He is a Certified Class IV Operator.

J.W. ELLMS AWARD



Doug Clark
City of Bowling Green

The J.W. Ellms Award is presented to an individual who is in an administrative or supervisory position, stressing participation in conference activities, civic affairs, and leadership.

Doug is the Superintendent at the City of Bowling Green WWTP. As the Superintendent at Van Wert and Bowling Green, he has always encouraged his operators to not only join OWEA, but to get involved. His interactions with all members of OWEA continue to foster a sense of unity with a common goal of clean water. He is a huge advocate for OWEA and will explain the benefits of the organization to everyone.

F.H. WARING AWARD



Nancy Taylor
City of Newark

The F.H. Waring Award is presented to an individual who has demonstrated a significant contribution to the field of industrial waste treatment through administration, operation, research, development, or treatment.

Nancy works for the City of Newark as the Chemist/Pretreatment Coordinator. The Pretreatment Program in Newark is comprised of twelve permitted industries. Nancy loves to do Public Education on the importance of surface water, the impact of storm water runoff, and recycling of water from river to drinking water, to wastewater, and back to river.

W.D. SHEETS AWARD



Jason Grooms
Metropolitan Sewer District of Greater Cincinnati

The W.D. Sheets Award is presented to an individual who is active in the field of education and demonstrates outstanding accomplishment and service in the field of training and education of students for the positions in the areas of operation and design of wastewater facilities.

Jason is a class IV certified wastewater operator and a Senior Plant Supervisor for the Metropolitan Sewer District of Greater Cincinnati. He is the Operator of Record for the Sycamore Creek and Polk Run WWT facilities. Jason has been in the wastewater treatment field for 18 years. He continues to hold tutoring classes in the evening on his own time for both MSDGC and outside operators looking to further their careers through achieving higher certifications.

AWESOME OPERATOR AWARDS

The Sections this year sponsored awards for the 2018 Conference to recognize "Awesome Operators", the folks that go above and beyond in what they do for their local water reclamation facilities.

NORTHEAST SECTION

Frank Daniels, Village of New Waterford

SOUTHWEST SECTION

Rocky Ball, City of Middletown

2018 Award Winners

L.T. "TOM" HAGGERTY AWARD



The L.T. "Tom" Hagerty Award is presented to a public agency employee who unselfishly provides guidance and assistance to wastewater plant operators and superintendents as a part of his/her duties within an agency.

George is an appointed member of the Ohio River Valley Water Sanitation Commission (ORSANCO). He was previously the Chief of the Ohio EPA's Division of Surface Water. Throughout his 38+ years with OEPA, George steadfastly supported OWEA's mission. George also advocated OEPA Staff involvement in OWEA.

George A. Elmaraghy, P.E.
ORSANCO

ENGINEERING EXCELLENCE AWARD



The focus of this award is on a project and not a person. The selected project must have been in operation for a period of one (1) year and not more than five (5) years.

The Akron Water Reclamation Facility Phase 1 Step Feed project is one of the City's critical Long Term Control Plan projects. The project goal was to maximize secondary treated flows with step feed aeration and final clarification improvements prior to installing high rate treatment. Based on post-construction operation, the Step Feed Phase 1 project exceeded the 130 MGD goal and can treat flows in excess of 140 MGD. The City anticipates a savings of approximately \$50 million. Energy efficient turbo blowers have reduced the WRF electrical blower load by 26% or savings of \$16,500/month.

City of Akron Water Reclamation Facility (WRF) Phase 1 Step Feed Improvements
Akron, Ohio

PUBLIC SERVICE AWARD



The Public Service Award is presented to an elected Ohio official or officials demonstrating a significant commitment to the protection and improvement of the water environment. Awardees need not be a member of the Ohio Water Environment Association.

Senator Brown recognizes the importance of our Great Lakes. He cosponsored the Great Lakes Ecological and Economic Protection Act, authorizing the Great Lakes Restoration Initiative. His "call to action" letter to the Army Corps resulted in disposal of dredged material from the Cuyahoga River in approved confined disposal facilities, not in Lake Erie. His Clean Water Affordability Act will help improve sewer collection systems, while keeping rates affordable and improving water quality. He was instrumental in authorizing USDA funding for WLEB phosphorus reduction initiative, to reduce phosphorus laden runoff into Lake Erie. He consistently supports legislation focused on environmental protection. Senator Brown realizes the importance of safe, dependable water infrastructure to the public and Ohio's economic health.

Senator Sherrod Brown
United States Senator, Ohio

PROFESSIONAL WASTEWATER OPERATIONS AWARD



The Professional Wastewater Operations, P.W.O. Award, honors individuals doing front-line work who have contributed practical application, professionalism and dedication to their particular wastewater treatment system.

Christen works at the NEORSD Southerly WWTP. Combining an MBA and Bachelor of Science degree in Biology from the University of Findlay with Class III Wastewater Certification, Christen has developed into the ultimate "Professional Operator". She has been leading NEORSD's Ops Challenge Team for the last 3 years. Her first team made it to WEFTEC in New Orleans. In 2017, Christen wrote and performed WEF's new official fight song, "Treat the Water Right". She exhibits a positive attitude, a passion for the science of wastewater treatment, and is dedicated to promoting the "everyday worker".

Christen Wood
NEORSD, Southerly WWTP

2018 Award Winners

LIFETIME ENGINEERING AWARD

The Lifetime Engineering Achievement Award was established to honor a member who, as an Ohio design engineer, has consistently delivered good basic engineering design of wastewater facilities over a period of 20 or more years. The awardee must be an Active, Lifetime, or Retired member of OWEA, recognized by his/her peers as having demonstrated a high level of competence in the design profession.



David Stewart, P.E.
CDM Smith (Retired)

David Stewart's career started 50 years ago while in the U.S. Army's engineering operations stationed in the Washington D.C. area. Dave worked for a consultant serving municipal and federal agencies. Some of his more visible work was as project manager for water system upgrades and new irrigation systems for the Lincoln Memorial, Jefferson Memorial and the Medal of Honor Golf Course. In 1992 Dave relocated back to Ohio. He served clients all over by developing and delivering cost effective, high quality treatment system design and construction.



David Frank, P.E., CPM
Arcadis, Inc.

Dave Frank a University of Akron alumni, has dedicated himself to improving the quality of life for communities throughout the country and in Ohio. His passion for engineering began while serving in the US Coast Guard's, Ninth District Engineering, where he worked on water and wastewater treatment systems at US Coast Guard stations on the Great Lakes. That passion for water resources buoyed his 31-year career with FPS and Arcadis.

LABORATORY ANALYST AWARD



Ange Layton
City of Lima

This award recognizes a laboratory analyst who has demonstrated excellence and professionalism in his/her daily laboratory work.

Ange is the Industrial Monitoring Chief at the City of Lima. Ange holds two Bachelor of Science Degrees and a Class III Wastewater Certification. She has worked for the City of Lima for 11 ½ years. Ange goes above and beyond the duties of her position in the lab and has taken on the responsibilities of Industrial Monitor Chief since the vacancy of that position, along with her normal lab duties.

COLLECTION SYSTEM AWARD



Todd Trabert
Metropolitan Sewer District of Greater Cincinnati

The Collection System Award is presented to an individual for contributions to the advancement of state-of-the-art wastewater collection.

Todd is the Principal Engineer for the Collections Division of the Metropolitan Sewer District of Greater Cincinnati. Todd manages the division's Assessment and Cleaning group which conducts all of the in-house cleaning and CCTV work for mainlines and building sewers. Todd is a WEF/OWEA member and is an invaluable resource for the Southwest Section's annual Collection System Hands-On Workshop.

WEF GEORGE W. BURKE AWARD



Presented to a municipality or industrial wastewater facility for an active and effective safety program.

The Easterly Wastewater Treatment Plant is the oldest plant owned and operated by the Northeast Ohio Regional Sewer District and has 71 full time employees and an average daily flow of 81.8MGD. The Health & Safety Department provides direction, support and expertise to every sector of the regional sewer district's diverse business functions. Easterly's safety efforts are seamlessly integrated into the day-to-day manner of running the plant by all staff. The facility has achieved 108,022 hours worked with a result of zero accidents or zero loss time days being recorded.

NEORS D Easterly

2018 Award Winners

FACILITY IMAGE AWARD

This Award is intended to recognize OWEA members who have enhanced the image of our profession by improving the physical image of their workplace or through outreach programs to schools and the general public.



City of Fremont Water Reclamation Center

Fremont, Ohio

When the City of Fremont's Water Pollution Control Center decided it was time for improvement, they did so in a big way. The result of this upgrade is a state of the art facility with a new name, Fremont Water Reclamation Center (FWRC). With the main goal being to reduce CSO's, they increased their peak flow from 9 MGD to 24 MGD. In an effort to further reduce nutrients, they also implemented an A2O BNR process. FWRC is located in an area that is used for many outdoor recreational activities, all of which keep the FWRC in the public eye.



City of Akron, Akron Waterways

Renewed! (AWR) Public Outreach Program

Akron, Ohio

The City of Akron's Akron Waterways Renewed! Public Outreach Program is a great example of effective Public Outreach. As part of the CSO abatement program the City developed an impressive outreach program with goals to educate the public on the CSO program and its benefits; increase social media and web presence; inform interested parties about ongoing work and how they will be affected; establish a rapport with the public and convey a sense of transparency; and highlight the program's cooperation with the EPA. Their outreach activities include such things as a stakeholders group, a blue heron mascot, rain barrels, community events, and construction site streaming videos.

WEF WILLIAM D. HATFIELD AWARD



Terry Spiegel
City of Bucyrus

Presented to operators of wastewater treatment plants for outstanding performance and professionalism.

Terry has served the City of Bucyrus for over 45 years. In addition to his responsibilities as Superintendent of the wastewater treatment plant, he recently took on the administration of the water treatment plant construction project. Terry is very supportive of his employees as they seek higher certifications and ongoing education in the field. Terry is an advocate for the establishment of wastewater treatment operations as a profession and he is a shining example of the professionalism others strive to have in this business.

WEF ARTHUR SIDNEY BEDELL AWARD



James L. Borton
Jacobs

Established to acknowledge extraordinary personal service to a Member Association.

Jim is a leader in OWEA and WEF. His tenure on the Operation Challenge and Operations Committees speak to his dedication to advancing the wastewater treatment operator profession. Jim was the WEF Operations Challenge Committee Vice Chair from 2013-2016 and has been the Chair since 2016. He served as OWEA Plant Operations Committee Chair and also served on OWEA's Publications Committee where he was Committee Chair for 3 years. He is a member of the 5S and Crystal Crucible Societies.

2018 Award Winners

WEF LABORATORY ANALYST EXCELLENCE AWARD



Jim Davis
Montgomery County
Environmental Services

Recognizes individuals for outstanding performance, professionalism, and contributions to the water quality analysis profession.

Jim is the lab services manager for Montgomery County Environmental Services. In this role he expanded the scope and services of the laboratory to offer testing to residential well owners, external water and wastewater systems and other government agencies. Jim has been co-chair of the SW laboratory analysis committee since 2009 and was the recipient of the Crystal Crucible award and OWEA's Lab Analyst award.

WEF OPERATOR INGENUITY CONTEST

For the past 6 years, WEF has sponsored the Operator Ingenuity Contest to recognize the simple, everyday fixes that operators invent to make work easier and safer. Entries are judged on safety, resourcefulness, and how transferable the ideas are. The criteria are kept simple to encourage all kinds of entries. Awards are given at WEFTEC, but this year WEF decided to announce winners in time for local MA conferences.

This year, The Totally Tubular Award goes to the Jackson Pike Wastewater Treatment Plant Maintenance staff: Chris Lathem, Chris Daugherty, Steve Slayton, and John Kleoudis.

The award is named for the mechanical float level indicator they created. This simple device ensures they can always get an accurate level measurement in their facility's flow diversion structure (FDS). It works even if the electronic level sensors go out — this situation is what prompted the fix. It also can confirm the reading on the electronic sensors.

They made the level indicator from a 20-ft length of 2"x 4" square tubing mounted to the concrete on top of the Flow diversion structure. They added a cable and float pulley system as well as level markings at every 6". The floating mechanism is made from a 1 gallon jug that floats on the surface of the wastewater in the Flow Diversion Structure. The jug is attached to a 1/4" cable that extends up the 20' measuring stick to the pulley and then down to the weighted level indicator.

As the level rises in the Flow Diversion Structure, the float goes up which pushes the weighted level indicator down. As the level drops, the float goes down, which causes the weighted level indicator to go up.

In addition to the certificate and a prize, this fix which was highlighted in a recent Buckeye Bulletin, also will be highlighted in an upcoming issue of Water Environment & Technology magazine.

LIFE MEMBER

The Water Environment Federations Life Membership is bestowed upon members who have been active for at least 35 years and have reached the age of 65.

- James R. Gills
- Jane Lee Winkler
- Richard L. Schlemmer
- Larry K. Hanes
- Robert P. Dominak

QUARTER CENTURY OPERATOR

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A Chat with Carnel Felton: Part 2

by Megan Borrer, OWEA Staff

THIS OWEA MEMBER IS A VETERAN AND ASSISTANT MANAGER AT JACKSON PIKE

STAFF: Tell us about your circle of trust and how you use it in your leadership.

FELTON: Here is one thing I learned. If your subordinates trust you, even though you may be telling them to do something that they dislike, they'll do it anyway and there won't be any adverse repercussions on you. What I'm saying is, I build the trust up by including you in on the decision-making. Why do I include you in on the decision-making? It's because then you got skin in the game, okay? When you got skin in the game, you are going to want to make sure that the game is played right. You're gonna make sure everything is done right. I waste no time in praising guys or girls when they do a great job. That's the cheapest incentive that you could give anybody is, "Good job. I think you helped us out a lot."

How you build trust is, a lot of times they have issues that ain't got nothing to do with wastewater, right? But this is where my mother comes in. She says, "If you can help somebody, then why not?" It makes sense to me. So they got our paralegal, right? They come in and they got kinda like a issue, legal, real estate, whatever, and I may know a little bit about it. I'd talk to them about it. And if I could give them a suggestion, I give them a suggestion, right? And what I find is, even the hard to work with employees, even with the disgruntled employees, or whatever, all of them might be getting them through what they need to do in order for the plant to be as efficient and operate as successful as it does. So that's what I say when I say, build trust.

And of course, it takes me a long time to build trust and it takes only a second to kill it. All they got to do is find out you were dishonest with them about something. I'm straight up. I mean, it may be a bitter pill for me to swallow. I'm not gonna tell them that this is a piece of candy instead of a salt tablet no, no. I tell them straight up, it's a salt tablet. Done already ate mine and it's coming down the line. This is what we have to do, boom, because the bottom line, we're getting paid to do a job, right?

I take more of the Gentle Ben approach than the gorilla approach. All of them are gonna tell you, "Yeah you can trust Carnel." That's what you want them saying about you. That's building the trust. And my thing is, when I give you advice, I'm not ever gonna tell you anything that will hurt you. I ain't that guy, right? If I could steer you, give you good information that you could take and help you out, boom. And I must have a pretty good track record and not too many of them hate me, I guess. I



don't know, [LAUGH]. Like I say, I can approach anyone because I have built that circle of trust.

I don't think I'm unique, but when it comes to management, it seems like I am unique.

And I'm not doing this for accolades, my whole life has been about teamwork, team concepts, and how to build a team. How to make a team work, right? And anybody can learn those skills. It's about listening, and I do talk a lot, but it's about listening and actually understanding what the person is telling you. Not just listening to mark time, to get them out of your office. No, no, I actually listened and listened intently. And usually you can help them out, guide them. And then, half the time they just want someone as a sounding board, they ain't really looking for advice, now I'm good at telling which one you want. I guess I'm an enigma.

When it comes to management because you have to treat everybody fair, and number one thing, you go out here and ask anybody in these two plants, Carnel doesn't show favoritism, Carnel has no favorites. What I tell my group as soon I got there, "Guess what, we are all musketeers, all for one, one for all." If someone in this section needs some help, we're all gonna give that person some help, then everybody can go back to their sections. I said, "That's how we operate, period." And everybody likes that because they've all got buy-in.

I get all of them to get buy-in. This is what people don't understand. I've gotta buy in to what I want them to do, what the plant needs them to do. And I got them to do it without vinegar, see what I'm saying? It's with honey, I got them to do it.

And yeah, probably my size is somewhat of an advantage. Let's just go here, I'm not gonna deny that. And I'm not even as big as I was. I lost like 70 pounds. But you don't want the diet I went on. I went to a diabetic coma in 2012 and was down out for a week, right? I wake up in the hospital, I'm thinking I'm just waking up in my bedroom from a hard night's sleep. Have you ever had one of them when you so tired, and you just sleep and wake up, you ain't dream, nothing.

I had no dreams, no, I ain't seen the light, I ain't seen nothing. I just thought I was waking up. Then I looked and I'm in a hospital. Where my bedroom door at, where the closet door? What happened to the window? That ain't Gerben Avenue, that looks like Broad Street! Man, I'm turned around. When I woke up Theresa's like, "Do you know who I am?" I'm like, "Theresa please, I need

some water for my throat." "You ain't getting no water. You done been in here a week." Blah, blah, blah. It was crazy, right? In that week I lost 40 pounds but on the other side, I conquered refined sugar and fructose and the weight just stayed off. Just the sugar alone, no more pop and all that.

Now some of my fellow ex-Marines. They take kinda like a harder approach to life than what I do. I know you probably seen ex-Marines. Everything's spit and polished. Come on back, you gotta get back into society because if I think everybody should be as perfect as they wanted us in the Marine Corps, well you aren't gonna have no friends.

I mean, even in stressful situations I try to stay calm. Once you get upset you can't think. The only thing you're thinking about is that you're upset. And there's this big problem that you're upset about, right? Me? No. "All right, let's put our heads together. Right now I want all minds on how we solve this problem." Okay, we solved the problem. What I've noticed, there ain't no finger pointing but at the beginning, when it's his fault, it's her fault, I don't care nothing about that. We got a problem, let's solve the problem. Then we'll talk about how it happened to avoid it from happening again. I get everybody focused on the problem, they ain't focused on each other and attacking each other.

Just little techniques that I learned that worked when it comes to dealing with people. I am a people person. It's a human experiment, you understand what I'm saying? I do believe we're gonna make it. In spite of the times we're in now, I just think that I have found that the human spirit has helped me more than it has hurt me. Let me just put that that way. I found that people are more helpful than they are harmful, and I think generally, most people wanna do the right thing. And if you give them the tools do to the right thing, they will. That's just me in a nutshell.

STAFF: What advice do you have for someone looking to further their career in wastewater? Or start it?

FELTON: One, start taking a course in chemistry. You wanna take chemistry. Biology ain't bad either. You also, I would say, take a tour of the plant and see what it's like to get in it because you can't go by Aesop's Fable, because the old story's still out there, this is a stinky place. Tour the plant, see if it's something you really want to do, talk to the people and I would say that about any occupation you wanna do. Just don't dive in it because it looked like it was a nice one to do on TV. No, no. Do research, network, OWEA, WEF, stormwater, all that if you wanna really get into it. Get in there and join these organizations, and participate and that's what you wanna do, lay a good foundation before you hop in it, is what my recommendation is.

It's a testing type of thing, and if you ain't a good test taker, this is not really a good field to try to embark upon. I'll be straight up with you, because I see people, good workers, that just can't put that pen and paper in

their hand. We'll put them out there in the field, they'll run any blower or any pump, take tanks in and out of service, they do all of that. Now you want me to write it down? No.

Preparation, make sure you understand. Say, you want to work for the City of Columbus. You wanna make sure you understand their process of getting hired. That's what I'm saying when you do the research. What is the civil service? What qualifications do I need? You wanna look at, how large is the facility? How large is the workgroup? And that gives you an idea of what your chances are of becoming a part of that.

STAFF: If you had to pick one person to say that you look up to or helped your career, who would that be and why?

FELTON: There's a couple people that go all the way back. Let's say Norm Shukite, and I just found out yesterday on Facebook that he had passed away and I'm sorry that I can't make his funeral.

When I first got to the City of Columbus Norm was already working there and he took me under his wing, he showed me all about how to log all the tests, helped me when it comes to studying for my license, and all that. So if I have to say anybody had a major impact on my career it was Norman Shukite, Storming Norman. What was crazy about us two, we was like the Bobbsey Twins, right? Even though he's white and I'm black, both of us 6'3", both of us was 300-some pounds. Both of us basically like Gentle Ben, we ain't trying to hurt nobody, right? Norm was really cool, he was great.

STAFF: What is the biggest benefit of being an OWEA member?

FELTON: The networking. They are kept up to date on the new processes and what's going on in the industry. That goes without saying. I wished I would have gotten involved with OWEA much earlier. At every stage [in your career] you could get something out of OWEA. You're meeting people at every stage and all over the state. You all do a magnificent job.

My only problem [with OWEA which] is like this industry, we don't tell people what we do. People flush that toilet, it's gone, right? They don't understand, that's why when I take people out on a tour out here they're like, "What?" Yes, this is where it's coming, this is the engineering Miracle that has taken care of all the stuff we do.

We don't tell our story, what we're doing for the community. Everybody wanna talk about how they're environmentalists and all, really? What are you cleaning up? No, the environmentalists are in this plant, keeping that from hitting the side of the river. This is what people don't understand about us. What we're cleaning out of this stuff. What we've got to deal with. What it looks like coming in, what it looks like going out, right? So horrible at telling our story, I'm sorry, we are. Think about that, walking in through the door, I can be handed an OWEA

Fireside Chats

membership. This is what it is. This is where you'll be going to seminars and trainings and everything. You'll get to visit other plants. How great is that for a new wastewater plant operator?

STAFF: Are you retiring at the end of this year?

FELTON: My retirement date is January 1st, right? I'm an any timer now, but probably the end of January I'm out of here. That's it. Yeah, it's been an odyssey.

It's just like I look at life. I cut my life up into decades, 10 years, right? 1 to 10, 11 to 20. I had a good time in each decade. I had a bad time in each decade.

I'm not looking back, looking forward. I'm a forward looking guy. I mean, I got so many friends my age, get stuck in the era, the 80s, the 70s. Had good times in those times, but now I'm looking forward, I'm looking forward to 2020, let's start another one. You chop your life up like that and you could look back.

The overriding thing is teamwork, team concepts, that's all that is. If you know how to build a team, you know how to get something done.

STAFF: What are you going to do in your retirement?

FELTON: Probably become a consultant for labor management issues. I think, because I'm talking to everybody now anyway for free. I then told them, "Now you know once I retired, you call me up. I'm gonna say, here's your 800 number you call me."

Consulting, traveling that's what I'm going to do. That's how much of this rock I ain't see even though I've been halfway around the world twice. I have been in a lot of different countries, Spain, Italy, Greece, Turkey France, Germany, all over the place, right? Still there's many places in the United States I have not been, that I am going.

That's what I wanna do, probably write. I'm an artist, so writing comes along with the program, with that talent,

and get back into that, drawing and painting and stuff.

STAFF: Is there anything else you want to tell the membership?

FELTON: Stay focused, stay on point, and you'll achieve what you're going after.

One of my techniques is I'm not gonna make fun of you. I'm gonna make fun of myself and get y'all laughing at stuff that I done went through, right? You don't use humor against someone else, put them on the spot. No, I've got enough stories, trust me. You have heard about that many of them, but yeah. So yeah, there are some crazy stories about some of the knuckleheaded stuff I done and survived. Just make the best of the situation you're in and you'll be all right. That's my two cents.



Fireside Chats - Looking for Recommendations!

The Fireside Chats is a series for the Buckeye Bulletin focusing on leaders in the industry. The Question and Answer Feature will dig into their leadership role and how it has had an impact on the industry. We will be focusing on leaders from OWEA to Plant Superintendents and every leader in between. Please nominate your boss, coworker, or someone you admire for a future article by emailing Megan Borrer at:

meganborrer@ohiowea.org.

What would you give for clean water?

by Vince Messerly, President, Stream + Wetlands Foundation



In August 2014, the city of Toledo made national news: their water supply, drawn from Lake Erie's western basin and serving 500,000 people, was declared unsafe to drink. Tests showed that microcystin, a chemical that is toxic to the liver, was present at levels more than double what the World Health Organization deemed the safe limit for drinking water.

Microcystin is produced by cyanobacteria, more commonly known as blue-green algae. The algae are fed by nitrogen and phosphorus, which (along with potassium) represent the primary ingredients in commercial fertilizers. Each spring, runoff from farm fields delivers a bounty of nutrients to the algae, leading to unchecked populations, or "blooms," not just in the Lake Erie basin but worldwide.

Modern drainage systems, which have been a boon to farmers because of their efficiency in drawing excess water away from sensitive crops, have the downside of being correspondingly efficient in providing cyanobacteria with their food source. In the mid-20th century, midwestern farm states passed laws authorizing construction on vast networks of drainage systems; most of those systems are still maintained today. Many drainage ditches discharge into the Maumee River, which is the largest tributary to the Lake Erie basin. The U.S. EPA designated the Maumee River as an Area of Concern under the 1987 Great Lakes Water Quality Agreement, citing sediment contamination and agricultural runoff as primary causes of the river's environmental problems.

Efforts to improve water quality

Soon after the disruption in Toledo's water supply, several government entities attempted to address the problem. In June 2015, the governors of Michigan and Ohio, along with the Premier of Ontario, agreed to work together toward reducing the total and dissolved reactive phosphorus entering the Lake Erie's Western Basin by 40 percent, with a goal of doing so by 2025. The Great Lakes Commission also set reduction goals, along with an action plan to achieve them. National efforts on the part of both the United States and Canada took place in February 2016, with the establishment of a 40 percent phosphorus reduction goal.

On July 11, 2018, Ohio Governor John Kasich signaled an intention to hasten phosphorus reduction when he signed Executive Order 2018-09K, titled "Taking Steps to Protect Lake Erie." The order proposes identifying and addressing Maumee River Basin watersheds that are in distress. Because distress arises primarily as a result of agricultural runoff, the order will likely cause farmers and resource agencies to rethink conservation practices and how to economically keep nutrients and soil on the land. One of the practices that may be part of the solution is the use of wetlands to capture sediment and nutrients.

What can wetlands do for you?

It's easy to "connect the dots" between fertilizers, drainage and the resultant contaminated water. It's more difficult to determine a fix for the situation. A natural solution is using wetlands to remove sediment and nutrients. A variety of processes play a part in a wetland treatment system, including sedimentation, absorption, chemical reactions, and the biological processes of plants and microbes. Naturally occurring wetlands in the U.S., however, have been decimated over the last two hundred years.

To say that wetlands were underappreciated during land settlement and throughout the mid-20th century would be an understatement. Wetlands were reviled because they were unstable terrain for foot and vehicle travel, and they are still eschewed due to concerns from vectors such as mosquitos that may carry diseases such as West Nile virus, encephalitis, La Crosse Virus, Dengue, Malaria, Zika Virus, yellow fever, etc.

"By the 1960's, many political, financial, and institutional incentives to drain or destroy wetlands were in place. The Federal Government encouraged land drainage and wetland destruction through a variety of legislative and policy instruments," according to the U.S. Geological Survey.

The survey also reported that of the 221 million acres of wetlands that were present in the United States at the



time of European settlement, only 103 million acres were left by the mid-1980s, according to an extensive inventory performed at that time by the United States Fish and Wildlife Service. The inventory was required by the Emergency Wetlands Resources Act of 1986 (P.L. 99-645, as amended). Some current estimates put the number of worldwide wetland loss at 50 percent, with 90 percent of the wetlands in Ohio being lost. Ohio's losses include the Great Black Swamp, which covered nearly a million acres south and west of Lake Erie during the settlement of northwest Ohio.

In addition to receiving governmental support, wetlands have enjoyed somewhat of a comeback in public opinion. They are now understood to be important ecosystems in themselves, since they provide plant and animal habitat, and to support the environment as a whole, improving water quality and sequestering carbon. But reintroducing wetlands—at least to the extent that would be required for adequate water filtration—is no small task. Nevertheless, given the history of environmental degradation in the Lake Erie Basin and its public health implications, that area is becoming a testing ground for progress on the issue.

Farm the best and conserve the rest

“Other than to stop using fertilizers—which isn't feasible—the only solution to the runoff problem is to use wetlands for purification,” said William J. Mitsch, Eminent Scholar and Director, Everglades Wetland Research Park at Florida Gulf Coast University (FGCU)'s Naples Kapnick Center (as well as Emeritus Professor of Natural Resources and Environmental Science at The Ohio State University). And while no one yet knows the exact ratio of farmland to wetland for achieving filtration, “it's at least 10 percent,” said Mitsch.

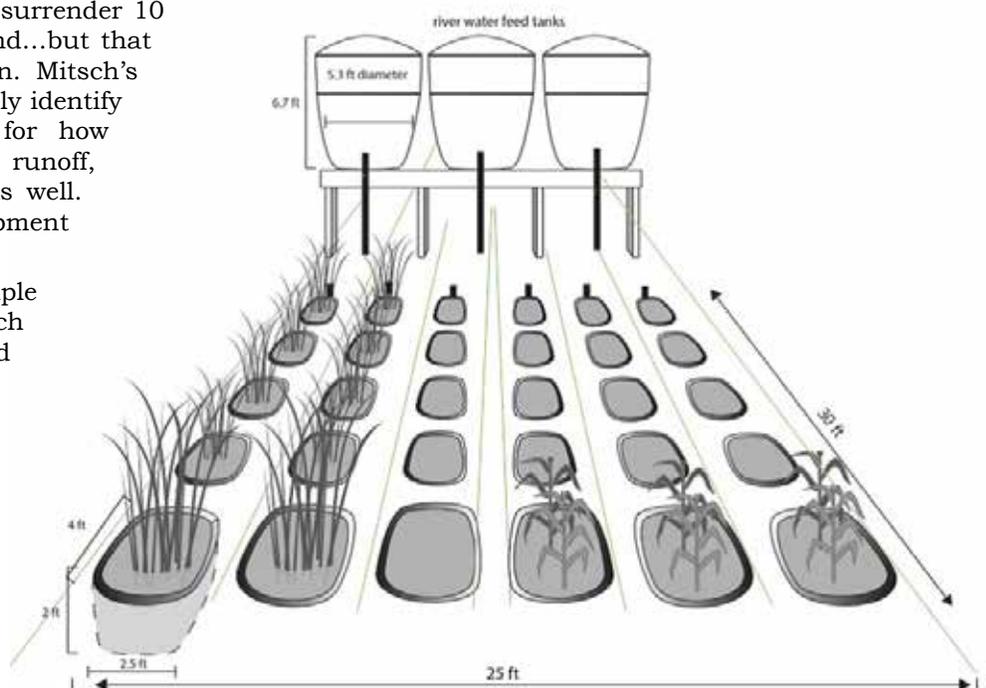
This has been perceived as a call to surrender 10 percent of a community's farmable land...but that is not a realistic—or desirable—option. Mitsch's research is explicit in its goal to not only identify physical and mathematical models for how wetlands might be optimized to filter runoff, but to incorporate business models as well. That will mean linking wetland development to achievable farming practices.

Mitsch has conducted multiple landscape-scale experiments in which wetlands were designed and constructed to test their ability to retain nutrients from runoff, including phosphorus, and purify the water. His approach is dubbed “wetlacre,” because it combines wetlands with agriculture. A comprehensive engineering approach is taken, and rather than draining water away from fields through existing drainage tiles or ditches, nutrient

and sediment-laden water spreads over land that has been planted with aquatic vegetation, where it's then naturally filtered.

Two experimental long-term wetland labs at Mitsch's Olentangy River Wetland Research Park at The Ohio State University illustrated that nutrient retention in wetlands can be sustainable for decades (if the loading rates are not excessive). Similar experiments were conducted in Florida, where native plant species in the Florida Everglades, such as sawgrass, have been losing ground to plants that thrive on high-nutrient agricultural runoff. A three-year experiment in the Everglades, which involved planting native wetland species, was conducted by Mitsch and his team from March 2010 to March 2013. Results suggested that phosphorus removal via constructed wetlands was practicable. And in more recent research (2016-18) a 50-acre wetland park, built in 2006 to 2008 in Naples Florida and acknowledged as a knock-off of Mitsch's Olentangy River Wetland Research Park, was shown to be a consistent sink for nitrogen and phosphorus on water that eventually flows to the nearby Gulf of Mexico near Naples' world famous beaches. Perhaps the wetlands are one reason that these beaches are not infested with red tide - harmful algal blooms infesting many other coastlines in Florida.

Current research is being conducted by Mitsch (with partial funding from the Stream + Wetlands Foundation) in a location upstream of the Maumee River in the former Black Swamp. Mesocosm experiments were established in Defiance, Ohio in 2017-18 as an initial phase of the project. A second phase of the project will involve creating small (perhaps 1,000–2,500 acres) demonstration treatment areas. If results of the mesocosm experiments and demonstration treatment



areas, which together will take a decade, suggest that wetlands are performing as desired, full-scale nutrient retention wetlands could eventually be implemented in the former Black Swamp. The full-scale wetlands would cover 50,000–100,000 acres (5–10 percent) of the Black Swamp’s original wetland area and reducing phosphorus loading by 480-960 metric tons/year (or 18–37 percent of the annual phosphorus loading by the Maumee River to Lake Erie).

The Black Swamp project will not only study the design of wetlands to decrease downstream damage, including harmful algal blooms, but hopes to reduce the need for additional fertilizers on planted fields, relying instead on re-use of the phosphorus that has accumulated in the wetland.

“After the wetlands remove the phosphorus, the fields can be ‘flipped’ and put back into rotation as farmland—most likely as corn fields, since corn is a crop requiring a lot of phosphorus,” explained Mitsch. His experimental wetlands will help determine the ideal number of years that a given area should remain a wetland, and the ideal number of years that it would be an agricultural field.

In addition to this modern take on the old farmers’ adage “farm the best and conserve the rest,” other economic opportunities may emerge.

“Water quality, conservation and carbon are all being addressed by the market,” said Mitsch, citing economic incentive programs for carbon trading and nutrient trading.

Furthermore, wetlands do support some crops, such as wild rice, so they don’t have to lie fallow and unprofitable. With local and heirloom foods being on-trend, perhaps these types of native crops will be a piece of the puzzle.

Conceptual plans for stormwater management may turn into realities sooner rather than later. Governor Kasich’s executive order will require farmers operating within “distressed” watersheds to develop and implement nutrient management plans, and those plans will entail regular soil testing, reporting and monitoring. Scientifically proven conservation methods will be crucial as farmers develop their compliance strategies.

But a virtue of the existing agricultural drainage ditch system is the cooperative spirit required to create and maintain it. The 21st century calls for similar cooperation in modifying the way farmlands collectively manage their fertilization and runoff. A path forward is starting to take shape, bolstered by scientifically proven wetland management, a regulatory environment that evens the playing field for all farmers and emerging markets that support a new kind of land use.

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Why Automation Can't Wait:

The Need for Technology in Today's Economic Climate

by Mitchell Beckner, Superintendent of Wastewater, City of Troy

In today's economic setting, utility managers face demands to accomplish more with fewer resources than ever before. The integration of computer-based technology and automation into plant processes provides a solution to this problem. However, some facilities still resist these improvements based on cost concerns, the notion that technology will complicate procedures, or simply resistance to change. Organizations need to recognize that their concerns about automation projects are unjustified. In order to grow and prosper in today's economic climate, plants must computerize their processes. Technology upgrades help reduce costs and errors, increase efficiency, and provide younger employees with the work environment they expect.

Cost evaluation methods have historically undervalued automation projects. These accounting processes usually hypothesize that without improvements, operating conditions will remain the same. This assumption can overstate a utility's true position. In actuality, resisting change may result in increased costs due to the degradation of operating conditions over time. Another problem arises with evaluation methods because they typically ignore any increased savings that occur after the project reaches its payback point (Ashford, 1988). This static view of future conditions and disregard of long term benefits falsely diminishes the apparent value of investments in technology.

When evaluated accurately, technology upgrades

normally pay for themselves within a few years through increased efficiency and savings in personnel costs. Oracle Healthcare Insight studied over 270 hospitals during a four year period to determine best practices for improving financial performance. The study included examination of the effects of automation in supply chain management, human resources and financial processes. It concluded that payback periods for investments in technology average two to three years and demonstrated that these cost savings usually continue well into the future (McDowell, 2010). Once paid for, automated processes function almost like an unpaid worker. They perform services and continue to produce cost savings with little or no additional financial input required.

The automation project at the Wastewater Treatment Plant in Troy, Ohio provides an excellent example of savings gained through technology. The Troy Plant is a 5 MGD activated sludge facility that operates 24 hours a day, 365 days a year. It had historically been staffed at all times. Management wanted to automate processes and add monitoring and remote control capabilities. The upgrades would allow staff reduction through attrition and also permit all plant personnel to work the same hours, creating more productivity from the employees. The improvements ranged from automation of data handling processes using Visual Basic scripts that were created in-house and the implementation of Allmax database software, to fully engineered mechanization upgrades including the installation of valve actuators, sensors,

The Troy Wastewater Treatment Plant is a 5 MGD Activated Sludge facility that completed a \$930,000 automation project in 2014.



PLC programming, etc.. Design of the project began in 2012 and work was completed in 2014 at a total cost of \$932,000 (Beckner, 2018). Preliminary calculations estimated that the project would pay for itself within 5.5 years, but by the end of 2016, the City had realized over \$949,000 in personnel cost savings since the project's beginning (Beckner, 2018). These benefits should continue at a rate of approximately \$250,000 a year into the foreseeable future (Beckner, 2018).

In addition to the financial benefits, computer based technology provides advantages through gains in efficiency and productivity. One hospital study found that the automation of systems could raise performance in standard efficiency measures by up to 65% (McDowell, 2010). The Pennsylvania sales tax collection office upgraded to a computerized online collection system and increased delinquent tax revenue by \$19 million in the first year (Worthley, 1980). The Brooklyn New York Fire Department reduced its response time from 10 minutes to 20 seconds through technology upgrades (Worthley, 1980). In a study of large manufacturing businesses, Black and Lynch (2001) found that in almost every case, investments in new technology brought increases in productivity.

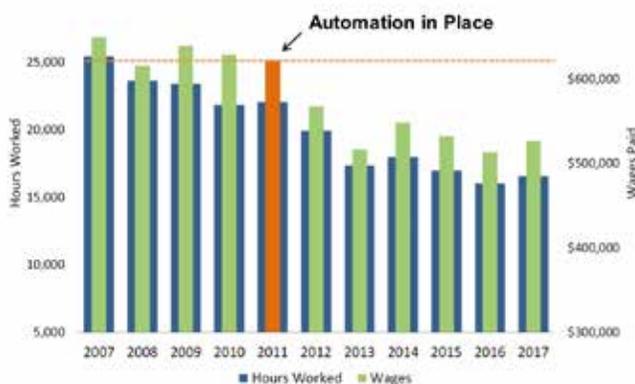
The Troy Wastewater automation project demonstrates specific efficiency advantages that can be gained by utilities. The SCADA (Supervisory Control and Data Acquisition) system at the Troy Plant continuously monitors hundreds of individual data points and operating parameters. It provides specific alarms on over 45 different operating conditions. During hours that the Plant is staffed, these alarms generate calls that go to a cell phone carried by the Plant Operator. The Operator is immediately aware of any problems or conditions that are outside of the desired parameters. This results in corrective actions being taken much more quickly than when Operators monitored Plant conditions primarily by making physical rounds and visual inspections. During hours that the Plant is not physically staffed (weekends, and second and third shifts) alarms are handled in the same way with calls going out to the Operators personal phones on a rotating basis. Often these alarm conditions can be corrected by the Operator connecting remotely to

the Plant's SCADA system and making the appropriate adjustments without travelling to the facility. The fact that all Operators work the same hours also increases efficiency by enabling more work to be completed during a given day.

Automation and computer based technology also simplify procedures and reduce or eliminate errors. A report by the Institute of Medicine in 1999 found that faulty systems caused the majority of medical errors, not people (Aron, Dutta, Janakiraman, & Pathak, 2011). Often the transfer of data across different units or departments triggered these mistakes. In a study of hospital practices, Aron et al. (2011) looked at observational, procedural and managerial processes. They determined that automating any one of these systems reduced inaccuracies and increased efficiency (Aron et al., 2011). By making processes more efficient, the time required to perform tasks is reduced. Workers become more productive and have the opportunity to focus on other aspects of their jobs.

The Troy Plant has significantly reduced data errors as well as the time spent on data entry by automating its data handling process. In the past, operational and laboratory data was hand entered on paper bench sheets, then copied into electronic spreadsheets before being copied once again into the OEPA monthly operating reports (MOR). Following the automation upgrades, much of the Plant operating data is now imported directly into Allmax Operator10 and Antero databases without any effort by Plant personnel. Hand collected laboratory and Plant data is now entered directly into Excel spreadsheets on portable Microsoft Surface computers. These spreadsheets contain custom made menus that use Visual Basic programming to convert and save the collected data so that it can be imported into the Allmax software without the need to copy or re-type the data. The Operator10 software then exports the data directly to the OEPA MOR. Data is physically entered into the system at most once, greatly reducing the potential for errors as data is transferred from system to system.

In the study by Aron, et al., (2011) upgrading observational processes generated the greatest reductions in error rates. In an earlier study, social scientists found



Year	Hours Worked	Wages Saved
2011	22,050	-
2012	19,907	\$85,464
2013	17,355	\$195,489
2014	17,954	\$174,939
2015	16,958	\$223,619
2016	16,020	\$270,296
2017	16,533	\$245,821

Total Savings: \$1,195,623

Work hours and wages paid annually at the Troy Plant. Cost savings through automation are evident beginning in 2012.

Annual savings in hours worked and wages through Troy Plant automation.

that the presence of surveillance cameras significantly influenced human behavior (Aron et al., 2011). Aron et al. (2011) discovered that when hospitals automated observational and data collection processes, workers realized their actions would leave an audit trail and they became more vigilant in their duties and less likely to cut corners or make careless mistakes. When inaccuracies are minimized, workers spend less time duplicating efforts and plants benefit through increased productivity and efficiency.

Technology can also help create an attractive work environment, particularly for younger employees now entering the workforce. People born after 1980 are often referred to as “digital natives” since they have lived their entire lives in the information era (Palfrey & Gasser, 2013). These young workers, or Millennials, have grown up with computer based technology and they have the ability to use it to its fullest capacity. In “Millennials and the World of Work” Andrea Hershatter and Molly Epstein state that “based on their own experiences, Millennials have every reason to assume that all necessary information can be gathered with the touch of a button on a 24/7/365 basis” (2010, p. 213). While earlier generations of workers must adapt to new technology (and often find that process difficult), technology essentially functions as a sixth sense in younger workers (Hershatter & Epstein, 2010). Older generations will inevitably leave the workforce and in a study of younger workers, Ng, Schweitzer and Lyons (2010) cite statistics that predict a shortage of workers in the next 25 years. They conclude that Millennials will have opportunities to be selective when making their career choices (Ng, et al., 2010). Responsible managers owe it to their organizations to prepare for this situation and modernize their processes so that they can offer attractive jobs to talented young candidates entering the workforce.

Managers often claim that the way they’ve always done things is working. Why should they redesign their processes? Benjamin Franklin is claimed to have said, “When you’re finished changing, you’re finished.” It is easy to see that this applies in today’s culture. Markets and businesses continue to push themselves and each other to improve. Technology dominates the world we live in and new developments continue to occur at an astonishing pace. Successful organizations make the most of this situation. While past practices may have worked well, it is essential for administrators and managers to use the modern tools that are available to them.

Another common obstacle to technology upgrades is the assumption that machines will replace workers if automation is allowed to take place. Undoubtedly this occurs in some instances but when taking a broad look at studies on this subject, no definite conclusion emerges (Betcherman, 1990). Often computer based technology increases the productivity of the existing workforce without staff reductions. As noted earlier, by increasing the effectiveness of processes and reducing or eliminating errors, workers become more efficient and can focus their efforts on other aspects of their jobs. If management desires staff reductions, they can often be accomplished

through attrition as workers change positions or retire, as was the case in the City of Troy project (Beckner, 2018).

Investments in technology typically pay for themselves within a few years and continue to provide savings long afterward. Automated processes reduce or eliminate errors and help increase the efficiency of employees. Younger workers now entering the workforce view technology as a necessity, and they are uniquely prepared to use it to its greatest potential. Upgrading to computer-based technology helps lower costs, increase effectiveness, and provide the foundation for a successful future. Technology is no longer just another option. It is the way utilities must operate.

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The Changing Landscape of Data Collection

by Justin Kerns & Thomas P. Mosure

The practice of surveying has existed throughout all of recorded history and has had a monumental impact on the development of human civilization. The ability to map, measure, and record the world around us has shaped cultures from early settlements to modern-day cities. It is a critical aspect to construction, transportation, asset management, and numerous other disciplines.

Field survey and data collection have long been labor intensive, time consuming, and expensive tasks. But as the art and science of surveying has progressed and improved throughout history, so have the tools and equipment. Ancient civilizations employed primitive tools such as rope, plumb bobs, and levels to record their surroundings. Survey equipment evolved over the years to include surveying chains, compasses, and transits. These tools were the standard throughout the world for quite some time, and can still be found in use today.

Modern surveying equipment—like the theodolite, total station, and 3D scanners—have greatly improved the speed and accuracy of data collection, but these tools still require extensive field work and post-collection processing. A new wave of technology is on the horizon and is rapidly becoming the new standard for data collection.

Technology Advances Survey Capabilities

With innovations to mobile technology, global positioning systems (GPS), cloud-based data storage, geographic information systems (GIS), and drone technology, emerging technologies are streamlining surveying and revolutionizing the way we collect and store information.

ms consultants, inc. first used the ArcGIS Collector application, developed by ESRI, when tasked with conducting field survey in Columbus, Ohio. The area surveyed was a highly urbanized, densely populated, residential neighborhood. Field data collection in a



Figure 1: Surveyor's Compass and Level

residential area such as this can be challenging and time consuming, due to high density of features, obstructions, and coordination with residents. The data collection was the initial step in designing and implementing green infrastructure throughout the neighborhood to reduce localized flooding, reduce demand on existing combined sewer systems, and improve stormwater quality. Field survey was required to calculate existing land cover, map stormwater drainage patterns, locate potential construction conflicts, and identify preferred locations for green infrastructure.

The field crews conducted door-to-door residential survey; locating, detailing, and recording all above-ground features within the project area. The above-ground features in this neighborhood included, but were not limited to: buildings, fences, retaining walls, decks, patios, sidewalks, utility meters/poles, roof downspouts, and vegetation (trees, bushes, and flower beds). Given the project area's size, the number of data points to be collected, and a limited timeframe, the ms consultants team determined it was necessary to deviate from traditional survey and data collection methods. Instead, the team looked to GIS-integrated technologies.

Using the ArcGIS Collector

The ArcGIS Collector application was chosen for this project due to its robust data collection capabilities, as well as the promise for time and cost savings. A variety of proprietary applications and software exists, with their own subtle differences, but most provide similar capabilities, are compatible with all of the major tablets and operating software, and can be found on the various

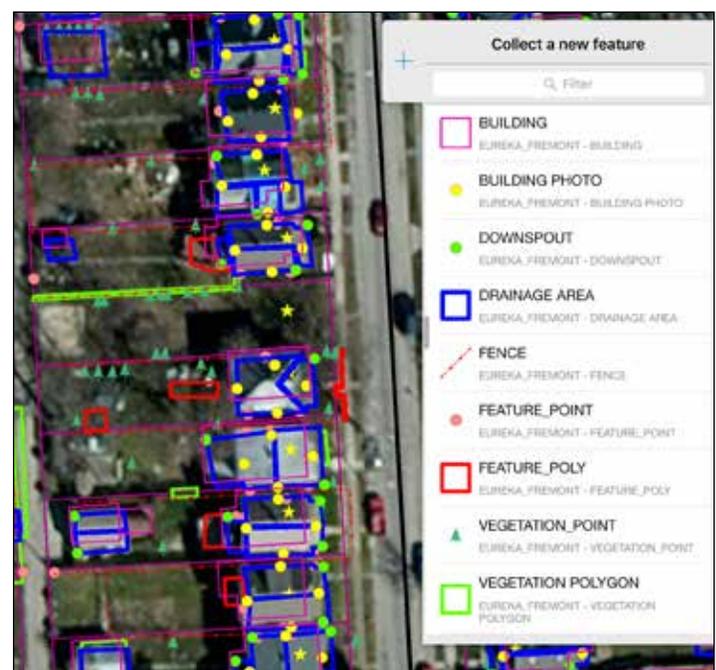


Figure 2: Collector Application User Interface

app stores. ms consultants chose the ESRI ArcGIS Collector application due to its integration with other ESRI products.

The application is easily downloaded and installed on a tablet of the operator's choosing. Data points are recorded by physically marking their location using the tablet's touchscreen. Unique symbology can be assigned to each feature begin collected to allow for easy visual recognition of the recorded data points. Custom basemaps can be loaded into the application or ArcGIS Online basemaps, including aerial imagery, street maps, and topography, can be streamed to the tablet using cellular data. Figure 2 shows a screen shot of the ArcGIS Collector Application user interface.

The data points are geographically referenced, meaning the coordinates and spatial location of each point is tied to the data being collected. This allows the data points to be imported and/or exported to existing GIS databases, as well as a variety of design software, and the data will appear in the correct spatial location. It is important to note that the spatial accuracy of the GIS-based collection applications are less than traditional survey, but for the purposes of this project, it was more than sufficient. While traditional survey equipment can record points within hundredths or thousandths of a foot of accuracy, it requires much more technical training, more equipment, and is more labor intensive. GIS-based collection applications only require a tablet computer, but accuracy is dependent on how closely the user can mark the point on the tablet screen. This balance of accuracy and efficiency must be evaluated for each project to determine if GIS-based collection applications are the right tool for the job.

In addition to the geo-referencing capabilities, these applications are highly customizable, and allow the user to set unique collection parameters. They have the capability to collect additional attributes and information for each data point being collected. These custom fields can be used to describe the quality of certain features, to identify special conditions, or to store photos of the item. This one-stop-shop capability replaced the traditional, and cumbersome, method of recording surveying notes with pen and paper on field worksheets and translating them into digital records in the office, as well as taking digital photographs and matching them up with the target feature. For example, the vegetation feature in this project contained a field to describe the type of vegetation (bush, tree, etc.) and a field to record the vegetation caliper. Photographs were taken of each vegetation point to confirm the documented characteristics and quality check the data inputs.

Collected data can be stored locally on the tablet's hard drive or uploaded instantaneously to a cloud-based storage system. Uploading directly to a cloud server reduces the need for internal tablet storage. The collected data can also be synchronized with the ArcGIS Online database, which allows the data to be viewed in real time by design engineers working in the office. This enables data processing to be conducted as it's collected versus waiting until the field crew returns to the office. Any gaps

in data or missed information can be identified in real time and relayed to the field crew, eliminating the need to make multiple field visits to collect missed data. If the field crew is working in an area with poor cellular service, or using tablets that are not cellular data enabled, the collected information can be saved on the tablet's hard drive and uploaded to the online database, when they get access to WiFi, or when they are back in the office.

For the project in Columbus, Ohio, using the ArcGIS Collector application resulted in significant time and cost savings due to its user-friendly interface, geo-referencing capability, and cloud data storage. In total, the 4-person survey crew documented over 35,000 data points, at over 2,000 residential properties, within the 297-acre project area, during a 2 month period.

A variety of uses exists for GIS-based collector applications, making them very versatile. The compatibility with existing geospatial databases makes it ideal for asset management, and a variety of field tasks, including data collection, site investigation, environmental impact assessments, tree surveys, and wetland delineation.

Unmanned Aerial Systems (UAS)

Another emerging technology in the data collection field is the use of unmanned aerial systems (UAS). Also known as drones, UAS can be used as a standalone survey method or in conjunction with GIS-based collector applications. Like the collector application, UAS offers a safe, accurate, and a cost-effective way to collect data, especially in areas that are inaccessible or too costly to survey using conventional survey methods. That is not to say that UAS are the best application for all projects, but engineers and surveyors should consider it as another available tool. If UAS is used on a certain acreage site with conducive terrain for aerial photogrammetry, it will save field time, save post-processing time, and reduce the number of resources—all of which ultimately save project costs.



Figure 3: UAS Technology for Dam Inspection

Using UAS

The Federal Aviation Association (FAA) regulates commercial small UAS operations through the Part 107 Small Unmanned Aircraft Regulations. Part 107 provides criteria for obtaining a remote pilot certification, registration requirements of the UAS, and operating rules and limitations of small UAS. Users may request a waiver to Part 107 operating rules to fit the need of the project location. Common requests for waiver include flying directly over a person or people and flying near airports/ in controlled airspace. Understanding the operating rules is a critical component to UAS flights, as the FAA could take approximately 90 days to review and issue a waiver for the flight operation. Collecting asset data in urbanized areas would likely require an FAA waiver, therefore UAS regulation constraints should be evaluated early in the project to identify any schedule implications.

In addition to identifying the regulatory requirements of the UAS flight, the site conditions must be evaluated. UAS uses photogrammetry to create several points that licensed software processes, creating a digital terrain and surface model providing horizontal and vertical information for each point captured. The compilation of these points is called a point cloud. The accuracy of the point cloud is dependent on several factors. The greatest of which being the type of terrain, as working in highly vegetated areas will yield inaccurate and unreliable data from the UAS that would require supplemental ground survey.

Another key factor is the flight design and parameters. Photogrammetry relies on the camera mounted to the UAS to capture high-quality photos enabling more accurate and reliable data collection; therefore, remote pilots should have an acute understanding of the exposure time (i.e. shutter speed), aperture, ISO range (i.e. sensitivity) and the sensor of the camera. Generally, remote pilots do not need to know camera specifications, but they are important components to mitigate motion blur, optimize focus on objects in both the foreground and background, and produce high-resolution photos to meet the requirements of the project.

Remote pilots should instead focus more on the critical design components of each flight, which are the

ground sampling distance (GSD), amount of overlap and the desired amount of accuracy. GSD is the distance between two adjacent pixel centers normalized to real world dimensions. The smaller the pixel size, the greater definition in each photo. Designers should carefully determine the accuracy needed for the end goal as the amount of time to process photos with a fine GSD (e.g. 2.5 cm) would take much longer than a GSD of 25cm. Next, remote pilots should determine how much overlap to use on the project. A single flight with 80% forward overlap and 60% side overlap will allow sufficient overlap to find ground control points (GCP) in several photos that will greatly increase the accuracy of the flight. The points should be easily visible by the UAS, and surveyed prior to the flight. Using the Pix4D software requires the remote pilot to establish at least three ground control points; however, better practice is to use five to eight per project under a general rule of thumb to provide GCP at 500-foot radii. Additionally, if there is a great deal of vertical relief on the project then locate GCP on both high and low planes. The GSD, GCP and flight overlap are the most critical components to capture the level of accuracy required for the project, and need to be determine prior to the flight.

Choosing the Best Technology

Beyond ArcGIS Collector and UAS, there are many more proprietary technologies and software platforms currently on the market for this growing industry. Each boasting impressive technical specifications, capabilities, and applications. ms consultants, inc. evaluated a number of different manufacturer’s products to determine which ones work best for their needs and intended uses. Anyone considering implementing GIS-based software and UAS technologies for data collection is encouraged to weigh the options to determine what is best for their unique application.

If you have any questions or want to discuss potential applications for these emerging technologies, please reach out to Justin Kerns (jkerns@msconsultants.com) or Thomas P. Mosure (tpmosure@msconsultants.com).



Figure 4: UAS Technology for Roadway Drainage Analysis

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Show Up, Set the Tone, Do it Well: Nine Ways to BE HERE NOW

by Anese Cavanaugh

I've been in a lot of rooms (and airports) lately. With a lot of humans.

All types of industries and levels of leadership. All types of opinions, values, and stands.

Right now I'm at the airport and the latest headline has a group of people gathered around the TV agreeing and disagreeing. The tension is palpable.

And I'm heading in to keynote a leadership conference in an industry essential to our future and well-being. The topic? Change, opportunities, culture... How do we navigate through this all gracefully, effectively, and powerfully?

In all these places, with all these humans, and in my own life, I find we're all considering questions in the form of one (or all of these): How do we create a healthier, more collaborative, more accountable, more ___ culture? How do we optimize our own leadership? Create better results and impact? Address – or even better – eliminate burnout? Reinvigorate purpose? Show up better together (and, by the way, what does “Showing Up” actually mean?) How do we navigate through all that is happening in today's political and people environment? How do we not get sucked into

the negativity, the chaos, the heartbreak – but instead be in service to it, and to each other, in whatever way we best can? How do we be IN the conversation with those we may not agree with? Oh... and how do we do all of this while still having enough left for ourselves and our families at the end of the day?

Here are a few questions I find that, in the busy-ness of life, get asked less frequently. But they are powerful. Even more powerful when asked with intention and breath:

How am I? Really.

And how do I feel about X, Y, Z?

And what's the biggest or littlest thing I can do (and BE) about it to help things go better?

Awesome questions.

Big ones. Important ones.

There's a lot to address. A lot to do and be.

I should add here that it doesn't matter age, industry, gender, race, position, profession, preference, geography – what matters most is... human.

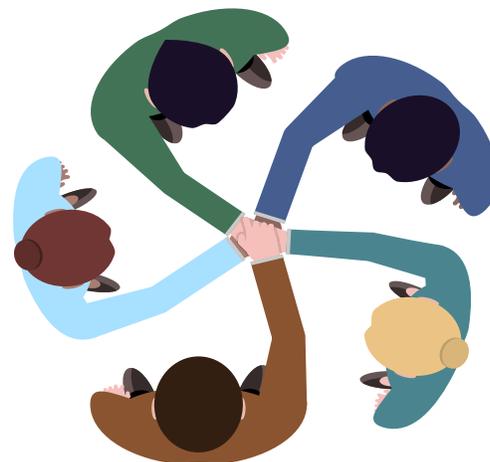
These questions are human questions.

Culture, leadership, burnout, purpose, impact,

The People Place

This Buckeye Bulletin series focuses 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 of 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.

(jtincu20@gmail.com) Thank you!



showing up, navigation, service and contribution, impact, survival, and a desire for some kind of “balance” are human things.

Culture is the energy of the container we create individually and together.

Culture is an experience. We create our own experience. From the inside out.

So we have some big influence here.

We can't control other humans or anything outside ourselves.

But... We can control ourselves.

We can't do something about everything.

But... We can do what we can do.

We can control our thinking, how we show up, how we regard others, how we take care of ourselves, and if we choose “high vibe” and “staying in the light and helping things go better” (even if it's the littlest thing), or “low vibe” and “going to the dark and contributing to things going worse” (even if it's the littlest thing).

And we can control how we act and what we do.

Whether we're talking about our organizational culture, team culture, marriage culture, family culture, the culture that lives in our own head, or culture in general... we have influence with the experience we create from the inside out through what we can control.

So since we can control NOTHING outside of ourselves...

"Me" is a powerful place to start. And I'm contagious. Because as much as I'm contagious for good, I'm also contagious for bad. I don't know if you've noticed, but when we choose high-vibe, we tend to create and attract more high-vibe and open up access to more wisdom. When we choose low-vibe we tend to attract and create more low-vibe. And narrow, or completely shutdown, wisdom. It's a superpower to expand or contract, to open up or shut down, to choose high vibe or low.

Here's a little exercise: Try this, go for one day (or a week! Do it! Do it!) without complaining (replace complaints with requests, suggestions, or even appreciations), and see how much happier and more spacious you feel. Notice how much easier it becomes to not complain as you go on. And also, how much easier it becomes to access productive and even more pleasurable solutions.

And then reverse it (if you can bear it now), complain a lot. (Even a day of complaining, or ten minutes will do.) You'll become a master. Why? Because you're training your brain and your energetic field how to see and hold the world. Wherever we put our attention, we

build.

So why not build well?

Choosing the higher vibration thought and self-care is a form of what I call “energetic hygiene.”

Our internal energetic hygiene is key to healthy leadership.

It starts with us.

I know some of you will still say – “Okay, Anese, that's all good, got it. I'll ‘show up,’ but what about ‘them’ and how do we actually create culture?”

I get it. After all, we can't do it alone, right?

So... I'm giving you, YOU here. Because really, truly, after working with thousands of humans and organizations, I find addressing you – contagious you – first, is your best bet at creating the change you want to see in the world. In fact, I don't know how you create a better culture and do more good in the world and help things go right – and sustain yourself at the same time – without tending to these things before, during, and after... everything.

So start here, and then if you want more about navigating “them” and “culture” – go check out my Inc. Column too. (But, I promise, you first will set you up more powerfully for anything you DO over there or anywhere when it comes to the “them.”)

Ready?

Here are nine things. Nine! Choose one or choose all. Bonus, within this list is something that is coming soon to support you more in these nine and showing up at even a higher level of leadership (as and if you so choose):

Prioritize self-care without further delay. Take exquisite care of yourself. You can't lead best from busy, burnout, and exhaustion. What's the LITTLEST thing you can do to up-level your self-care today?

Keep your thinking high-vibe. Choose the thought that serves you and creates expansion in your system. At every moment, with every thought, you have “choice points” – choose a thought that serves, or one that doesn't.

Find the “thank you.” If you can find gratitude – you win. Finding the “thank you” opens up more space, gives us more access to information, and puts us in a more resourceful state to figure out the next step. What is the “thank you?” I had a friend yesterday tell me he felt like “punching his colleague in the face” because he was “so annoying and disrespectful” to the team. The “thank you” in this situation? I can see five right off the bat. 1) His colleague feels safe enough to show up so honestly when he's having a rough day or disagrees with the crew. 2) My friend sees his own personal core

The People Place

values are showing up and they are fierce. (He also has an opportunity to explore why this conversation was so triggering for him. Awareness is power.) 3) He now sees a place to be in service of his colleague, give him feedback on impact, and contribute to his growth. 4) My friend, whether he agrees or not, has now been given an opportunity to consider another perspective. And, 5) they have an opportunity as a team to create some new agreements around how they work through conflict. Ahhh... more space.

For your energy, intentionally distribute it. Pay close attention and intention to how you spend your time and energy. Anything that contracts (versus expands) in your body is a sign that you're heading into an activity, agreement, or engagement that is likely not in alignment with your core energetic integrity, needs, and contribution strengths. Which means, likely not the best use of your energy, and therefore impact.

Stand tall and confident, your presence commanding. Really. Posture, breathe, being in your body can help open up more information, more courage, more strength and more credibility.

Lead and inspire without shouting or offending. Use your voice intentionally. Consider the human in front of you – whether they agree with you or not – consider the human. How can you lead and connect with them from a place of invitation and inspiration versus force? Hint: Remembering they're human, getting curious, and connecting from your heart is the first place to look.

Focus on impact and service and contribution. What do you want your leadership to be about? How do you want people to remember you? What's the legacy you want to leave that leaves the world a better place? What do you want your kids to see? How can you serve and contribute to things going well?

Don't be afraid to make the call. Ask for help. You are not in this alone. You are not. Ask for help from your colleagues and friends and family. Choose your help intentionally. Therapy, somatics, coaching, energy work, you name it, whatever you need, get it.

Don't go it alone, for together we will climb.

Yes. Like that.

Here's to showing up. We must show up first. Because yes – we are contagious.

Go get 'em.

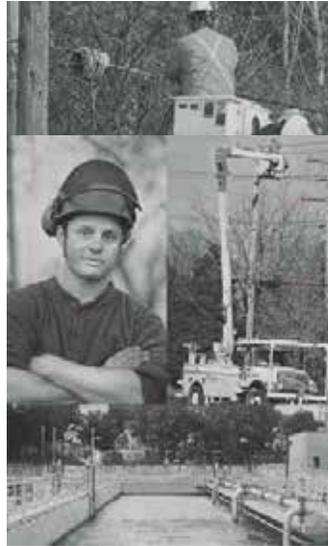
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WEF Utility Partnership Program Member Utilities

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 on to 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 anytime 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 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.



OWEA currently has 29 municipalities signed up for the Utility Partnership Program.

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

Or contact OWEA, info@ohiowea.org, 614.488.5800

Avon Lake Regional Water	City of Mason	Clermont County Sewer District
City of Bellevue	City of Newark WWTP	Delaware County Regional Sewer District
City of Canton WRF	City of Oberlin	Fairfield County
City of Celina	City of Painesville	Lake County Dept. of Utilities
City of Columbus	City of Solon	Metropolitan Sewer District of Greater Cincinnati
City of Dayton WWTP	City of Steubenville	Northeast Ohio Regional Sewer District
City of Fairborn	City of Toledo Div of Water Reclamation	Sanitation District No 1
City of Harrison	City of Troy	
City of London Ohio	City of Twinsburg	
City of Mansfield	City of Warren WWTP	
City of Marietta WWTP		



Ohio EPA has revised the drinking water and wastewater operator certification rules. Many changes clarify existing rules and several new provisions strengthen the rules. The new rules can be found here¹.

Below are highlights of some of the changes.

All certified operators are referred to as “Certified Professional Operators.”

New staffing requirements for distribution and collection systems. A properly certified professional operator, not necessarily the Operator of Record, must now visit a Class I system at least three days per week and a Class II system at least five days per week. A visit is defined and can range from a visual inspection to preventative maintenance.

Revisions to log book requirements. Records shall be maintained in hard-bound books with consecutive page numbering; well organized computer logs, which automatically document the date, time and person making entries and prevent the erasure or deletion of data; or an equivalent methodology sufficient to record the information required by rule and approved by the Director to ensure authenticity and accuracy.

New requirements to report minimum staffing times. Operators of Record are now required to report their minimum staffing times to Ohio EPA on a form approved by the Director. This is in addition to staffing, maintenance and operations information recorded in the log book. This is an important tool for Ohio EPA to determine how systems are meeting operational capability. Ohio EPA will continue to evaluate and improve reporting of this information over the next year. Guidance for reporting can be found on the operator certification website².

The only information that needs to be added to the electronic Drinking Water Reports (eDWR) or electronic Discharge Monitoring Reports (eDMR) is information that documents the facility met the minimum staffing requirement. No additional staffing time needs to be reported.

The Drinking Water reporting guidance was updated and is available at <https://epa.ohio.gov/Portals/28/documents/reporting/edwr-OperatorHours.pdf> and includes a YouTube video demonstrating how to enter the data. If you have questions, contact the Division of Drinking and Ground Waters at 614-644-2752 and ask for assistance with eDWR.

The guidance for wastewater reporting is available at <https://epa.ohio.gov/Portals/35/edmr/doc/eDMR-OperatorHours.pdf>. If you have questions about eDMR

reporting, please email EDMR@epa.ohio.gov or call the Division of Surface Water at 614-644-2001.

Attendance upload requirements for training providers. Training providers are now required to upload verified attendance through Ohio EPA's eBusiness Center. Once the contact hours are uploaded, certified professional operators will find those hours in their Water/Wastewater Operator service in the eBusiness Center.

Renewal applications are now due by November 30 of the renewal year. Certificates will still expire on December 31 of the renewal year. If operators do not renew by December 31, then they cannot act as operator of record until they do so.

Renewal applications must be submitted electronically through Ohio EPA's eBusiness Center³.

Reduction of the renewal grace period from 12 months to six months. The grace period for renewing now ends on June 30. Operators who do not renew their certificate by this date will need to retake the exam to be certified.

Requirement for applicants to review an Ohio EPA training course prior to submitting certification, exam, OIT or renewal applications. All applicants must now review an operator certification training course on the webpage. Applicants will attest to reading the document when they electronically sign their applications.

NEW RULE – Contract Operator Rule

A certified professional operator is considered a contract operator if he or she is not employed directly by the entity for whom they are providing services. All contract operators and contract operations companies are required to be approved by the Director prior to providing service as a contract operator or contract operations company. In order to apply, interested parties should submit an application and a sample contract for review. All contract operators or contract operations companies must submit the application. The new rule can be found here⁴. The application and an example contract are also available online here⁵.

Certified professional operators are welcome to use the example contract provided, by updating or removing any necessary information while also ensuring that the provisions documenting compliance with Ohio Administrative Code (OAC) 3745-7-21 are included. Only one representative sample contract needs to be submitted, you do not need to submit a contract for each client. The contract must address who is responsible and the minimum expectations for the following:

- operation of the facility;
- minimum staffing hours;
- emergency operations;
- maintenance;

Southwest Licking Community Water and Sewer District Environmental Control Facility

by Josh Holton – Lead Operator

It is not the intent of this plant profile to go in complete details of the history of the Southwest Licking Community Water and Sewer District's (District), Environmental Control Facility (ECF). For a complete and detailed history of the District refer to the 2005 winter plant profile on the ECF written by current Water Reclamation Supervisor, Mel Weaver. I will attempt a quick summarization then move forward to more of a plant update status.

The Beginnings

The District has a unique history, established in 1989 as a small rural water and sewer district under Section 6119 of the Ohio Revised Code. Its purpose was to service the southwestern part of Licking County which had inadequate or improperly working individual septic systems. After developing the necessary plans and designs to create the rural system, construction began for a 1.0 million gallons per day (MGD) designed oxidation ditch, collection system, and a 0.8 MGD design ion exchange water treatment plant and corresponding distribution network. In June of 1994, the new wastewater treatment plant began accepting flow from the collection system. Construction in the collection system rapidly grew with sewers and lift stations being constantly added as well as package plants from small subdivisions decommissioned and connected to the District.

Growth of the system can not be understated in the beginning. By June of 1997, the average daily flow (ADF) for the ECF was reaching 0.972 MGD, nearing its design capacity. Growth projections during this time estimated future plant capacity in the range of 4 to 5 MGD. However,

at this time, the newly formed water and sewer district could not responsibly build to these flow projections due to financial constraints. To address the growth, the District decided the best approach would be a phased expansion approach to ensure financial stability and still meet the needs of a growing district.

Phased Expansions

The first phase of expansion was the 1A expansion. This expansion would address multiple needs for the District. The first was the expansion of a main influent pumping station to increase capacity from 2.2 MGD to 3.0 MGD. Additionally, a new tank complex would be constructed at the ECF for flow equalization (EQ) and sludge digestion/storage. The tank complex would consist of eight 280,000-gallon tanks, six of which were to be used for EQ and the remainder sludge processing. EQ was needed at this stage because of the significant size of the collection system already. With this size, inflow and infiltration (I&I) had already plagued the district. Also, at this time a new discharge from the oxidation ditch was modified to correct freeboard deficiencies. This was accomplished by cutting a slot in the outside wall then reversing the flow direction from inside to the outside. By doing so the peaking factor was increased from 2.2 to 3.5. Additionally, the RAS pumping station size was increased to provide a pumping range of 0.5 to 2.0-time Average Daily Flow (ADF).

During construction of phase 1A, design of phase IB was already under way which would increase treatment capacity from 1.0 MGD to 2.65 MGD. To reach this design

SWCWSD Plant



flow conditions, the tank complex would be modified from EQ to secondary treatment. Four of the eight tanks would be converted to an extended aeration basin. The other four would all be utilized as sludge digestion/storage. By converting four tanks into secondary treatment, it created two parallel treatment trains of 1.0 MGD from the Oxidation Ditch and 1.65 MGD from the new IB extended aeration treatment train (1B). Additionally, a new headworks, clarification for 1B, a combined effluent complex consisting of UV disinfection/post aeration, and sludge dewatering processing with the addition of a belt filter press and covered cake storage pad were added. This phase was completed by July 2004, which has been the last of the major expansions. Plant specifics are summarized in Figure 1.

Loading Characteristics

The District has not seen much flow increase since the recession in the early 2000’s. This can be partially attributed to an aggressive attempt at reducing I&I throughout the District. However, since growth has resumed, flow has started to rise but more importantly loadings have increased, specifically ammonia loadings. The service area was originally designed as a rural service area, which is why a Total Kjeldahl Nitrogen (TKN) for the plant was designed at 25 mg/L. There is now a mix of heavy warehousing inside the service area. During inspection of loadings from some of the larger users, a high amount of load was discovered. For example, one business discharges on average 160 mg/L at a rate of 12,145 gallons per day. This equates to two and a half percent of total TKN loadings for the treatment works. Currently with our ADF of 2.1 MGD and with a design of 2.65 MGD, we are exceeding design loadings for ammonia due to the high concentrations of ammonia. In fact, just the ammonia portion of TKN, is at ninety-five percent of total design TKN loading. Since the ECF is already approaching nutrient design loadings and growth is occurring at a steadily increasing rate, the District has begun the process of considering expansion or addition of wastewater treatment plants.

Two Plants in One - Two Strategies

It is understandable in looking into the District’s past to understand how we got to where we are today but there are drawbacks. Each treatment train (Oxidation Ditch and 1B) operates as an individual plant and acts dissimilar to similar influent characteristics. Process control, plant operations, and maintenance is all doubled in operating the split treatment trains. Each plant operates off different Mean Cell Residence Times as well aeration control strategies.

The 1B aeration basin is controlled by traditional Dissolved Oxygen (DO). In the summer the treatment

train operates with one cross the line 75 HP Positive Displacement (PD) blower and one variable frequency drive (VFD) 75 HP PD blower. Conversely in winter two VFD blowers are utilized with a minimum of 38 hertz which is required for mixing of the aeration basin. The target setpoint for dissolved oxygen is 2.8 mg/L which is regulated via an online dissolved oxygen (DO) probe located in the last cell of the aeration basin. Oxygen is regulated in the first pass to the minimum required for mixing to promote an anoxic zone in the first cell. This is a very weak anoxic zone, but with the demand of the raw wastewater we have been able to achieve this. This change made in the 2013 year is noticeable as the first drop of nitrate/nitrite yearly average reduction on Figure 2.

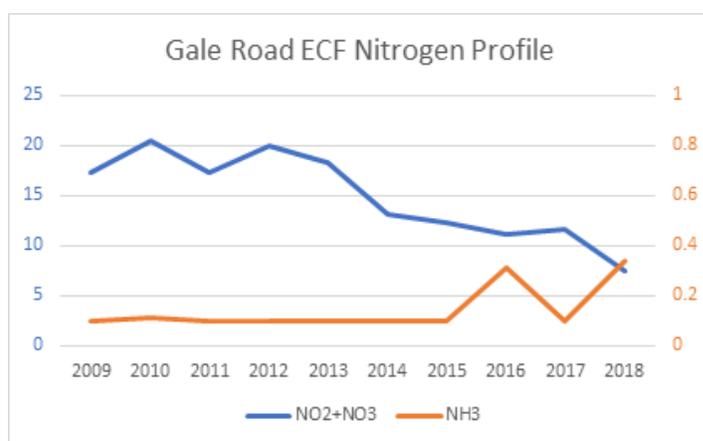


Figure 2

Typical operation control strategy for the Oxidation Ditch has remained unchanged since original plant start up, except the addition of VFD’s making changes easier. Speed for aerators was adjusted seasonally based off grab DO samples ensuring high enough oxygen for our peak loadings. This strategy started to adjust in 2016.

Ammonia Based Aeration Control

The District was involved in the OWDA study #7179 Acquisition and Development of Information Leading to the Adoption of New Ammonia Criteria and Implementation Support Tool. This study was to assess the capabilities of treatment works to meet a 0.80 mg/L ammonia limit. During the study it was noted that our effluent was consistently under 0.10 mg/L which was lower than the stream ammonia concentrations. However, the ECF effluent nitrite concentration was 2 to 3 times higher than the stream nitrate concentrations. Currently we do not have a nitrate limit, so this was not an immediate concern or compliance issue.

While discussing these results and already evaluating the reduction in the 1B treatment train, the focus shifted to the Oxidation Ditch. Jon VanDommelen of Ohio EPA

Plant Profile

Compliance Assistance Unit allowed District operators to utilize the online monitoring equipment from the study inside the Oxidation Ditch cells. The goal was to create an anoxic zone inside the oxidation ditch aeration basin. At first, the strategy was to reduce the inside aerators to minimum speed to create this anoxic zone. However, this was not very successful as we were still adding too much oxygen. Conversely turning one aerator completely off was not enough air especially during peak loading times. This was evident by the ammonia profile generated by the online monitoring equipment. To combat this, the District installed a timer on the second inside aerator to match these loading times. Success was achieved by reducing nitrate concentrations from above 20 mg/L to less than 10 mg/L. Another added benefit was energy reduction. The District was fortunate to have online energy metering in place from the Demand Response program and submetering of each treatment train. During the trial, a 26 percent reduction in energy from the Oxidation Ditch was demonstrated. At this point a business case analysis was done to show an estimated pay back of 3.1 years if the District created an online control system based on Ammonia Based Aeration Control (ABAC). The system consists of two nitrite/ammonia probes, one DO probe, a monitoring system, and a PLC to integrate all four aerators and the probe system.

District operators did the process in house to minimize costs. A control strategy was developed by District operators as well. The controls are set up as two zones, anoxic and aerobic. The anoxic zone is controlled based on the ammonia concentration in the middle pass. This controls the speed and on/off operation of the two inside aerators. Then a probe in the outside pass controls the speed of the outside aerators with a maximum speed ramp up set off a max DO setpoint in the outside pass. There is also a supersede setpoint that provides a safety net, which is based on the outside ring ammonia concentrations. If this is reached it will turn on all aerators until the ammonia in the outside ring is lowered back to appropriate levels. All set points are user defined giving complete flexibility to the operator. Currently the District is closing in on the year mark of operating off ABAC. Nitrates are now typically less than 5 mg/L with ammonia less than 0.30 mg/L in the Oxidation Ditch. Effluent nitrate concentrations have shown a 40 percent reduction despite increased loadings to the system. Additionally, the energy reduction is currently averaging a 17.4 percent reduction, or a 900 kWh/ MG treated which is significantly lower than best practice for nitrification of 1,240 kWh / MG

treated. The District fully expects the energy reduction to increase after familiarity and comfortability with the control strategy.

Future Endeavors

The plant will also be undergoing a screenings upgrade which will be completed at time of publication of this article. Debris in the treatment works has been an issue in the past. To alleviate this, a new center flow fine screen by Hydrodyne is currently being installed. This will help the removal of debris as well as handle the peaking flows more efficiently than the grinder/auger type screen

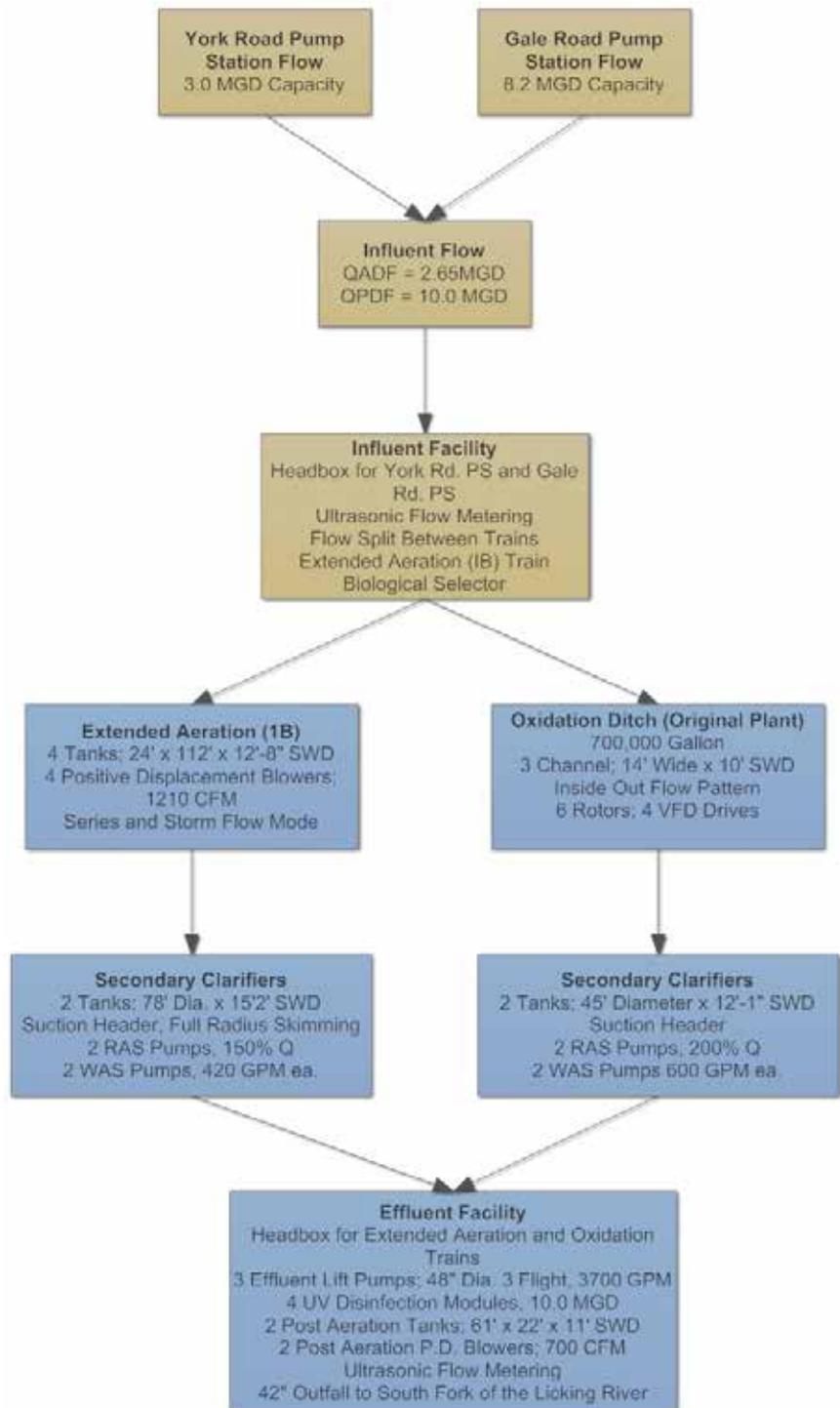


Figure 1

Plant Profile

that was installed previously. This has some potential treatment opportunities as well. Since debris has plagued the ECF, mixers have been taken offline in the 1B aeration train as well as in portions of selector zones to each treatment train. With improved screenings, it is the hope to possibly recommission these mixers to lower aeration demand due to minimum mixing requirements in the 1B treatment train.

With the growth the District has seen, improvements are also being made on the drinking water side of the District. A new Nano filtration Water Treatment Center (WTC) is currently under construction with a scheduled start-up date of January 2019. This directly affects the ECF because of the volume of reject water associated with a Nano filtration WTC. The original plan was to direct discharge reject water into the South Fork of the Licking River however this would not be permitted. The District did not want to direct the reject water to the sanitary sewer because this would take a portion of the capacity in the sewer systems. An agreement was made with Ohio EPA to install approximately 13,000 feet of force main from the WTC to the Effluent Facility of the ECF. The reject water would then get blended with plant effluent prior to discharge to the South Fork of the Licking River. By reducing Total Dissolved Solids (TDS) concentrations by moving from an Ion Exchange Softeners which consumes around 1500 tons of salt per year, TDS loadings would be reduced by 8,219 pounds per day. This would project the total blended concentration of 1025 mg/L, well below the 1731 mg/L of TDS concentration limit.

This strategy has required a permit modification with some unique sampling requirements. It was determined that an internal monitoring station 602 would be added which is the ECF's discharge. At this location all technologically based limits would be required to be met. At the 001 station, the combined discharges would be required to meet all water quality-based standards. Loadings for each would be independently calculated by adding an internal monitoring station 603 which is the daily flow from the new WTC's concentrate. It is the District's goal to have this project operational by the time of the WTC start-up; however, there is redundancy in the strategy to allow concentrate discharge to the sanitary sewer if construction goals cannot be met.

By being financially responsible but proactive regarding asset management and growth response, the District has positioned itself well to continue to serve the residents of the southwestern portion of Licking County. The location of the service area and possible future service area additions provides a bright future. I am grateful for the opportunity to assist in the growth of the District and eager to await the future here at Southwest Licking Community Water and Sewer District.



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Tartan Fields Wastewater Treatment Plant Aeration/Anoxic Upgrades & Hydraulic Capacity Upgrades

by Cory Smith, Operations Superintendent, Delaware County Regional Sewer District and Dale Kocarek, Stantec

Tartan Fields Wastewater Treatment Plant (WWTP) is an extended aeration process that began service in 1999. The original plant design is rated at 0.25 million gallons per day (MGD). The plant sits inside of a pole barn. The reason for a pole barn design was to help with perception of a wastewater treatment plant near the Tartan Fields Golf Course as well as, containing odors.



Tartan Fields WWTP

As the WWTP began service in 1999 the recommendations for treatment were based on the land application management plan that is established between Delaware County Regional Sewer District (DCRSD) and the Tartan Fields subdividers agreement. In 2013, the DCRSD was notified by the Ohio EPA that Tartan Fields WWTP and a few other WWTP's within the system would fall under a Land Application Management Plan (LAMP). The LAMP would now put requirements on operations to meet certain effluent standards. The LAMP is different from the National Pollutant Discharge Elimination System (NPDES) because the effluent at Tartan Fields is used on the Tartan Fields Golf Course for irrigation purposes. The LAMP is meant to protect the environment in which the effluent is applied. The effluent applied is considered non-potable water, therefore, those that come in contact with the irrigation need to be made aware that treated wastewater is used as irrigation.

Because of the new effluent requirements placed on the WWTP the operations staff began trying to figure out how the plant would operate in order to meet the newly acquired LAMP permit requirements. The Ohio EPA gave the DCRSD an 18 month compliance schedule that would allow staff time to figure out the best management practices within the plant in order to meet permit.

Tartan Fields WWTP was designed with three aeration tanks that should have been used as a plug flow operation. Right away staff realized that all three tanks could not be used because this would create low food to microorganism (F:M) ratio within the plant. The low F:M ratio meant that there was not enough food in the influent compared to how many microorganisms within the aeration tanks. When the food supply is limited to the number of microorganisms we would begin to see layers of foam and slime layers that would form a dense floc and eventually have an impact on clarification. Therefore, the next option was to cut back on the mass and try to operate the plant with two aeration tanks. The problem with this is that staff did not have the flexibility within the tanks to make sure the flow would be able to move from tank to tank. We decided to operate the plant with two tanks in a



parallel method. When we tried this method we would put return activated sludge (RAS) and the influent in each tank. Treatment would happen in each tank and then go directly to the clarifier. In order to treat wastewater we need to have three basic items: food, time, air. During this trial we found that we had a good F:M ratio and the oxygen was sufficient. However, what we did notice is that we did not have enough time to

nitrify.

As the operations staff and management staff started to strategize on satisfying permit conditions we thought about moving the effluent in one of the tanks to the opposite end of the aeration tank. This would then allow for a two tank plug flow system in which there would be enough time to nitrify. When this project began we also decided to install an anoxic zone. The anoxic zone would require a baffle and mixer. We purchased an Aqua Aerobic floating mixer. The anoxic zone baffle would be constructed internally. The diffusers that were in the aeration zone and would be in the future anoxic zone were removed so that they were not destroyed by the mixer. Once the diffusers were removed the baffle was constructed. The wooden baffle was constructed and installed by DCRSD maintenance staff.



Tartan Fields Anoxic Zone Baffle

Currently, the system operates at 57% of its "rated capacity," based on the original design capacity of 0.25 MGD. The plant experiences infiltration and inflow (I/I) from the sanitary sewer system during wet weather periods. During the year 2015 Tartan Fields WWTP received an average annual flow of 0.142 MGD with a low of 0.114 MGD in February 2015 and a high of 0.171 MGD in June 2015. It should be noted the average flows

for June 19-21, 2015 were all recorded as 0.264 MGD. As the flows reach these types of numbers mixed liquor suspended solids (MLSS) start to overflow the top of the aeration tank walls. This condition coincides with a condition when two influent raw sewage pumps and one RAS pump is running.

During the aeration tank upgrade construction, staff began to plan for hydraulic concerns. The operations staff has identified that during this time Tartan Fields WWTP cannot handle any flows above 0.250 MGD without overflowing the tanks. The design hydraulic peaking factors were reported to be 3.5 which is consistent using the approach prescribed in Ten State Standards. The MLSS conduit between aeration tanks and final clarifiers must carry a flow of 1.25 MGD without experiencing problems. This formula includes RAS flow. The plant was not designed with flow equalization. Influent raw sewage is pumped directly into the plant screening box from the influent well outside. To combat these high flow instances with the design of aeration tanks at Tartan Fields, staff decided to use the third aeration tank that was not in use for treatment as an overflow tank. In 2015, 8" PVC pipes were installed to help balance out the treatment tanks one & two. During high flows when the treatment tanks start to overflow they flow into the overflow weirs and into the third aeration tank which is considered the overflow tank.



Overflow into third aeration tank

The Tartan Fields development depends on the Tartan Fields WWTP to provide a service. During investigation of the plant hydraulic issues and on an 18 month compliance schedule with the OEPA, development did not stop. In fact, the DCRSD was in a situation where we needed to honor development agreements to add more flow. Therefore, DCRSD hired Stantec to complete a study at the Tartan Fields WWTP that would focus on the hydraulic issues within the plant. The study that Stantec performed was a baseline for existing hydraulic capacity, preparing a hydraulic grade line, identifying bottlenecks within the system, and prioritization of upgrades.

DCRSD wanted to ensure that the solutions to fix the hydraulic issues were simple and that in-house resources were used. Therefore, DCRSD hired a small contractor

to complete a few projects that could not be performed internally. Decisions on the plant upgrades were made by county staff and contractor. Time was a factor as well. Because of the nature of this project in dealing with high flows the county decided that not having design plans in place saved a lot of time.

Stantec found that there was only 4.5 inches of head loss between the aeration tanks and final clarifier effluent weir. This lack of good head loss and different bottlenecks within the plant is what is causing the plant to back up. There were a few major discoveries made that both Stantec and DCRSD felt we could eliminate quickly. These discoveries would help create necessary head loss and bottleneck improvements.

Discovery 1: The aeration tank 8" effluent pipe caused approximately 6" of head loss. During normal flow conditions, line velocities drop below 1 foot per second (FPS), which may contribute to build up of debris in the line during low flow conditions.

Solution 1: Increased the 8" effluent pipe to a 12" effluent pipe. This was completed in order to help create more velocity through the pipe. This 12" pipe was ran from the aeration effluent to the clarifier. An 8" cleanout was also added so that we are able to clean the pipe as needed in case of debris buildup in the line.



New 8" Clean Out. Used former clarifier influent valve as cleanout.

Discovery 2: Aeration effluent exhibits poor outlet control. The outlet for aeration effluent was configured as a standpipe and because of the hydraulic nature the effluent has a vortex characteristic. This vortex characteristic limits flow and promotes air entrainment. To release entrapped air the county did attempt to put in a few air release pipes. The air release pipes are too small.

Solution 2: The aeration tank effluent outlet had to be modified in order to prevent head loss and air entrainment. Between the operations manager and contractor an aeration weir box with slide gates was designed and installed. The weir gates can be manually adjusted based on the flow in the plant. This design helps reduce the air entrainment within the effluent by eliminating the vortex characteristic.

Tartan Fields Aeration Effluent Weir Box Install



Discovery 3: During Stantec's study they found that the hydraulic grade line between the Aeration Tank System to the Final Clarifiers is only 0.38 feet of drop. Stantec states, that normal design practice is to provide a non-submerged weir, with an aerated nappe of at least three inches under the weir, to promote good hydraulic control and allow a minimum of three inches of head build up on top of weir.

Solution 3: The hired contractor lowered the final clarifier

weirs by three inches. Because of the clarifier design this is all the room we have unless major construction is completed. Overall the goal is to allow more freeboard for the aeration tanks. The typical design practice would be more than one foot of vertical drop between the Aeration Tank System and Clarifier. With the work being done internally by DCRSD staff and contractor the three inch weir drop has made significant improvements.

Since the above improvements have been made at the Tartan Fields WWTP there has been only approximately 5 feet of MLSS overflow in the spare aeration tank. While this is great news and the operation staff has done a nice job operating the plant, after all improvements have been completed, DCRSD is not finished. The long-term plan for the Tartan Fields WWTP is intended to be a future initiative for the Delaware County RSD. A recent Request for Proposal has been awarded to an engineering firm to continue with the improvements at the WWTP for future growth. Within the long term improvements, the design team will look at the following items: Raw Sewage Pump Station, Flow Equalization, Screening Structure, Aeration Tank System/Operational Flexibility, Final Clarifier/RAS Pumping, Continued Hydraulic Improvement Concerns, and Electrical System Capacity.



Tartan Fields WWTP Clarifier #2 Weirs Lowered



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The Sinking Caisson Method

Excavation Support Solution for 'Bad' Ground

by Aaron J. Smith, PE, CCM, H.R. Gray – A Haskell Company

When a challenge meets innovation, an opportunity can arise. Excavation support for even the smallest of utility construction projects can be challenging. Managing multi-million dollar utility installations at depths of 50 feet, 100 feet, or deeper, excavation support can flat-out make-or-break a project. Oftentimes contract documents leave the design of temporary excavation support in the hands of the contractor allowing competition, ingenuity, and creativity to deliver engineering solutions for even the most difficult project conditions. The Northeast Ohio Regional Sewer District (NEORS) is seeing successful application of an innovative approach to excavation support in “bad ground” conditions called the Sinking Caisson Method.

Headquartered in Cleveland, OH, NEORS is in the seventh year of “Project Clean Lake”, a three (3) billion dollar, twenty-five (25) year EPA Consent Decree program with the ultimate goal to ensure 98% of wet weather flows entering the combined sewer system receive treatment, thereby dramatically reducing raw sewage discharges into Lake Erie and adjacent waterways. Project Clean Lake consists of multiple large-scale projects including deep underground Combined Sewer Overflow (CSO) storage tunnels, major upgrades to wastewater treatment plants, and full-scale capacity increases to the interceptor sewer system. Approximately \$1.2 billion of construction projects are currently either in-progress or have been completed under the program. Of all the work going on at NEORS, construction associated with Project Clean Lake is arguably the most high-profile.

Despite all the public attention on Project Clean Lake, NEORS’s influence reaches much farther than just the shores of Lake Erie. With over 380 square miles of service area including the City of Cleveland and all or part of 61 surrounding communities, there is a wide network of existing sewer infrastructure that NEORS

must continually maintain, operate, and upgrade. Considering all the new construction and existing system maintenance and upgrades, there is never an off-season for NEORS. With a majority of its assets underground, excavation and the support thereof are regular challenges that NEORS’s contractors need to face head on.

For NEORS’s deep excavations and shafts, contractors have commonly utilized methods such as interlocking steel sheet piling, steel H-piles and lagging, and steel liner plates with steel rib reinforcement to provide earth support. Alternative methods such as augered cast-in-place concrete secant pile shafts and slurry wall shafts have also gained popularity on over the last few years. Once in a while, a contractor will propose an idea that NEORS has never encountered on a project before. Such was the case for the Sinking Caisson Method.

For two projects, Westerly Low Level Relief Sewer and Kingsbury Run Culvert Repair, Ward and Burke Construction, an Ireland-based contractor and relative newcomer to NEORS, proposed the use of a ‘Sinking Caisson’ design to solve the excavation support problem in difficult geotechnical conditions including garbage fill, a high groundwater table, and hazardous waste. As per typical NEORS practice, the contract documents stated that means and methods of Temporary Excavation Support were the responsibility of the Contractor. NEORS was cautiously receptive to the unfamiliar method and the work proceeded accordingly.

The Sinking Caisson is a simple concept. An open-bottomed reinforced concrete structure (segment) is cast on the ground surface, excavation is performed inside of the segment, and gravity does the work of lowering the segment to the excavated level via the self-weight of the segment. A repeatable process, this method can be used to build shafts of considerable depth by casting additional segments and continuing the excavation. Though the



Cast-in-place concrete segment is constructed on surface.



Excavation commences within the Caisson.

Technical Article

concept is simple, the work is not easy; there are many factors that must be controlled to produce a successful Sinking Caisson shaft.

The Initial Segment is the most critical component of any Sinking Caisson structure. To minimize contact surface area between the bottom of the Initial Segment and the earth, a steel cutting shoe is incorporated around the outer edge of the caisson bottom to establish a bladed shape and protect the leading edge of the caisson. Once inside segment face forms are set and prior to installing the outer face forms, aggregate material is mounded from the cutting shoe upward on an angle to the inside form. This is done so that when the initial segment is cast, an angled segment bottom is created which slopes outward toward the cutting shoe further enhancing the blade-shape effect. Constructing the segment bottom in this fashion allows access for the advancing excavation to be performed completely to the outside edge of the caisson.

Once the Initial Segment is cast and the forms are stripped, the contractor must address the next critical factor: control of alignment and plumbness. This can be accomplished through use of a cast in place concrete perimeter guide wall/collar. To ensure the caisson has adequate annular space to advance through the guide wall, a bond breaker (which can be as simple as 1-inch-thick insulation foam board) is secured to the initial caisson segment, and the concrete guide wall is cast around the segment perimeter to designed depth (Note: Ward and Burke's guide walls were typically between 2-feet and 3-feet tall). The completed guide wall serves to maintain the location of the top of the caisson and prevent it from wandering off-line or out of plumb during excavation advancement.

Casting of additional segments is subject to the need of the design. If water-tightness is critical, water stop can be installed at the segment-to-segment joints; PVC water stop can be cast into segment top or Hydrophilic water stop

can be placed prior to casting the next segment. If caisson wall penetrations will be required (ex. Intermediate tunnel shaft), 'soft eyes' can be installed strategically to create locations that can easily be removed later. Soft eyes may be constructed of masonry block or other material that is more easily removed than the reinforced concrete of the caisson wall yet can still withstand the sinking caisson advancement process.

After a segment is cast, the excavation within the caisson proceeds. Once the excavation has advanced to a depth equal to a segment-length, excavation is halted, a new segment is cast, and the process continues. This repeatable process is performed until the caisson is advanced to design depth. Typically, a concrete base slab/mud mat is cast at the bottom of the shaft. As the caisson bottom has been constructed with an outward facing slope, this base slab installation is a great way to lock in the bottom of the excavation. With the caisson advanced to design depth and the base slab cast, the finished product is a clean, dry, circular concrete shaft in which to perform work.

Ward and Burke successfully installed sinking caisson shafts on the Westerly Low Level Relief Sewer and Kingsbury Run Culvert Repair projects, reaching depths up to 65 feet with shaft inside diameters of 15 to 20 feet. The shafts were used to facilitate microtunneling operations, providing intermediate access points to deflect the tunnel alignment and install manholes for sewer consolidation. The benefits that Ward and Burke saw from using this method included overall water-tightness in the finished shaft (even though no waterstop was used!), minimized exposure of workers to the unsupported shaft excavated face, and minimal ground displacement and loss. Shaft excavation was even able to be advanced "in the wet". As the excavation progressed, there was a threat of heaving of the shaft bottom due to soil conditions and groundwater pressures. To mitigate this the contractor was able to flood



Excavation can even proceed in bad ground (Note the tires within the excavation).



Self-weight lowers the Caisson via gravity during excavation. Cast a segment on the surface, excavate, allow the caisson to sink, and repeat the process until design depth is achieved.

the shaft with water to equalize pressure and continue excavation underwater using a clamshell bucket. Once the caisson was advanced to design depth, the concrete base slab was placed underwater via the tremie method utilizing a self-leveling concrete mix design.

The sinking caisson method is not a solution for every situation. Existing utilities can pose a problem as a caisson cannot advance through an existing line. Utilities should either be relocated prior to construction or the project should be designed to avoid them. Also, the Sinking Caisson is a soft ground solution; bedrock will prohibit advancement of the caisson. However, in cases where soft ground transitions to bedrock, the sinking caisson can be installed in the soft-ground portion and provide a suitable form anchor for casting concrete compression rings as the bedrock excavation progresses. Finally, cost is a factor that should always be considered, though one should keep in mind the potential project savings of sinking caissons as they do not require extensive dewatering or ground improvement to facilitate installation.

NEORS D has shown a willingness to embrace innovation, exemplified in two recent 'firsts': First Curved Microtunnel in the Midwest U.S. (Dugway West Interceptor Relief Sewer, Cleveland, OH), and the longest S-Curve Microtunnel in the U.S. (Kingsbury Run Culvert Repair, Cleveland, OH). Ward and Burke's performance successfully using the innovative Sinking Caisson method to solve difficult soft ground conditions has given NEORS D confidence in using the innovative

method again in the future. One interesting development is that NEORS D has discussed the possibility of using the Sinking Caisson method for permanent work, with the caisson itself acting as the outer structural wall for manholes, vaults, and similar structures. A truly custom method able to be designed to any dimension, the Sinking Caisson method could be a great way to install structures in areas with less than ideal soft-ground conditions. With NEORS D's Project Clean Lake Program to continue to the year 2036, there is ample opportunity to continue exploring innovative possibilities like the Sinking Caisson Method.



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Into the Future of Water Utilities: Advancing, Evolving, Reinforcing

by Jason Tincu, Greene County

“Water is the driving force of all nature.” ~Leonardo da Vinci

Introduction

Water is the lifeblood of our existence. Without it, we would perish. With it, we shall thrive. Water fuels our bodies, societies, advancements, and future. At the global level, access to clean water and effective sanitation is still a challenge in many parts of the world. In the United States and developed nations, the challenge is more so how to advance, evolve and reinforce our water utilities, infrastructure and water quality metrics. The following piece will highlight what an effective and resilient water utility means to local communities, how to go about guiding a water utility toward such an auspicious goal, and some of the top challenges (and solutions) that water utilities are facing.

Water utilities serve as the lifeblood of their regional communities. It's often said that the water utility is the first asset built and the last one to shut down due to its importance and contribution to the local community. Without access to clean, plentiful drinking water and water reclamation services, every community function is compromised: economic development, police and fire services, tourism, environmental management, housing, recreation and parks, and so on. The future of our communities is directly tied to the resiliency and effectiveness of our water utilities.

Overview

The management of a water utility can be simply analogous to the management of a family household. Similar to a household, a water utility has a set of assets that need managed, a set of human resources that need nourished, a set of policies and procedures to adhere to, limited financial resources, a set standards and expectations to meet while being guided by a leadership team (parents or guardians) who are deploying discipline, empathy, passion, support and guidance.

Many top performing water utilities are using global models such as the Utility of the Future or UOTF (<https://www.nacwa.org/resources/utility-of-the-future>) to guide their policies, procedures, and decision-making. The UOTF model provides a framework to “embracing and implementing innovative approaches and technologies—related to energy production, water reuse, green infrastructure, non-traditional partnerships and more—in order to improve sustainability and environmental impact, while lowering operational costs, increasing revenue and helping boost the local economy.” (UOTF website)

Challenges

Water utilities across the US face a series of challenges – globally, regionally and locally – that pose threats and impediments to executing the mission and vision of the organization. These challenges vary depending on a number of factors: environmental features, municipal structure, local demographics, utility age, growth potential, etc. Below are some of the most pressing challenges as it relates to Ohio water utilities.

Workforce

“You win with people.” This Woody Hayes quote signifies the difference maker for water utilities. Human resources make a water utility successful, every area and discipline: administration, engineering, O&M, customer service, public education and so on. Workforce initiatives such as training and development, mentoring, succession planning, knowledge transfer, leadership development, and employee retention and recruitment are vital for meeting organizational standards and expectations. Considering the expected ‘brain drain’ within this industry (loss of up to 60% of the workforce in the next 10 years), such workforce initiatives should be strongly considered as a top priority.

Financials

Water utilities across Ohio are all facing financial strain due to a number of factors: conservation and reduced billings, elimination or reduction of state and federal funding, aging infrastructure and increasing need for reinvestment, public pressure, regulations, regional competition for development, etc. Developing a comprehensive and fluid financial strategy including billing projections, cash flow analysis, capital improvement planning, and debt/bonding forecasting is a must due to the factors noted above.

Asset Management

Water utilities are comprised of tens, if not hundreds (or more) of millions of dollars in assets: pipes, mechanical and electrical equipment, tanks/structures, etc. Inventorying, assessing, evaluating and prioritizing replacement schedules is currently one of the biggest challenges for water utilities and is now scribed as a regulation for public water systems (Ohio's Senate Bill 2). Asset management programs help water utilities to manage assets and prioritize reinvestment.

Regulation

Over time, it can be deemed necessary to increase environmental or regulatory standards for water utilities. New regulations usually come backed with technical background data and support, can be affected by local, state or national political influence, and can force financial and operational burdens on water utilities. Initiatives that may immediately affect Ohio water utilities are the asset management requirements set within Ohio’s Senate Bill 2 and the consideration of a statewide phosphorus discharge limit for wastewater facilities. The current state and national climate for new regulations above and beyond these is not aggressive; but could change over time.

Regional Planning and Capacity Assessments

Water utilities, especially large countywide systems, must take a proactive approach when developing regional planning and capacity assessments. Urban service boundaries and Section 208 plans must be adhered to so that water and sewer services meet the need of regional development. The last thing that any municipality wants

to do is to lose out on a community investment and economic development opportunity due to poor planning and implementation on the water and sewer side.

Public Education and Engagement

Over the decades, many will argue that, as an industry, the water industry did an inadequate job at education and engagement of the public about services and benefits provided. With today’s reliance on the internet, social media, and public engagement, many water utilities are investing more and more into public education and engagement efforts to promote their brand, rally support and educate their customer base.

Obviously, this piece is not all encompassing. Feel free to share your thoughts, comments, and opinions. Cheers—JT

Jason A Tincu: Utility Expert, Coach, Change Agent, Mentor

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Cincinnati State's Environmental Engineering Technology Program Offers Opportunities

by Barbara Browne

Obtain an operator's license, earn that college degree, develop new skills, get that promotion!

These are just a few of the benefits that are possible through Cincinnati State's Environmental Engineering Technology (EVT) Program.

Many years ago, 1995 as a matter of fact, there started a great relationship between the Metropolitan Sewer District of Greater Cincinnati (MSDGC) and Cincinnati State Technical and Community College (CState). What this relationship brought to the table was a union that saw many Plant Operators at MSDGC receive an Associates of Applied Science degree in Environmental Engineering Technology (EVT) plus Water/Wastewater (EVTW) as well as receive their wastewater licensure from the Ohio Environmental Protection Agency (OEPA). This was the brain-child of Dr. Ann Gunkel (Cincinnati State - EVT Program Chair) and Charlie Kane (MSDGC - Treatment Supervisor). Today (23 years later) there is still a need more than ever for this training/educational relationship.

Now let's go back and see why and how this relationship started. Years ago, in the water/wastewater field, degrees were not very important. Most Plant Operators hired before the 1990's probably did not hold a high school degree, let alone a college degree. Why was this found to be true? The lack of automation had much to do with this fact. Plant Operators walked the plant hourly to make "their rounds" and check the equipment by utilizing their senses (touch, sight, smell, and hearing). Lord, let's not include that sense of taste, but unfortunately, some of us have had that old proverbial sh** bath that just might have included our sense of taste (yuck).

Plant Operators' roles have since changed with the automation of the plant's equipment. Supervisory Control and Data Acquisition (SCADA) has truly helped this movement to get equipment automated and monitored via the computer screen, which is something I was very unfamiliar with in my professional life. With this automation, companies started looking at the importance of Plant Operators and their knowledge of such automation and computer skills. The water/wastewater field was becoming more technologically challenging to employees and companies needed to find a way of developing their operators to meet these new challenges.

Charlie Kane saw a need for more educated operators and approached Dr. Gunkel. Between the two of them, a water and wastewater major was developed under the EVT Program that helped "groom" operators to become more knowledgeable in the field of wastewater. These operators would learn how to manage this new field of automation taking over the field of water/wastewater. The program was set up to also help the operator study to take their OEPA exam in Columbus to achieve licensure in wastewater, as well as earn CEUs to maintain current

licenses. The relationship was strictly between MSDGC and CState. Greater Cincinnati Water Works (GCWW) would come into the relationship when MSDGC and GCWW merged to become one entity. Employees were also able to earn a Stormwater Management major (EVTS) and an Environmental Safety & Security Certificate (EVTSC) when they were added in 2010.

Charlie and Dr. Gunkel spent a lot of time, with input from the Advisory Board, developing just the right classes that operators would need to become better at their jobs. For example, in the Environmental Microbiology course, an operator could learn how to utilize the microscopes at their plant to see the health of their wastewater. This can be easily accomplished by looking at what microorganisms are in the wastewater. Another example was Environmental Sampling. This class taught students how to utilize various instruments to collect and analyze their wastewater. The Operation of a Wastewater Treatment Plant course did just what the title suggests. The course was designed to give a student the overall treatment process and explain how to operate the various processes. Field trips were very important in this class so the student could see the process in action. Calculations for the Wastewater Operator course helped teach the math to the students in wastewater language and formulas. Besides just taking degree specific courses, the students had to take core classes such as English, math, public speaking, social science and others.

Employees have mentioned how seamless the process was to sign up for the classes so the "old-timers" wouldn't be intimidated to become a college student. Books were purchased for their class and a "runner" from MSDGC would pick them up and distribute them to the students. Parking passes were paid for initially. Originally, the classes were even held at the main plant so employees could attend with missing minimal work time (saved travel time up and back from the college). CState students who did not work for MSDGC came to the plant to attend the class if they signed up for it which was a plus for the college. Some students who were undecided in their major were swayed once they saw what MSDGC was all about. A measure of the program's success was the amount of employees' recommendations to others, the increase in licensed operators (Wastewater Licenses I-II-III and IV), promotions from within MSDGC (now meets education requirements), and the rise in college graduates of the employees. There was a chance of losing employees to other companies but MSDGC took pride in having this perk for its employees and kept their employees by paying them competitively.

Unfortunately, the contract between MSDGC and CState ended in 2017. Employees now must use tuition reimbursement and pay for their own books and parking to earn their degrees while juggling work and home

commitments. As a former EVT student, a former MSDGC employee, and now an adjunct at CState in the EVT field, I see a decline in the enrollment from MSDGC employees. This breaks my heart because I know how valuable an education is, no matter who pays for it. I see people flunking probation because they cannot pass the OEPA exam. It is a requirement of MSDGC for employees to have a WWI license or an Operator in Training (OIT) status by the end of the probation period or the employees lose their job. During the 22 year contract, over 400 MSD/GCWW employees participated in the EVT training/educational program; many earned their degree and licensure for skill

advancements.

My hope is that operators and the new management of MSDGC read this article and take an interest in the future of MSDGC so the operators can pursue their educational dreams. Sign up for your EVT degree at CState and go after that promotion you have been dreaming about. Who knows, this could be the start of something even bigger and better like a Bachelor of Science followed by a Master's degree? For more information on the EVT, EVTW, EVTS and EVTSC programs through Cincinnati State, please contact Dr. Ann Gunkel at (513) 569-1783, or ann.gunkel@cincinnatiastate.edu.



ROLL CALL

NATHAN COEY

has started a new position as the Utility Director for the City of Wooster.



JASON TINCU

has started a new position as the Director of Greene County Sanitary Engineering.



CHRISTEN WOOD

has started a new position as Operations Administrator for Summit County Department of Sanitary Sewer Services.



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Understanding Ohio's Nutrient Puzzle: One Water Ohio Nutrient Forum Debrief

by Jason Tincu, Nutrients Chair

Background:

On August 28, 2018, a diverse group of stakeholders and subject matter experts gathered at the Ohio Water Environment Association (OWEA) and Ohio American Water Works Association's (OAWWA) #OneWaterOhio conference in Columbus, Ohio to discuss challenges and opportunities in attempting to solve Ohio's Nutrient Puzzle. The initiative was instigated by the OWEA's Nutrient Committee and was part of a phased approach at supporting the state's nutrient management initiative. OWEA's efforts are aimed at education, collaboration, facilitation and general support to various state agencies and decision makers. The first phase, understanding Ohio's Nutrient Puzzle, is highlighted below. Phases 2 and 3 will be rolled out later by OWEA and are briefly mentioned below in the action items section.

The Session:

#OneWaterOhio's Nutrient Forum was facilitated by Mr. George Hawkins, former farmer, regulator and General Manager of DC Water and current president and CEO of Moonshot LLC. The goal of the session was to put a 'bunch of really smart people on a panel to speak about differing perspectives on Ohio nutrients' including professionals from regulatory, agriculture, environmental science, utilities and technology and 'allow George to pick their brains'. A full list of panelists is below:

Sarah Hippensteel Hall, Miami Conservancy District; Bryan Humphreys, Ohio Pork; Bob Miltner, Ohio EPA; Libby Dayton, Ohio State University; Todd Danielson, Avon Lake Water; MaryLynn Lodor, Cincinnati MSD; Kirk Merritt, Ohio Soybean; Darin Wise, Columbus; Tiffani Kavalec, Ohio EPA; Guy Jamesson, retired; Rachel Lee, Ostara; Candice Bauer, US EPA; special thanks to Stacia Eckenwiler, Columbus; Beth Toot-Levy, GeoSyntec; Adam Sackenheim, Fairfield

The 90-minute conversation weaved in and around the subject areas of OWEA's role in nutrient management, lessons learned from other regions, existing conditions in Ohio, the history and state of agricultural practices, the utility perspective, available technologies, regulatory approaches and general nutrient-related discussion including audience participation.

Session Takeaways:

Spirit of Collaboration:

Overall, there is a great spirit of collaboration at the managerial and technical levels. All representatives

expressed both concern and interest in working to solve Ohio's Nutrient Puzzle. The main challenge seems to lie at the political level.

Dataset:

The state of Ohio has a great dataset to work from. Between NPDES data, Ohio's recent statewide mass balance as well as Ohio EPA's supplemental data, much of Ohio is modeled and tracked as far as sources, loads and conditions.

It's a Tough Time to be a Farmer:

Between increased pressure for efficiency (competition), the effects of recent trade tariffs and negative press regarding nutrient impairment, it's a very tough time to be a farmer. There is an urge to do things smarter, faster, better-but resources and funding can be a challenge. Improved nutrient management techniques on the agricultural side must be considerate of these issues to prevent pricing ourselves out of the global market.

Nearfield and Farfield Impairment Issues:

Environmental scientists and regulators concede that there are both nearfield (receiving streams) and farfield (final discharge into Lake Erie and the Gulf of Mexico) issues that need to be considered in our nutrient management approach. Summertime low flows show nearfield impairment while farfield hypoxic zones are even more obvious an issue.

Innovative (and Increased) Agricultural Controls:

For decades, farmers have attempted to 'do the right thing' by implementing tricks such as no-till, cover crops, measured fertilizer and manure applications, separation distances, etc., and in some cases, have made a positive impact. However, these techniques, cumulatively, have not tipped the scales for today's conditions and practices. Agriculture must look to implement innovative and increased controls in order to reduce the massive loadings that are sourced to the edge of field.

Progressive Regulatory Approaches:

Traditional regulatory approaches, singular NPDES limits, general permits, etc., tend to do well for conventional pollutants. However, nutrients are a beast of their own that require some outside the box thinking. Regulators should consider progressive approaches such as bubble or watershed-based permits, trading programs (point and non-point), watershed action plans and others to maximize impact and reduce local investment.

Funding Considerations:

Nutrient controls are not cheap, regardless if they are at edge of field or at a POTW. Utilities are already taxed with obligations related to wet weather including massive consent decrees, traditional pollutant controls, rehab and replacement of existing infrastructure and upkeep of service growth and community development. Agriculture is also under their own, aforementioned pressures. Ohio is at a place where it needs to reduce Lake Erie loading by 40% and the Ohio River basin to some capacity as well. Funding options such as federal subsidies, statewide program fees, grants and other wide-ranging, equitable sources must be considered.

Next Steps:

OWEA Nutrient Committee:

OWEA is currently assembling their Nutrient Committee. This committee will be charged with the task of solving Ohio's Nutrient Puzzle alongside diverse stakeholders and state agencies. The commitment is estimated at six meetings per year and the coordination of an annual workshop. Please email me at jtincu20@gmail.com with any interest in participating.

OWEA Nutrient Workshop:

OWEA just hosted its inaugural Nutrient Workshop on November 13th in Columbus. The agenda focused on solutions to Ohio's Nutrient Puzzle.

Ohio's Nutrient Puzzle Phases 2 and 3:

After better understanding Ohio's Nutrient Puzzle, we will work into Phase 2, solutions, during the aforementioned workshop and Phase 3, implementation strategies, as we move into 2019 and beyond.

Thanks for your time, attention and interest in the subject at hand. Feel free to comment or contact me directly with any comments, questions or concerns.

Kind Regards, Jason Tincu (OWEA Executive Committee and Nutrient Committee Chair)

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A YP's Lessons Learned & Bridging the Experience Gap

by Amy West, Project Engineer, Brown and Caldwell

February will mark my two-year work anniversary of being hired as an engineer for the first time. I will undoubtedly remind my co-workers at Brown and Caldwell how just 30 days prior to receiving the offer, I posted to social media my horoscope for the month which read, “January will see you making money. Career too will progress well,” followed by my snarky remark, “30 days to get a job!” At the time, I had just moved back in with my parents after living in Washington D.C. for six months where I worked as a baker. I had no leads on an engineering job (or any job), and while I was so grateful I had a family that could help me out, moving back in with my parents was hard. Thirty days to find a job felt totally impossible. But it happened, and I love the work I get to do every day! Working as an engineer in an office environment was completely new to me and I may only be two years in, but I have learned so much within that short time. I’ve worked in a variety of industries and one thing is certain...I belong in the water/wastewater industry! A lot of my enthusiasm for the work that I do stems from the people I get to meet and work with every day. My passion is deeply rooted in the potential for great things to happen within the industry to help communities adapt to changing climates. However, this potential can only be tapped when we decide to work collaboratively and effectively share information.

This article is based on a presentation which originally was called “Bridging the Generational Gap”. I was tired of members from different generations blaming the other for problems and refusing to work together instead of learning from each other. After a few failed attempts to deliver this idea to small groups, I was disheartened. I believed that this was such an important topic, but I couldn’t figure out how to talk about the generational gap in the workforce in an amiable way. I ended up offending people even though my intention was to break down stereotypes. Thankfully, one of my trusted mentors was able to make it click for me. I realized that the “generational gap” was really one of many types of “gaps” that are everywhere: generation, gender, race, or language, but the issue is the same – they prevent the sharing of information and experience. They are walls, where there should be bridges. So instead of learning from our mistakes and improving our ideas, we get stuck in a repetitive cycle of slow progression.

How do we change this? How do we bridge the gap? We must continually work to improve our understanding of each other by building authentic relationships and engaging with the people around us. I hope that by sharing my following experiences in the past few years will aid in building those bridges that we do desperately need.

Multiple Mentors

I credit a lot of my success to my mentors who I can confide in and trust to have my best interest at heart.

One mentor of mine was among the first people at Brown and Caldwell to make me feel like I was doing the whole “engineering” thing right, and their words have stuck with me during every time I start to doubt myself. But I have multiple mentors, and I have found that having a variety of mentors allows me to see many different sides of the industry, helping me to figure out what my career goals might be and how they might change in the future. I see it as, “How can I select a future for myself without seeing all the possible options?”

Finding someone you connect with may take time - it’s something that needs to happen organically and can’t be forced. Mentoring programs and meeting people outside of your circle are great ways to connect with people that can be mentors and mentees. At Brown and Caldwell, we have a program called Mentor Circles which is a group learning system where all participants understand that they have something to learn and also have something to teach. The Mentor Circles have provided a space where I can present new ideas, ask for advice when I need it, and receive unbiased feedback. In fact, my Mentor Circles group helped me improve the idea of “Bridging the Generational Gap”. I know I wouldn’t be as successful as I am today (and I still have a lot to learn) if it wasn’t for the willingness of my mentors to share their knowledge with me.

Continue to grow

I often hear people talk about plateaus that they reach after years of work. They have become good at what they do but stay at a good enough level which has led them to “burn out”. They are good enough at what they do and do it efficiently. However, they no longer feel the drive they had when they started. This is what can happen when we forget to take time to reflect on our work and enhance our skills which allow us to grow. I get it, life is busy, and it often feels like we don’t have time to make mistakes. But the problem is that if we are always performing then we are unable to improve. So how do we escape the cycle of doing work followed by more work, especially if we have deadlines to meet? We can start by taking small steps when risks are low. For example, make a goal to learn (and use) one new word a day. Or, if you have a stack of unread magazines on your coffee table that you will “one day get around to reading,” make a goal to read one article every two weeks. If you are willing to dedicate so much time to your place of work, you should also be willing to invest time in yourself to grow. Ask the most successful person you know what they do to better themselves – you might be surprised how easy it can be.

Learn your organization's values

Finding a company whose values aligned with mine was very important during my job search, and I am often reminded that I made the right choice in joining Brown

and Caldwell. But organizations are often a lot more than what is advertised. If you are a YP, you might have the opinion that for now, putting your head down and completing all the work that is given to you is fine – you’ll worry about the economics of business when you have more experience and your role requires it. However, a better understanding of your organization’s values will show you how to better position yourself to contribute more, earlier on in your career. This is also applicable to the industry as a whole. Demonstrating that you not only understand the “what”, but also the “why” behind your work will help you elevate your contributions and show that you care about your work. Speaking to other YPs and asking what they value has given me the opportunity to understand what they consider success and how business models could shift to better accommodate them. This has allowed me to be an advocate for new employees and contribute to improving their experience.

Be authentic and be yourself

During the first few months as a YP with no prior office experience, I felt completely lost when it came to how to professionally interact with people in the office. I wanted my co-workers and peers to take me seriously, but I also wanted to use exclamation points and smiley faces in emails. It took me awhile to stop feeling intimidated and remember that those on the other side of the emails were just people! Be appropriate but be yourself. Embrace what makes you “you” and own it. Be genuine in all that you do, and people will notice and appreciate it. When you show your genuine self, others respond by doing the same, which develops trust and strengthens relationships.

I am a very curious person who will ask way too many questions if you let me, and as an engineering consultant, I anticipate that someone at some time is going to think that I am only asking these questions to obtain sensitive information. It bothers me that I would make someone feel that way. I must remind myself that I cannot control how people react to my actions, but I can control my intent. In my experience, people can tell I am sincere and in return, are sincere as well. Authenticity is the support beams of the bridge between people.

Be hungry but know when your stomach is full

I am a true believer in saying yes and taking every opportunity, and as a YP, I want to demonstrate that I am hard working and dedicated to my job. However, knowing when to say no is a skill that is usually learned the hard way. My advice to anyone new in the workforce is to demonstrate quality rather than quantity. Favoring quantity is a quick way to burn out early in your career and can also come off as ingenuine ambition. Take your time to invest in your work. Even if you make mistakes, your mentors will see that you care about what you’re doing and willing to put in the effort. Additionally, spending your spare time investing in yourself rather than using it to catch up on producing high quantities of low quality work will improve your ability to take on more work in the future. The ability to produce quality work is the foundation of trust for relations within your career.

What will be your legacy?

I’ve talked about how important I believe mentoring is, but it wasn’t until my final year of college that the power of mentoring revealed itself. While studying at Ohio State University, I signed up for a class called, “Women in STEM: Leading with Confidence.” I didn’t have any female engineering friends and thought this class might help me find women I could relate to. This class changed my life. Each week, this group of sixteen women discussed topics such as emotional intelligence and personal branding, and each week we all became increasingly confident to face our career challenges. As we grew to trust each other, we were able to have vulnerable conversations about what we experienced in our day to day lives – study tips, interviewing tactics, advice for having difficult conversations...things that I wish I had learned before my last year of college. That’s why mentoring became a passion of mine. I want to be the mentor that I needed when I was younger.

So, now I ask you: what drives you to act? When your career is reaching its end, what do you hope to say about it? Will you be one who retires with all the information you have learned locked inside your mind, or will you retire having mentored the new and successful workforce because you taught them everything you know? Will you take revenge on how you had to learn everything you know, or will you do your best to leave things better than how you inherited it? Will you reinforce the walls, or build bridges?

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Thriving Despite Low Numbers

Women are underrepresented in water sector, data say

by Katherine Saltzman



The water sector employs significantly fewer women than the national average of all workers, according to the report, *Renewing the Water Workforce: Improving Water Infrastructure and Creating a Pipeline to Opportunity*, published in June 2018 by The Brookings Institute (Washington, D.C.)

According to the report, 46.8% of workers across the U.S. are women, though women “only account for 14.9% of the water workforce.” Furthermore, the occupational breakdown of women in water is skewed. “While women make up a majority of water workers in certain administrative positions — including 95% of secretaries — they only account for a fraction of employment in some of the largest water occupations overall, including plumbers (1.4%) and water treatment operators (5.2%),” the report says.

Successful women on the job

Joanna Healy, a Grade 4 certification operator at the McDowell Creek Wastewater Treatment Plant, which is operated by Charlotte Water in North Carolina, began her career in the mailroom at the Hoover Dam in Nevada. Soon a position testing water and wastewater samples opened, and she took it. Later she moved into compliance reporting. Healy then transferred to a community college where she received an associate degree in Applied Science in Wastewater Treatment before moving to North Carolina.

“Usually there aren't a whole lot of us in the classes, Healy said. “In the maintenance tech class there were over 60 students and I was one of two females.”

Healy attained her Grade 4 certification in 2.5 years by earning her associate degree. She also received a Pretreatment and Maintenance Tech 1 certification and plans to get a Pretreatment and Maintenance Tech 2 certification.

Despite few women in her classes, Healy said that she has received support and mentorship from trainers and colleagues throughout her training and career in the water sector.

“I think it's really neat that women and can do anything men can do,” Healy said. “That's what I tell my daughter. You can do all the things the guys can do, but you don't have to prove yourself to anyone.”

Tara Romine started working at Charlotte Water in October 1990 as a laborer. An operator position later

became available and she received on-the-job training to become qualified; more formal training was not readily available then, Romine said. By July 1998 she had received her Grade 4 certification and in 2000 took on the responsibility of first chief operator at Mallard Creek Water Reclamation Facility for Charlotte Water. When the facility became the first ISO certified plant in Charlotte Water, she assisted with the development and creation of the ISO program. In her role, Romine helps implement standard operating procedures and create work instructions and procedures for new operators among many other responsibilities.

Romine said her career in water has been filled with strong relationships and rewarding opportunities.

“I was always treated well,” Romine said. “The gentleman that I train have given me the utmost respect. It has been a very good working environment for me. I feel like I have really been given a gift to serve the community.”

Barriers to entry

The Brookings report includes overall recommendations on improving gender and racial diversity in the water sector. These include

- ◆ increasing the visibility of the sector for younger students,
- ◆ creating more opportunities for workforce training, and
- ◆ expanding career paths for professionals in the water workforce.

However, the report stops short of forming conclusions on why so few women are in the water workforce.

Kalpna Solanki, CEO of the Environmental Operators Certification Program, suggests that Canada faces similar obstacles to the U.S. in terms of recruitment, training, and retention, especially for female employees. Solanki's non-profit organization classifies water and wastewater facilities in British Columbia and Yukon and certifies the operators who work in those provinces.

“Very often people literally fall into the career. It wasn't necessarily a planned path. It would be better if it was proactive rather than reactive,” Solanki said.

Often information on these water jobs are heard about at the Canadian equivalent of city or state departments of parks and recreation or departments of sanitation with majority male staff, she said

“[Men] get into the [water/wastewater] workforce because they happen to be there,” she said. “There are not many women [here], so the result is fewer women going into the field from that point.”

Solanki echoed The Brookings report message that

women’s job descriptions within water sector are skewed. While things are changing, and most female operators love their jobs, she said that she is aware of some situations of discrimination and harassment in the workforce.

If 10% of the water workforce is female, their number are not spread evenly among the four major area specialties: water treatment, water distribution, wastewater collection and wastewater treatment, she said.

“I would be surprised if more than 1% is female in wastewater collection and 1% to 2% of women in water distribution,” Solanki said. “Within that 10 % of female operators, there are some specialties that have almost no women at all.”

Overcoming entrenched attitudes

Even though Canada has workforce standards in place at public utilities, each employer at the utility must reinforce rules and guide employees on proper workplace behaviors. This is especially true if women have historically been underrepresented in the specialty area, Solanki explained.

“Some of the feedback I have received from women especially in water distribution and wastewater collection, [is that] the problem often lies at the employer level,” she said. “The support mechanisms are not in place in where women are just parachuted into the workforce. The men are not prepared for this change [and] are not educated with regards to workplace harassment. The women are not properly trained in terms of what is acceptable and what is not acceptable behavior and what resources are available to them,” Solanki said.

In June 2018, Solanki participated on a panel discussion during a workplace diversity workshop at the Canadian Water Summit. Topics included how to promote the field

in general as well as to women; it also dealt with how to better recruit and integrate women in areas of the water sector where they are currently underrepresented.

“Most of the women that I meet like the work, are good at it, and like the variability of the job — there are no two days that are the same,” Solanki said. “We do hear of a few women who face harassment but, in general, most the women are happy and really enjoy being in the field.”

Amanda Schuffels serves as an example of a happy newcomer to the water sector. In January 2018, she took on the role of full-time grade 1 wastewater operator at the Kelowna Wastewater Treatment Facility in British Columbia, Canada. Previously she had worked in co-op training positions and part-time roles at the utility.

“A lot of men and women have taken me under their wing and have taught me what I needed to learn so that I can strive in my position, she said. “I love the job and industry.”

Despite their lower numbers, female operators and utility leaders are at the forefront of the sector. These women prepare and train new employees, support innovations and technologies, manage the day-to-day operations of their facilities and support the environment and public health for communities across the world.



Katherine Saltzman is a publications assistant at the Water Environment Federation (Alexandria, Va.) where she works on WEF’s Operator Initiative programs.

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Settleability-based Design and Operation of Final Clarifiers

Samuel Jeyanayagam, Ph.D., P.E., BCEE, WEF Fellow

Vice President & Wastewater Solutions Lead – US North of Jacobs

Introduction

The discovery by Ardern and Lockett more than 100 years ago (that it is possible to separate biological solids from bulk liquid and use them to seed incoming wastewater) was one of the main reasons for the rapid and widespread acceptance of the activated sludge process. While many new approaches have been used to capture the solids (e.g., membranes), gravity separation in final clarifiers remains the predominant mechanism because of its simplicity and low cost.

As illustrated on Figure 1, the activated sludge process consists of the biological reactor and the solids separation unit. They perform two distinct functions but operate as a single system. Consequently, the performance of the clarifier is closely linked to that of the biological process and vice versa. In fact, no other two wastewater treatment processes are as closely linked as these two are, and their inter-dependency (Figure 2) should be considered in the design and operation of the activated sludge process.

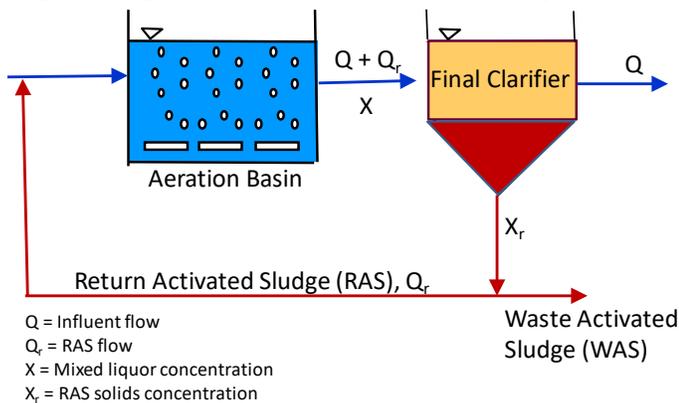


Figure 1: Activated Sludge System

Traditional clarifier design approach uses empirical parameters such as surface overflow rate (SOR) and solids loading rate (SLR). These design criteria implicitly assume that sludge settleability will not fall below a certain minimum value, which is undefined. Further, textbook recommendations for SOR and SLR do not provide guidance for adjusting these values to account for the variation in sludge settleability and mixed liquor suspended solids (MLSS) concentration. Clarifiers that are poorly designed and operated without consideration of sludge settleability can have the following problems:

- Curtail the operating range of a clarifiers and limit the treatment capacity of the entire facility, particularly during wet weather
- Lead to non-compliance with respect to total suspended solids (TSS), biochemical oxygen demand, and total phosphorus (TP)
- Produce a dilute return activated sludge (RAS)

stream and inability to maintain the aeration basin solids inventory

- Result in a dilute waste activated sludge (WAS) stream, thus overloading the sludge handling facilities

The Author’s opinion is that the use of textbook values should be limited to initial or high-level assessment of clarifier capacity.

The focus of this article is to enable engineers and operators to use site-specific settleability-based SORs and SLRs for making design and operating decisions. The benefits include right-sizing facilities, ensuring compliance, and optimizing operations.

Functions of a Clarifier

The final clarifier is a crucial component of the activated sludge system and is expected to perform three functions: clarification, thickening, and solids storage. Failure of any of any one of these functions can result in elevated effluent solids.

Clarification

Clarification is the actual separation of the solids from the liquid phase and occurs in the top layers of the clarifier. Less than 2 percent of the solids mass entering the clarifier is implicated in clarification. Although small, this fraction has a massive effect on the effluent quality. Generally, when the mixed liquor particles flocculate well, they will also clarify well, thereby contributing to relatively clean effluent with low TSS. If adequate flocculation is not promoted, a significant number of

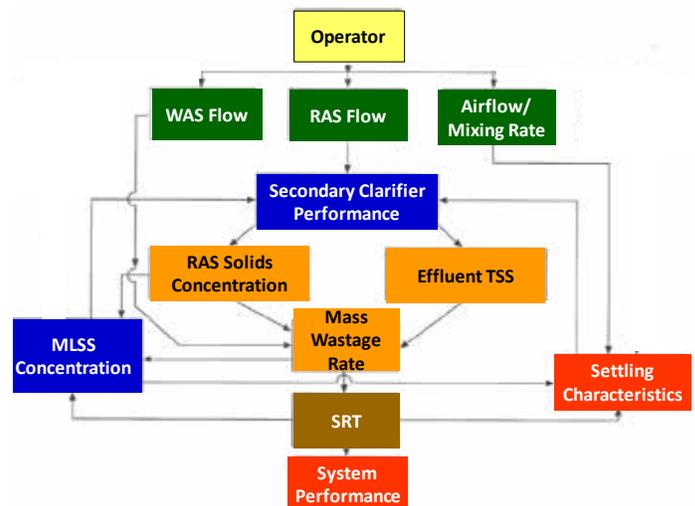


Figure 2: Biological Process and Secondary Clarifier Interactions (Roper, 1976)

small and dispersed particles will accumulate in the upper layers of the clarifier. These solids, because of their poor settling characteristics, are more likely to be flushed out with the effluent than settle to the bottom to be captured in the RAS. Clearly, good clarification is fundamental to avoiding permit excursion with respect to TSS and TP.

Thickening

Thickening refers to settling and compaction of the separated solids at the bottom of the clarifier. It involves most of the solids (greater than 98 percent) entering the clarifier. Clarifier thickening capacity is related to the ability of the clarifier to convey the separated solids to the RAS line. This movement of solids to the bottom is accomplished by (a) gravity settling, and (b) general flow to the bottom caused by RAS pumping action. If the clarifier solids application rate is greater than the solids withdrawal rate, solids will accumulate in the bottom. The onset of sludge blanket rise is an indication of thickening failure. If left unchecked, the sludge blanket will reach the effluent weir causing solids washout, the same outcome as clarification failure.

Storage

The most critical or stressed clarifier operating conditions are experienced under high SLRs and SORs, which typically occur during peak wet weather flows. Normal operations can also experience short-term inventory shifts as a result of diurnal load fluctuations. The net transfer of solids from the aeration basin to the clarifier triggers thickening failure (rising sludge blanket). The rising sludge blanket is also a system response to a decreased RAS recycle ratio (because the RAS flow rate is held constant during peak flows), which requires a longer thickening time to achieve a higher RAS solids concentration. One common design practice is to allocate volume within the clarifier to accommodate inventory shifts so that the expanding sludge blanket does not result in solids washout. Another peak flow management strategy is to switch to step-feed or contact stabilization operating mode to retain or hide the solids in the aeration basin and thereby reduce clarifier solids loading.

Flocculation, settling, and thickening characteristics will vary from time to time and must be considered to ensure reliable clarifier performance. An interesting perspective is that the settling and thickening characteristics are more important than clarification because the biological process depends on an adequate supply of RAS to maintain the required solids inventory. The small quantity of solids that escape with the effluent because of poor flocculation (clarification failure) is generally inconsequential to the successful operation of the biological process but could markedly affect regulatory compliance.

Clarifier Solids Profile

The clarifier solids concentration profile, shown on Figure 3, provides insight into what happens within the clarifier. Based on the solids concentration, four zones

are recognized: clear/effluent zone (h1), separation/clarification zone (h2), sludge storage zone (h3), and thickening/sludge removal zone (h4). In practice, the transition between zones is gradual, and distinct boundaries do not exist as depicted in this conceptual model (Figure 3) proposed by the International Water Association (IWA). If the solids application rate is equal to or less than the solids withdrawal rate, zone h3 will not appear.

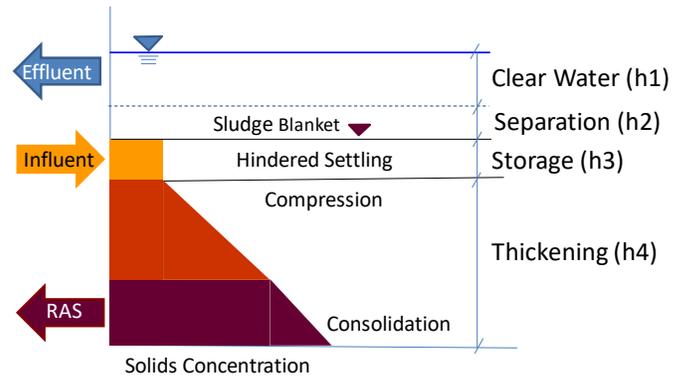


Figure 3: Final Clarifier Solids Concentration Profile (IWA)

Settleability

Final clarifier performance is inexorably linked to sludge settleability. A well-settling sludge will successfully clarify and thicken, and more of it can be stored within the clarifier during wet weather events. Most of the bacterial cells implicated in the activated sludge process fall into the 1- to 10-micrometer (μm) size range. They are small and dispersed in the bulk liquid. Their sedimentation rates are too low to be removed by gravity separation economically. For example, an organism that is $10\ \mu\text{m}$ (3.9×10^{-4} inches) will take 2 years to settle $xx\ \mu\text{m}$ (4 inches). The formation of large and compact floc is a prerequisite for efficient solids separation and subsequent thickening in the final clarifier.

Fortunately, microorganisms have a natural tendency to clump together to form heavier flocs that can be removed by gravity sedimentation. This phenomenon, called bio-flocculation, is best explained using the widely accepted two-step mechanism (Figure 4):

- ◆ **Microstructure:** Floc-formers produce extracellular polymeric substances (EPS), which help them stick together to form a weak and relatively small floc, susceptible to shearing.
- ◆ **Macrostructure:** Filaments are responsible for macrostructure formation. They form a reinforcing network on which the floc-formers grow into large (greater than $100\ \mu\text{m}$) and strong flocs that are not easily broken up by turbulence. Consequently, the density differential between the heavier floc and water, which is the driving force for gravity separation, is significant, enabling efficient solids capture through sedimentation.

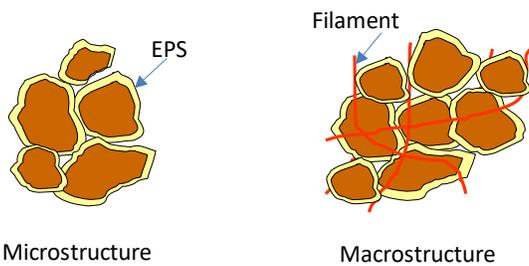


Figure 4: Floc Formation

An ideal floc settles and thickens well and is characterized by a good balance between floc-formers and filaments. The filaments mostly grow within the floc providing strength and structure. Very few filaments protrude outside the floc. As presented in Table 1, commonly encountered solids-liquid separation problems can be attributed to microstructure or macrostructure failure.

Table 1. Symptoms and Causes of Common Separation Problems

Separation Problem	Symptom	Potential Cause
Dispersed Growth	Turbid effluent. No distinct solid-liquid interface.	Microstructure failure because of poor EPS production. Low SRT. Can occur during start-up.
Viscous (non-filamentous) Bulking	Jelly-like and slimy consistency.	Microstructure failure because of excessive EPS production. Presence of toxic material or nutrient imbalance.
Pin Floc	Larger flocs settle rapidly - low SVI. Pin flocs cause turbid effluent.	Macrostructure failure because of inadequate filaments.
Filamentous Bulking	Filaments protrude outside the floc. Sludge settles and compacts poorly - high SVI. Clear effluent.	Macrostructure failure because of excessive filaments.

SRT= solids Retention Time; SVI = sludge volume index

Suspended solids can settle in one of four distinct regimes (referred to as Classes I through IV), depending on the solids concentration and the tendency of the particles to flocculate. The correlation between solids concentration (dilution) and degree of flocculation is qualitatively illustrated on Figure 5. Particles on the top left corner are completely dispersed and exhibit

Class I settling. With time, the particles flocculate with decreasing tendency to settle independently (Class II). As the concentration increases, particles transition to Class III or zone settling. As the concentration increases further, the settling regime becomes Class IV.

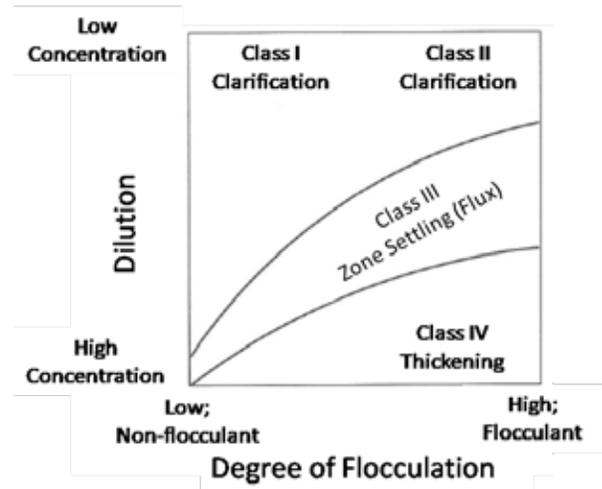


Figure 5: Particle Settling Behavior as a Function of Concentration and Degree of Flocculation

Classes I and II occur at the top section of the clarifier and contribute to the separation of the solids from the liquid stream (clarification). Class III typically occurs in the middle section of the clarifier and is responsible for the mass movement of solids (flux) towards the bottom where they undergo compression and thickening (Class IV). While all four types of settling can occur in final clarifiers, Class III (Zone settling) governs design.

Sludge Volume Index

In wastewater treatment, mixed liquor settleability is measured using the SVI. The standard unstirred SVI, which is the simplest and most commonly used in North America, is defined as the volume in milliliters (mL) occupied by 1 gram (g) of the suspended solids following 30 minutes of settling (unstirred) of the aeration basin’s MLSS. The standard SVI is calculated as follows:

$$SVI = 1,000 V_{30} / (XV_t)$$

where

- SVI = Sludge Volume Index, mL/g
- V_{30} = Settled sludge volume after 30 minutes of settling in a settling column, mL
- 1,000 = Conversion factor, milligrams per gram
- X = Mixed liquor concentration before the test, milligrams per liter (mg/L)
- V_t = Volume of settling column, liters (L)

The standard SVI values are affected by many factors including MLSS concentration and wall effects of the settling column. To overcome these deficiencies, other SVI measures, such as stirred SVI (SSVI), SVI at a sludge concentration of 3,500 mg/L (SSVI_{3.5}), and dilute SVI,

Case 1: Identify operating scenarios at poor SVI of 175 mL/g

Locate Operating Point

Use equation (4) to determine the required RAS flow to maintain 3,000 mg/L MLSS

$$\begin{aligned}Q_r &= QX/(X_r - X) \\&= [(1 \text{ mgd}) * (3,000 \text{ mg/L}) * (8.34 \text{ lb/Mg})] \div [(12,000 \text{ mg/L} - 3,000 \text{ mg/L}) * 8.34 \text{ lb/Mg}] \\&= 0.33 \text{ mgd (i.e. 33\% of Q)} \\SLR &= [(Q + Q_r) * X * 8.34] \div A \\&= [(1.0 + 0.33 \text{ mgd}) * 3,000 \text{ mg/L} * 8.34] \div (2 \text{ Clarifiers} * 1,256 \text{ ft}^2) \\&= 13.2 \text{ pounds per day per square foot (lb/d/ft}^2)\end{aligned}$$

Locate the operating point A on Figure 6 using the clarifier SLR (13.2 lb/d/ft²) and the given RAS solids concentration (12,000 mg/L).

Check the operating point location using the 3rd variable, RAS withdrawal rate (gallons per day per square foot [gpd/ft²]):

$$\text{RAS withdrawal rate} = Q_r/A = (0.33 \text{ mgd} * 10^6)/(2 \text{ clarifiers} * 1,256 \text{ ft}^2) = 131 \text{ gpd/ft}^2$$

This confirms that the operating point A is correctly located.

Limiting SVI

The operating point A is at the allowable solids loading for SVI = 175 mL/g. This means that the clarifier is critically loaded at this SVI. To ensure safe operation, three options are available to the operator:

- ◆ Improve settleability by reducing SVI to 150 mL/g by implementing filament control. This action will not move the operating point but will shift the allowable solids flux SVI line from 175 to 150 mL/g and the operating point will then be left of the new SVI line representing stable operation.
- ◆ Activate a third clarifier, if available. This action will reduce the clarifier SLR from 13.2 to 8.8 lb/ft². That is: $(1.33 \text{ mgd}) * 3,000 \text{ mg/L} * 8.34 \div (3 \text{ Clarifiers} * 1,256 \text{ ft}^2) = 8.8 \text{ lb/ft}^2$. The new operating point (A1) is now left of the SVI 175 mL/g line – i.e. underloaded/stable condition at 175 mL/g SVI.
- ◆ Reduce SLR by switching to step-feed operation, if this operational flexibility is available. This action will reduce the MLSS concentration in the clarifier feed, retaining the solids in the aeration basin and avoiding solids washout.

Case 2: Impact of declining SVI

Assume a clarifier operating at point (B) – allowable solids loading = 30 lb/d/ft² at SVI=100 mL/g; RAS solids concentration = 15,000 mg/L. Evaluate the operational impacts if the settleability declines to 150 mL/g SVI.

If the plant keeps operating at the same RAS withdrawal rate (250 gpd/ft²), the new operating point at 150 mL/g

will be at B1. The resulting operational impacts are:

- ◆ Reduced solids rate from 30 to 24 lb/d/ft² (i.e., more clarifiers will be required)
- ◆ Reduced RAS solids concentration from 15,000 to 12,000 mg/L (i.e., lower SRT resulting from lower aeration basin solids inventory caused by fewer RAS solids). The SRT impact can be avoided by reestablishing the original RAS concentration of 15,000 mg/L. This will require the clarifier to be operated at B2 by drastically reducing the RAS withdrawal rate from 250 gpd/ft² to around 75 gpd/ft² to promote greater thickening. However, this decision should be weighed against potential issues associated with deep sludge blankets (e.g., solids washout, denitrification, secondary P release, etc.).

Drawbacks of Flux-based D&O Charts

While the D&O charts are handy and ready-to-use tools, they are not without drawbacks. The flux theory, which is the basis of the D&O charts, assumes an ideal clarifier exhibiting one-dimensional flow where the movement of sludge and water is in the vertical direction only. The underlying stipulation is that all the solids entering the clarifier are removed in the RAS with no solids lost in the effluent. In reality, the clarifier flow pattern is three-dimensional and made complex by density and temperature currents. In addition, it is impossible to achieve 100 percent solids capture and removal in the RAS. In addition, flux-based analysis is incapable of predicting effluent quality (TSS), only whether a clarifier is underloaded, crucially loaded, or overloaded. Because the D&O chart considers the clarifier as a “black box,” it cannot be used to evaluate proposed clarifier improvements (e.g., installation of baffles). Despite these drawbacks, the Daigger-Roper D&O chart is a quick way to predict clarifier performance during design and operation. Experience has shown that to overcome the internal inefficiencies of the clarifier, a 20 to 25 percent derating factor is often needed. It is strongly recommended that those using the Daigger-Roper D&O chart compare the results to plant operating data (such as SLR, RAS flow, RAS concentration, etc.) to determine the clarifier-specific derating factor. For example, if the D&O chart predicts 25 lb/d/ft² as the allowable (not to exceed) SLR, while plant historical data show rapid sludge blanket rise occurring at SLR = 20 lb/d/ft² for the same SVI, the derating factor is $5 \div 25 = 20$ percent. Moreover, each clarifier is unique and different units at a particular plant can have different derating factors.

Computational Fluid Dynamics Modeling

The drawbacks of D&O charts can be overcome by using computational fluid dynamics (CFD) models to assess and predict clarifier performance. Secondary clarifiers are extremely complex, with many competing and enabling processes occurring simultaneously. CFD models are powerful tools that take into account the complex hydrodynamic conditions within the clarifier and transform the flux-based “black box” approach to a “glass box” approach. Impacts of internal features, such

Hello, future

as inlet structures, sludge collection mechanisms, and strategically-located baffles can be visualized, and “what if” questions asked to optimize performance design and justify improvements based on cost-benefit analyses.

Conclusion

It is common sense that safe driving habits include paying close attention to curves in the road. Operating a clarifier is no different. The two most important variables in clarifier design and operation, settleability and flow, can vary and are often unpredictable. Flux-based D&O charts can be used by designers for capacity analysis and by operators for making rational and timely decision. The engineer’s goal should be to use good design practices to provide operational flexibility, and the operator’s goal should be to achieve compliance over a wide range of operating scenarios. The Daigger-Roper D&O chart provides a proven method of quickly analyzing clarifier performance on a day-to-day basis. More in-depth analysis can be performed using CFD models, which will require extensive data collection for model calibration and validation.

Dr. Jeyanayagam is Vice President and Regional Wastewater Solutions Lead at Jacobs. He has over 38 years of academic and consulting experience and has completed projects in seven countries. His areas of expertise include resource recovery, disinfection, and nutrient removal. Sam is a Fellow of the Water Environment Federation (WEF) and has written and presented over 180 papers and co-authored over 27 WEF manuals. Sam teaches wastewater treatment courses at the University of Wisconsin, Madison. He received his MS and PhD degrees from Virginia Tech.

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Chemical Precipitation as Primary or Polishing Process for Phosphorus Removal

by Jurek Patoczka and John Scheri, Mott MacDonald - jurek.patoczka@mottmac.com

INTRODUCTION

Chemical precipitation of phosphorus is utilized as a primary, supplemental, polishing, or backup process wherever phosphorus removal is required. For small and medium-sized facilities, and where the existing train configuration is not conducive to modifications for the enhanced biological phosphorus removal (EBPR) process, chemical addition could be the method of choice.

In practice, whenever an effluent phosphorus limit must be consistently met, chemical addition is almost always practiced, at least in a standby mode. Additionally, when denitrification is required and available carbon is a limiting resource, chemical precipitation of phosphorus might be indicated.

While the underlying chemistry and operational practices of chemical phosphorus precipitation are well established, this paper will focus on several selected novel or less known aspects developed for the “Chemical Precipitation of Phosphorus” chapter of the recently published Water Environment Federation Manual of Practice *Operation of Nutrient Removal Facilities* (MOP 37), including the following:

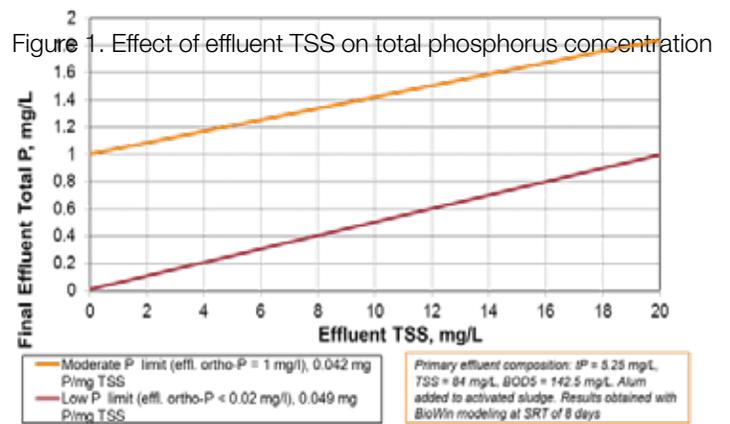
- ◆ Summary formulas for calculating chemical dose required (for alum and ferric)
- ◆ Experiences in “cold” chemical addition startup and response time, including the fate of added chemicals and resulting precipitates
- ◆ Summary tables with relevant properties of most common chemicals
- ◆ Conversion factors to calculate increase in inert solids generation resulting from addition of chemicals such as alum and ferric for various process conditions
- ◆ Conversion factors to calculate the increase of wastewater total dissolved solids (TDS) due to addition of chemicals such as alum and ferric for various process conditions (with or without neutralization)
- ◆ Formulas to calculate increase in inert the fraction of mixed liquor due to addition of chemicals such as alum and ferric, based on activated sludge reactor hydraulic retention time, sludge age, and chemical dose

ROLE OF SOLIDS SEPARATION

The contribution of particulate phosphorus is particularly important for facilities with low effluent limits, because even seemingly low effluent TSS can carry a significant phosphorus contribution (Figure 1). An additional consideration is that, in systems with a dedicated phosphorus removal process, either by chemical addition to the activated sludge or by EBPR,

the phosphorus content in MLSS and effluent TSS are increased.

While the phosphorus content of MLSS is approximately 2% in a municipal activated sludge facility without a dedicated phosphorus removal process, the content increases to 4% to 5% for a facility with a stringent phosphorus limit, regardless of whether the phosphorus is removed from the effluent and incorporated to the sludge by precipitation or by EBPR.



SUMMARY DOSE FORMULAS FOR CHEMICAL APPLICATION

The following formulas were developed for MOP 37 for calculating approximate dose requirements for two common chemicals (alum and ferric). The formulas are approximate, as many site-specific factors, such as wastewater composition and chemistry, point of addition, mixing conditions, pH, and temperature will influence the dose requirements.

Alum

The following approximate formulas were developed for MOP 37 for calculation of the application rate of 49% alum solution in metric units:

$$A = (0.0118)(X_i - X_e)(Q) / [1 - 0.95 \times \exp(-1.9 \times X_e)] \quad (1)$$

Where:

- A = 49% alum solution application rate (L/d)
- X_i = soluble phosphorus concentration at the application point (mg/L)
- X_e = target effluent soluble phosphorus concentration (mg/L)
- Q = facility flow (m³/d).

In US customary units, the formula is as follows:

$$A = (11.8)(X_i - X_e)(Q)/[1 - 0.95 \times \exp(-1.9 \times X_e)] \quad (2)$$

Where:

- A = 49% alum solution application rate (gpd)
- X_i = soluble phosphorus concentration at the application point (mg/L)
- X_e = target effluent soluble phosphorus concentration (mg/L)
- Q = facility flow (mgd)

Q = facility flow (mgd)

SELECTED ASPECTS OF CHEMICALS USE

Tables 1 and 2 provide summaries of key properties of common aluminum- and ferric-based chemicals used for phosphorus precipitation.

Proprietary Formulations

In addition to commodity chemicals listed in Tables 1 and 2, a number of proprietary formulations for phosphorus removal are being marketed. While the exact composition of these products is typically not known, they are based on a combination of some of the aluminum or ferric chemicals. These products variously claim to be easier to handle, generate less sludge, be less sensitive to lower wastewater temperatures, and/or have a lesser effect on facility pH.

While claims of lower sludge generation should be treated with skepticism, the other advantages may be valid. This is attributable to the fact that these formulations typically contain some form of neutralizing alkali agent, which increases pH and alkalinity and makes the chemicals less corrosive, as in the case of sodium aluminate and polyaluminum chloride (PACl).

However, this convenience typically comes at a higher chemical cost. The recommended method of evaluating the expected benefits of using alternative chemicals is to determine the dose of each chemical needed to achieve the required phosphorus removal in side-by-side jar tests. Such jar tests should include the evaluation of the required dose of a neutralizing agent.

The dose requirements established in the comparative jar tests can then be combined with unit costs of

Ferric Chloride

The following approximate formulas were developed for MOP 37 for calculation of the application rate of 37% ferric chloride solution in metric units:

$$A = (0.0155)(X_i - X_e)(Q)/[1 - 1.07 \times \exp(-2.25 \times X_e)] \quad (3)$$

Where:

- A = 37% ferric chloride solution application rate (L/d)
- X_i = soluble phosphorus concentration at the application point (mg/L)
- X_e = target effluent soluble phosphorus concentration (mg/L)
- Q = facility flow (m³/d)

In US customary units, the formula is as follows:

$$A = (15.5)(X_i - X_e)(Q)/[1 - 1.07 \times \exp(-2.25 \times X_e)] \quad (4)$$

Where:

- A = 37% ferric solution application rate (gpd)
- X_i = soluble phosphorus concentration at the application point (mg/L)
- X_e = target effluent soluble phosphorus concentration (mg/L)

Name	Chemical formula	Molecular weight	Aluminum metal contents, % by weight	Specific density		Weight ratio of dry chemical (Al ₂ (SO ₄) ₃ *14H ₂ O) for stoichiometric P precipitation (g of chemical/g of P)
				Kg/L	lb/gal	
Alum, dry	Al ₂ (SO ₄) ₃ ·14H ₂ O	594	9.1	0.6 to 1.1	5 to 9.5	9.6
Alum, 49% solution ⁽¹⁾	Al ₂ (SO ₄) ₃ ·14H ₂ O	594	4.4	1.33	11.1	9.6
Sodium aluminate, anhydrous (powder)	NaAlO ₂	82	33	0.72	6.0	2.64
Sodium aluminate, trihydrate (granular)	Na ₂ O·Al ₂ O ₃ ·3H ₂ O	218	25	1.02	8.51	3.52
Sodium aluminate, 20% - 45% solution (could vary significantly)	NaAlO ₂	82	Varies	Varies	Varies	
Polyaluminum chloride, solutions of various strength	$\frac{Al_nCl_{(3n-m)}(OH)_m}{Al_{12}Cl_{12}(OH)_{24}}$ example: Al ₁₂ Cl ₁₂ (OH) ₂₄	Varies	Varies	Varies	Varies	

Table 1. Properties of aluminum-based chemicals used for phosphorus precipitation.

¹ 49% alum solution has dry alum ((Al₂(SO₄)₃*14H₂O) content of 0.647 Kg/L (5.4 lb/gal), and aluminum metal content of 0.059 Kg/L (0.492 lb/gal).

alternative chemicals to determine overall application costs. Only then can the relative costs of using different chemicals be compared to other factors, such as ease of handling and the need for any additional neutralizing chemicals, and an informed decision be made. For small facilities, use of specialized or proprietary formulations may sometimes be justified; however, at larger facilities, chemical costs will likely be an overriding consideration.

Role of Polymers

Organic polymers do not remove or precipitate soluble phosphorus, but their use can significantly improve the solids separation process. Use of metal salts for phosphorus removal can create, at least initially, fine precipitate (floc) or even colloids.

Flocculation and settling of such particulates can be greatly improved by the application of a polymer. When used, the polymer addition point should be as far downstream from the point of addition of the metal salts as practical, and should be located in a place where adequate mixing is available or can be created. In many typical configurations of the activated sludge process, metal salts are added at the outlet of the aeration basin, with polymer addition at the final clarifier splitter box. Adequate mixing, which is critical to polymer effectiveness, can be provided by simple air lance agitation.

When added to mixed liquor, the polymer dose required is typically in the range of 0.5 to 1 mg/L for dry polymers, which typically have approximately 90% active content. For emulsion polymers, with only 30% to 40% active content, the required dose will be about 2.5 to 3 times higher (as expressed in the weight of the emulsion, as supplied).

Name	Chemical formula	Molecular weight	Iron metal contents, % by weight	Weight ratio of dry chemical for stoichiometric P precipitation (g of chemical/g of P)
Ferric chloride, dry	FeCl ₃	162.5	34.5	5.24
Ferric chloride, 37% solution ⁽¹⁾	FeCl ₃	162.5	12.8	5.24
Ferric sulfate, dry	Fe ₂ (SO ₄) ₃	400	28	6.45
Ferrous chloride, dry	FeCl ₂	127	79	6.14
Ferrous sulfate, dry	Fe(SO ₄) ₂	152	37	7.36

Table 2. Properties of iron-based chemicals used for phosphorus precipitation.

⁽¹⁾ 37% Ferric chloride solution has specific density of 1.36 Kg/L (11.4 lb/gal), dry FeCl₃ content of 0.504 Kg/L (4.2 lb/gal), and iron metal content of 0.173 Kg/L (1.44 lb/gal).

POINTS OF ADDITION

Metal salts addition points should be upstream of solids separation steps such as clarification or filtration. Figure 2 depicts the typical available options. The use of chemicals is most efficient at a tertiary application point, where most primary or biological solids or other constituents that can bind with metal salts are already removed. However, most existing facilities are not equipped with a suitable tertiary treatment process.

Chemicals can be added in front of conventional sand filters; however, this increases backwashing frequency and the acceptable chemical dose in such an application can be too small for adequate phosphorus removal. In such instances, split-point addition may be most effective, with part of the chemical going to secondary clarifier influent (aeration basin effluent) and part going to secondary clarifier effluent (filter influent).

At conventional activated sludge facilities, and particularly at smaller extended aeration facilities, common practice is to add chemicals to a turbulent location in front of final clarifiers, such as the effluent weir of the aeration basin, or to a clarifier's distribution box.

The chemically enhanced primary treatment (CEPT) process uses the same chemicals used for phosphorus removal, thus reducing residual phosphorus in the primary effluent. At the same time, the biological processes benefit from lower loading of organics, nitrogen, and TSS. Such practice also minimizes the inert fraction of the mixed liquor and, in case of ferric addition, minimizes the potential effects of chemicals on UV disinfection.

When phosphorus is removed by chemical addition to tertiary facilities (tertiary clarifiers and/or polishing filters), recycling the resulting chemical sludge to the primary treatment process should be considered, if feasible. Such practice will facilitate use of the residual phosphate bonding capacity of tertiary sludge and could substantially reduce the overall use of chemicals.

RESPONSE TIME AND STARTUP OF CHEMICAL ADDITION

Phosphorus removal by chemical addition can be initiated on demand without the acclimation period required for some biological processes. Figure 3 illustrates results from a test performed at an oxidation ditch facility without primary clarifiers or tertiary filters. The alum dose required for achieving the desired effluent total phosphorus level (below 0.5 mg/L) was determined before initiating the test; however, no chemical was added for more than 3 weeks before initiation of the test. As Figure 3 shows, the clarifier effluent total phosphorus, originally at 3.7 mg/L, started to decrease almost immediately upon activation of alum addition and dropped below 1 mg/L within 24 hours. In 3 days, the concentration stabilized at 0.35 mg/L.

- The delay in system response to initiation of chemical addition to activated sludge could be attributed to a combination of the following factors:
- Travel time between the chemical application point and the effluent sampling location. If only a

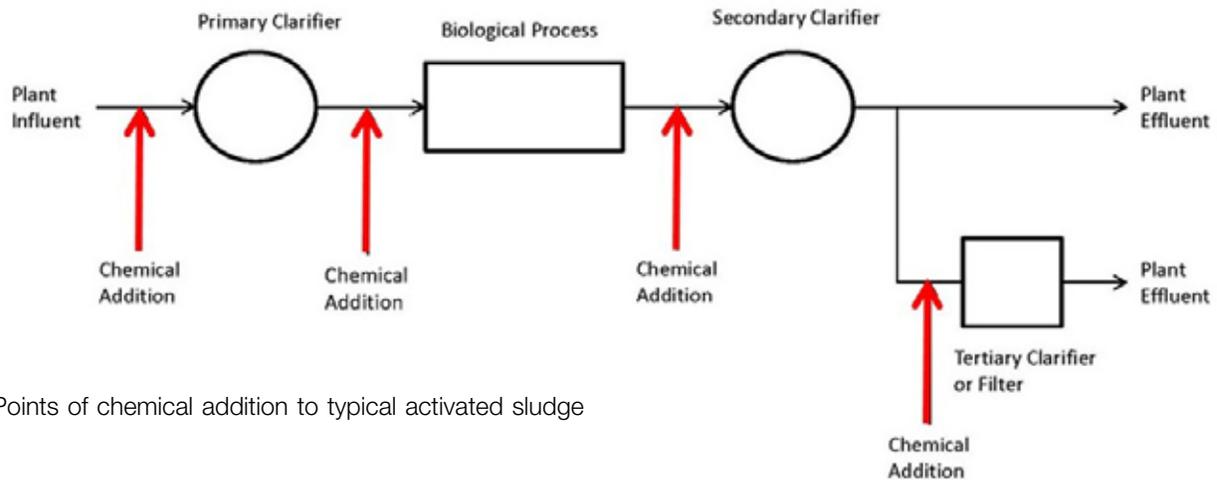


Figure 2. Points of chemical addition to typical activated sludge plant.

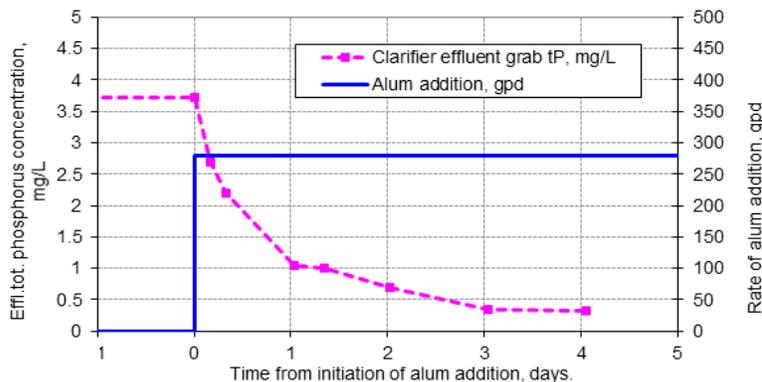


Figure 3. Response time to activation of chemical addition for phosphorus removal

final clarifier is present, this delay will be marginal. Any tertiary facilities, chlorine contact tanks, and particularly a stabilization lagoon, will add delay commensurable with hydraulic retention time (HRT) of these facilities.

- ◆ The excess unused chemicals applied at the secondary clarifier influent will be returned with RAS to the aeration basin and will bind with phosphorus in the raw wastewater. The time required to reach an accumulation of these chemicals close to a saturation point (steady state) corresponds to several multiples (3 is a good number) of HRT.
- ◆ Metal salts are coagulating agents and they will be partially used by biomass and colloids in the aeration basin for coagulation of mixed liquor flocs until a degree of saturation of the biomass inventory is achieved and the mixed liquor at the point of the chemical application is presaturated with chemicals and precoagulated.
- ◆ Precipitates resulting from metal salt addition continue to adsorb orthophosphate for several hours or even days, delaying the time to achieve equilibrium.

EFFECT OF CHEMICAL ADDITION ON FACILITY OPERATIONS

Sludge Generation

The addition of chemicals for precipitation of phosphorus will generate additional, inert chemical sludge at the point of addition. The amount of additional sludge (on

a dry-weight basis) generated by the addition of selected chemicals can be calculated based on the conversion factors provided in Table 3. For example, for a 3785-mL/d (1-mgd) facility adding 10 mg/L of alum, the expected additional sludge generation will be 4.11 mg/L, or 15.6 kg/d (33.9 lb/d), based on a 0.411 conversion factor from Table 3. In many applications, particularly when levels of phosphorus below 1 mg/L are targeted, an excess of chemical over that required by the stoichiometric equation is needed. Because the excess chemical will precipitate in a different form, a different conversion factor will result, as indicated in Table 3.

Inert Accumulation

Chemical precipitates accumulating in the aeration basins will result in an increase in the basin inert solids concentration. This effect should be considered when designing a biological treatment system. The equilibrium concentration of inert chemical residue resulting from chemical addition to the activated sludge system can be calculated as follows:

$$MLSS_{Sci} = D \times F \times SRT / HRT \quad (5)$$

Where:

MLSS_{Sci} = concentration of chemical inerts in the mixed liquor arising from chemical addition, mg/L

D = chemical dose applied to the activated sludge process, mg/L (based on the nominal forward flow of wastewater)

F = TSS conversion factor for the chemical applied, as listed in Table 3

SRT = solids retention time, days

HRT = hydraulic retention time, days

Use of the above formula is illustrated as follows. Assume the following conditions:

- ◆ Flowrate, 3785 m³/d (1 mgd)
- ◆ Aeration basin volume, 1892 m³ (500 000 gal)
- ◆ Sludge age of the process, 12 days
- ◆ Ferric (37% solution) application rate, 300 L/d (79.3 gpd)

Chemical ⁽¹⁾ /process	TSS increase factor (F), kg per kg (or mg/L per mg/L) of chemical added	TDS increase factor, kg per kg (or mg/L per mg/L) of chemical added
Alum for stoichiometric phosphorus precipitation (as alum orthophosphate), without neutralization	0.411	0.165
Excess alum (precipitating as aluminum hydroxide), without neutralization	0.263	0.485
Typical alum application for chemical P removal (at 3:1 alum to phosphorus stoichiometric rate), without neutralization	0.312	0.378
Typical alum application for chemical P removal (at 3:1 alum to phosphorus stoichiometric rate), with full neutralization with caustic	0.312	0.533
Ferric chloride precipitating as ferric orthophosphate	0.929	0.071
Excess ferric (precipitating as ferric hydroxide)	0.658	0.655
Typical ferric application for chemical P removal (at 3:1 ferric to phosphorus stoichiometric rate), without neutralization	0.748	0.460
Typical ferric application for chemical P removal (at 3:1 ferric to phosphorus stoichiometric rate), with full neutralization with caustic	0.748	0.745
pH adjustment with caustic	0	0.575
pH adjustment with sulfuric acid	0	0.980

Table 3. Sludge generation and TDS increase factors from use of selected chemicals.

¹ Alum dose expressed as Al₂(SO₄)₃·14H₂O; ferric as FeCl₃.

The HRT of this activated sludge system is equal to the aeration basin volume divided by flow: that is, 1892 m³/3785 m³/d = 0.5 days (or 12 hours). The ferric solution application rate is equal to the ferric chloride dose of 40 mg/L. With 3 mg/L phosphorus concentration in the influent, this represents stoichiometric ratio of Fe to P of approximately 3 to 1. From Table 3, the TSS increase conversion factor (F) for FeCl₃ applied at a 3-to-1 ratio is 0.748. Consequently, the inert MLSS concentration is the following:

$$40 \text{ mg/L} \times 0.748 \times 12 \text{ d}/0.5 \text{ d} = 718 \text{ mg/L}$$

The 718 mg/L accounts for only the component of the inert fraction of the mixed liquor resulting from chemical dosing in addition, and above, the typically expected inert MLSS fraction resulting from inert TSS present in the influent or generated during the treatment.

A straightforward way of calculating the additional mass of dry-waste inert chemical sludge that is generated is to multiply the chemical use rate expressed in kilograms per day (pounds per day) (see Tables 1 and 2 for chemical content of typical technical solutions) by the applicable TSS conversion factor from Table 3. For example, 49% alum solution has 0.647 kg/L (5.4 lb/gal) of alum. If a facility is using 200 L/d (52.8 gpd) of the 49% solution, the mass of alum used is 200 L/d × 0.647 kg/L = 129 kg/d (285 lb/d). Assuming a typical application with a 3 to 1 stoichiometric rate, the appropriate TSS conversion factor from Table 8.3 is 0.312. Consequently, this alum addition will result in generation of 129 kg/d × 0.312 = 40.3 kg/d (88.7 lb/d) of inert alum sludge.

Total Dissolved Solids Increase

Addition of chemicals will, in most instances, result in an increase in TDS concentration. However, in most typical applications, an increase in TDS because of chemical addition for phosphorus removal will be relatively modest.

Table 3 provides TDS increase factors for selected chemicals. For example, the addition of a relatively high (100 mg/L) dose of alum, which could be sufficient in producing effluent total phosphorus concentration on order of 0.2 mg/L, will increase TDS by 53.3 mg/L based on a factor of 0.533 from Table 3 (assuming a 3 to 1 stoichiometric rate). In most situations, where chemical addition is lower, TDS effects from using chemicals for phosphorus removal will be relatively small.

Sludge Settling, Thickening, and Dewatering

In addition to increasing the waste solids generation rate on a dry-mass basis, the addition of chemicals such as aluminum and ferric salts will affect sludge settling and dewatering properties. When added to activated sludge, these flocculating chemicals will generally improve solids separation in the secondary clarifier because of the increased capture of fine floc and colloids. Alum and in particular iron-based chemicals will increase activated sludge specific density, improving its settling properties (lowering the sludge volume index). This could improve performance of secondary clarifiers, allowing operation at a lower sludge blanket and/or higher MLSS concentration.

The effect of chemicals is more difficult to predict in sludge thickening and dewatering operations, with some plants reporting decrease in percentage of solids in thickened sludge when alum was used for phosphorus precipitation.

Biological Phosphorus Removal

While the EBPR process can sometimes be effective in producing low-effluent phosphorus, consistently meeting low-effluent limits could be impaired by periods of substandard performance or upsets. For these reasons, chemical addition is commonly practiced at EBPR facilities as a tertiary polishing step, a backup process, or more commonly in a form of simultaneous biological and chemical phosphorus removal by coagulant addition

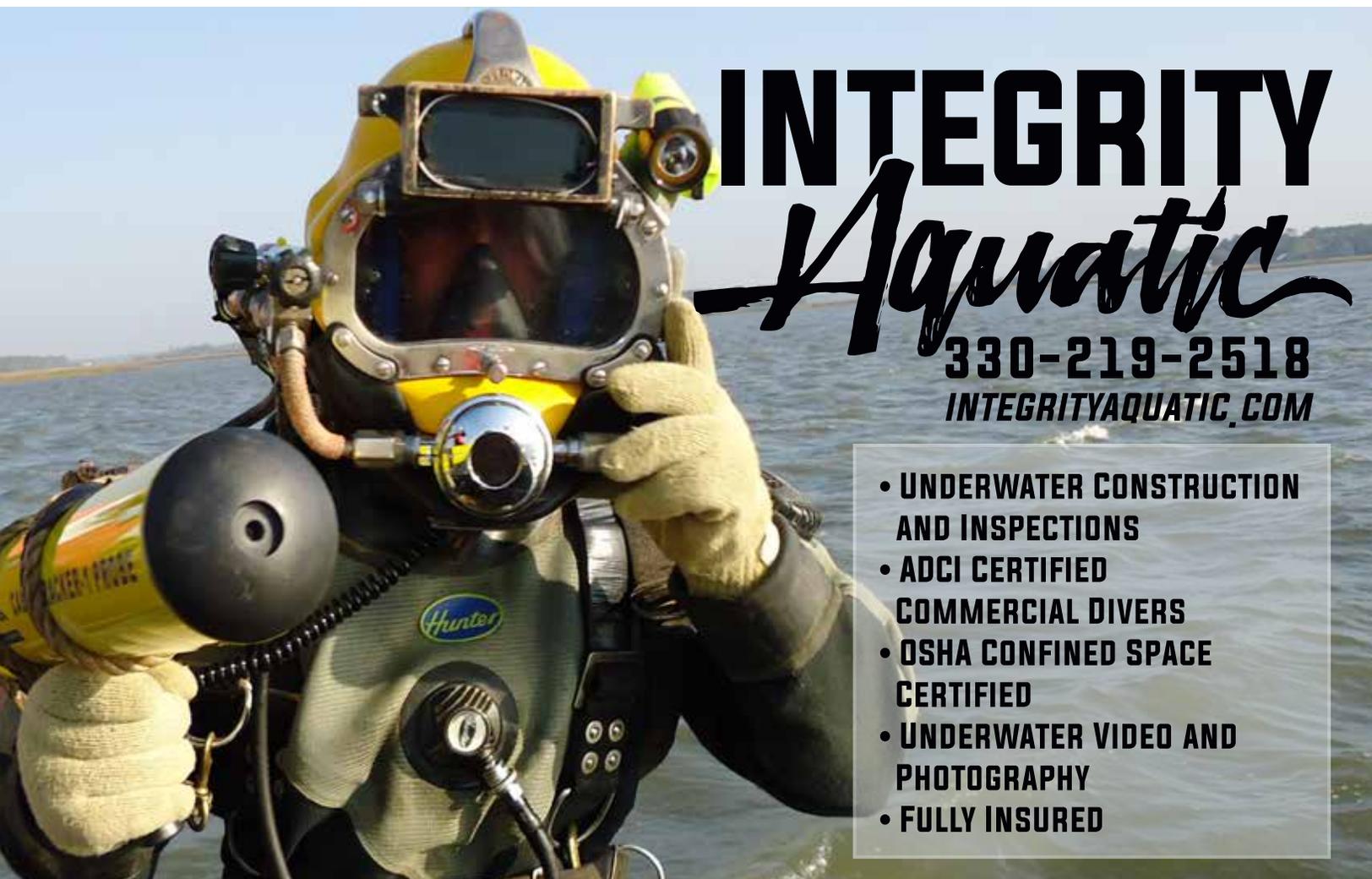
to the activated sludge train.

Though adding metal salts to an EBPR process has been shown to improve the overall phosphorus removal efficiency, there are concerns that continuous dosing of coagulants to an activated sludge facility may lower the efficiency of the phosphorus release and uptake cycle by competition or inhibition. As chemicals added to activated sludge remain in the system for a period commensurable with sludge age, the effect of a chemical added at a high dose during a period of inferior EBPR performance could linger for a considerable time, delaying recovery of the EBPR system.

Consequently, metals addition to the EBPR process should be practiced carefully, at the lowest necessary dose, with the point of addition being at the effluent from the aeration basin. Where possible, chemical addition to the EBPR activated sludge train should be avoided and, if necessary, chemicals should be applied to the primary clarifier and/or to tertiary process.

REFERENCE:

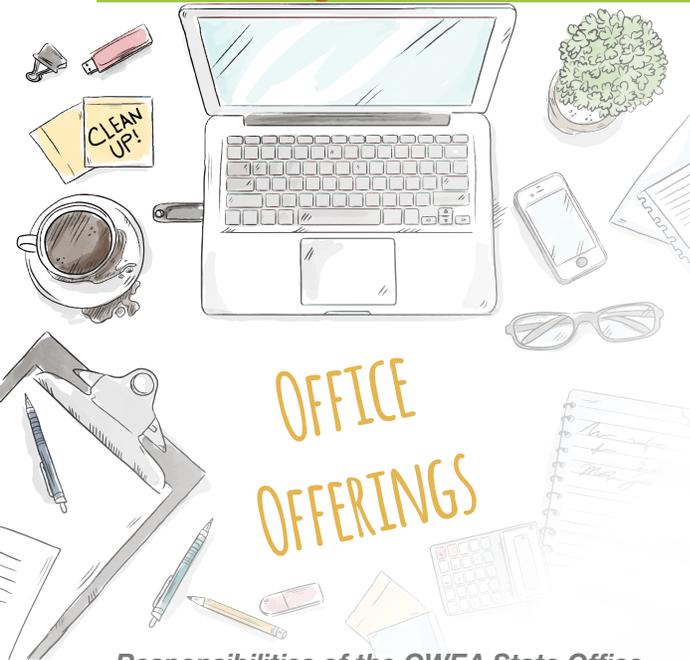
WEF Manual of Practice No. 37, *Operation of Nutrient Removal Facilities* (MOP 37), 2013, Chapter 8, Chemical Precipitation of Phosphorus (2013).



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Office Offerings



We have all heard the phrase “It takes a village...” In the case of OWEA, this is completely true! As most of you know OWEA has a staff of three full time paid employees: Megan Borrer, Chelsea Cameron and yours truly. With over 2,000 members to serve, multiple workshops, rule monitoring and a large Annual Conference, we couldn’t do everything we do without our “village” that includes committees and sections.

While we all work together to serve our members, we have some fairly defined roles. I thought that those of you who are current residents of our “village” or those who are considering moving in, would find this interesting.

In general, the OWEA state office and staff are here to execute and handle the day to day challenges of the association. Our committees focus on the strategic and big picture items, while our sections handle local member engagement. Here is a more detailed breakdown:

Responsibilities of the OWEA State Office

- Handle filing all Contact Hours (CH) with EPA and inputting them after the event
- Handle all registration and set up for events and provide all onsite supervision and execution
- Event marketing and promotions
- Establish event timeline (i.e. when registration opens, etc.)
- Pay invoices including reimbursements
- Liaison between the EC and Committees
- Order supplies for meetings/events
- Sign all contracts or MOUs with treasurer
- Logistics of events/workshops
 - Onsite contact with venue staff
 - Dates
 - Menus
 - Locations
- Attend section events as able
- Answer phone calls/emails about section events as relative
 - Process credit cards for section events
 - Reimburse sections quarterly for event payments processed by State Office
 - Liaison between the Sections, EC and Committees
 - Help with local contract questions and insurance issues
 - Provide insurance, tax filings and tax ID number

Responsibilities of the OWEA Sections

- Plan local events
- Provide CH at a low cost to operators
- Adhere to timelines for courses
- Submit all CH information via the electronic form
- Ensure course is relevant
- Ensure it relates to daily plant functions if applying for OM
- Return completed Contact Hour forms to the office in an appropriate time
 - Ensure all Operators fill out CH forms COMPLETELY
 - Receive and share member input
 - Plan for the future of the section
 - Share goals and overall vision with office for execution

Responsibilities of OWEA Committees

- Strategic Planning
- Technical program planning
- Setting program and meeting agendas
- Receive and share member input
- Plan for the future of the program/committee
- Share goals and overall vision with office for execution
- Give all relevant CH information and submit via proper online forms
 - Be budget conscience
 - Understand how YOUR committee fits with the overall OWEA vision

While we all have set roles and responsibilities, it truly takes everyone to make the Ohio Water Environment Association the great organization it is. I am both privileged and proud of my role here as your Executive Administrator. We have plenty of room still in the “village” so if you aren’t currently involved, please consider joining a committee or becoming active in your section.

Best, Dawn

DAWN SINK KENNEDY, CAE, EXECUTIVE ADMINISTRATOR



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By joining WEF, you also become a member of a local Member Association (MA). Please enter your membership category (Box 1) and the Local MA you wish to join from the list on the next page. **Note:** District of Columbia, Illinois, Maryland, and Virginia residents have two MA choices. Please indicate your primary choice in box 2 below. If you join both, please add your secondary selection as a Dual MA with the corresponding Dual MA dues in box 3 below.

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A Great Day for Celebration

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

In this article, I use the terms *innovation* and *invention* interchangeably. While *innovation* can be both a noun or verb, *invention* is a noun. Applied meanings for these words can overlap at times.

THE INVENTION PROCESS

I have always been fascinated with the process of invention. How does one get an idea and develop it into something useful and beneficial?

One of my first introductions into the invention process came from television. One product sold on TV during the 1970s was the Popeil Pocket Fisherman. In 1970 I thought this product was cool, but nearly five decades later I recognize it as gimmicky and ridiculous. Ron Popeil (1935-) was a symbol of that era, and a consummate salesman and inventor of kitchen gadgets and the portable fishing reel that one can keep in the trunk of their car. In spite of this first impression I have always been in awe of the invention process and hold respect for people with the ability to invent.

I do not work in research, but my brother is a research scientist at a university. He has given me insight into the classical research process and how it is done in university settings. In learning from him, the Water Environment Federation (WEF) and the Water Research Foundation, I have picked up a few tidbits of knowledge through the years.

I learned that research is driven by both grand ideas and grass roots efforts done at the university level through grant funding. Grass roots efforts are quieter in nature and considered to be traditional or “bottom up” research. Projects are limited in scope to a few years and geared to prove or disprove a hypothesis.

District Science Fairs and Stockholm Junior Water Prize, which we support at OWEA, are microcosms of the scientific process done by professionals. The science fairs are events where OWEA helps teach and guide our youth consistent with our mission statement. I am pleased to report that WEF has chosen the Ohio State University (OSU) to host the next three years of the Stockholm Junior Water Prize competition in the United States. Along with WEF, OWEA will have a large part in this event in 2019.

TO SUMMARIZE

The invention process is not based on speculation, magic, or the dark arts popularized during the late

Middle Ages in turning lead to gold using alchemy. It is based on a foundation of research and a body of knowledge done by intelligent and serious-minded individuals and institutions. The stories behind invention are fascinating. New inventions are developed on a good foundation.

ORIGINS OF NASCAR

One of my favorite stories of innovation involves NASCAR (National Association for Stock Car Auto Racing). NASCAR traces its beginnings from the 1930s when drivers ran moonshine during the Great Depression in rural areas of America. Early drivers were natural mechanics and had keen reflexes with the ability to drive fast at night on winding rural roads.

A popular car of this era was the 1939 Ford. Known for its balance, stability, sturdy frame and powerful V8 Engine, it could transport product by removing the back seat. This car could execute a 180 degree turn quickly and drive in the opposite direction and gear up quickly to full speed in a matter of seconds. This maneuver was called “the moonshine turn.” Enterprising mechanics tinkered with engines to create more power. All of this helped create respect for the profession of automobile mechanic, which led to continued development and evolution of the automobile that we see today. It is also the roots of NASCAR.

INNOVATION IN OUR INDUSTRY

A core theme of WEFTEC is Innovation with supporting themes of sustainability and resilience. Utilities in vulnerable areas are making strident efforts to undertake extreme event planning as a byproduct of climate change. WEFTEC had an Innovation Pavilion on the Exhibition Floor nestled between 1,000 exhibitors. There were many presentations on innovation, resiliency planning and other related topics.

We spend effort planning, designing, constructing, managing, regulating, and operating collection and treatment works with the purpose of providing efficient capture, transport, and treatment. We improve form and function by selecting appropriate equipment, to make facilities efficient, operable, maintainable and regulatory compliant. Historically, we have focused on solutions of reasonable cost, efficient and reliable treatment. Wet weather compliance was and continues to be a large focus area for Ohio and other Region V states.

Kocarek Korner

The paradigm of viewing a pollution control facility as a resource recovery facility is a new way of thinking. Impetus for this transformation was a result of the Great Recession in 2007-2009. While the Great Recession lasted less than two years, the slow recovery lingers. Since that time, utilities have been working harder to find new ways to keep systems working. This need is transforming our industry into a new way of viewing pollution control facilities.

One of the oldest wastewater treatment technologies is the primary clarifier. While seemingly plain and ordinary, the primary clarifier provides high value in removals. In this current era, our industry is beginning to view this old technology as a potential source of fuel rather than treatment process.

THE OPERATOR INGENUITY AWARD

Professional operators are amazing people. They have a broad knowledge of science, math, management, and an uncanny ability to fix broken equipment with limited budgets. Just like the beginnings of NASCAR with automobiles, I have found that operators can fix, repair and improve just about anything.

At WEFTEC this year, I heard a story about a Plant Manager out west who designed a new mixing system, that involved large air bubbles. His premise was to

introduce air in a small plastic chamber and applying the siphon principle to release air bubbles in an anoxic tank in a programmed sequence using programmable logic. During the question and answer period, I requested the speaker to submit the idea to WEF for the Operator Ingenuity Award.

If you have a story about operator ingenuity, please contact us. We look for new and innovative ideas to share with our members.

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Dale Kocarek



Ted Baker



Kathy Richards

WEFTEC is a time of transition for the WEF House of Delegates. WEF has a new President, Tom Kunetz from Chicago and a new Speaker of the House, Keith Hobson, from Iowa.

We have our own transitions in Ohio. Your WEF Delegates representing OWEA are Dale Kocarek, Ted Baker, and Kathy Richards.

Tom Fishbaugh is ending his term as an Ohio Delegate after completing his second non-consecutive three-year term, and Kathy Richards from the Akron Water Reclamation Facility and former NESOWEA President has joined. I (Dale Kocarek) remain on the HOD for one more year in my second consecutive three-year term. A year from now in 2019, I will end my term of service, at least temporarily, in the House of Delegates.

I wish to thank Tom Fishbaugh for his long-term service to OWEA and the WEF HOD. Tom has a long history of service to OWEA and WEF. He was OWEA President in 1999-2000 and a Delegate (then called Director) from

2001 to 2004. Prior to joining the HOD in 2015 again, he was on the Audit Committee for many years.

Tom's contributions to OWEA and WEF are too numerous to count and have been extremely valuable, particularly over the last year where we have had staffing transitions and difficult things to discuss and decide upon. Tom offered much wisdom and a historical perspective to the Board and WEF. He is also a good listener, problem solver, and has a good sense of humor. I enjoy going to WEFTEC and spending at least one evening with him.

Kathy Richards is our newest WEF Delegate. Kathy is employed by the City of Akron Water Reclamation Facility for 14 years and currently is the Environmental Compliance Team Leader, overseeing the Laboratory, Industrial Pretreatment Program and Regulatory reporting. She holds a B.S in Microbiology with a minor in Chemistry from the University of Akron and has 10 years' experience working in the private sector at various environmental laboratories.

Kathy acted as the NES Laboratory Analysts Committee Chair before being elected to the NES Executive Committee in 2012 and is the most current Past President. She was awarded the Laboratory Analyst Award from the NES, OWEA and WEF and is a member of the Crystal Crucible Society. Most recently, Kathy was the capable President

of the NESOWEA.

I (Dale Kocarek) was honored by WEF House of Delegates Speaker Aimee Killeen this year at WEFTEC on September 28, 2018 to receive Volunteer Service Pin. This award was created in 2017 to recognize outstanding service to the House of Delegates. I was one of three in the HOD honored to receive this award this year. I feel that it carries nearly the same recognition in the House of Delegates as the 5S Shovel. I felt truly honored and have greatly enjoyed being part of the WEF Community. I believe that I am well known in the WEF House of Delegates as I am at OWEA. For those interested in becoming a delegate, this helps make the commitment worthwhile.

WEF wants its delegates to be heavily involved in both their member association and WEF. This expectation is increasing more and more as we are the conduit for member associations to WEF. There is a burden of responsibility on us to provide information from WEF to OWEA and from OWEA to WEF.

We were given the opportunity to participate in the Student and Young Professionals Service Project at the Treme Community Center in New Orleans where a large rain garden/planter box was created. This project will help the local Parrish abate storm water drainage problems and provide a beautiful landscape feature.

WEF introduced three new workgroups this year: diversity; operator licensure, and service to member associations. Each reflects the strategic objectives of the WEF board of trustees. We will talk more about those as the year unfolds.



Service Project at NOLA Treme Community Center on 9-28-2018

Section Reports



SWOWEA

Dave Wilson, President

The last quarter of the year usually finds SWOWEA busy with events. Operator Education Day was on October 26, The Collections Systems Hands on Event was November 1, Lab Analyst Committee meeting at YSI was also November 1, November Plant Operations Seminar and Section Meeting November 15 followed that evening by a YP committee social event, Past Presidents Luncheon in early December and the new year will kick off with Southwest's Industrial Waste Seminar and Section Meeting January 24, 2019!

OWEA members have you considered "getting involved?" It takes many hands to organize and present OWEA and the section events. Being involved can be a most rewarding experience! Did you know that you do not have to speak publicly to be involved? You can be involved "behind the scenes" of events and never use a microphone. Did you know you do not have to attend a boatload of meetings to be involved? Most committees meet 4-8 times per year and all will gladly assign duties to folks who are absent from a meeting. So, what is stopping you? Get involved!!

I recently heard a speaker tell us to not forget the power of talking to people. Knowing that this makes me sound my age, I feel at times our technology makes us impersonal. The two-way street of communicating can

be lost in emails and text messaging. How often do we listen to someone? Do we notice the inflections in tone and timbre? Trying to communicate and convey emotions properly in electronic communications can lead to disaster, many times it is better to stop typing and start talking.

Lastly, I'd like to thank all our sponsors in the Southwest section for helping us keep our event prices low! Sponsorship allows us to put on the high-quality educational events you see in SWOWEA!

Work Hard and Have Fun!!

Dave Wilson, dwilson@blanderson.com



From left, Erik Torgersen SWOWEA vice president, Shaun Spiller Plant Superintendent Springfield Ohio WWTP, Dave Wilson SWOWEA president, Bryan Heck Deputy City Manager Springfield Ohio at the SWOWEA September 2018 Section Meeting.

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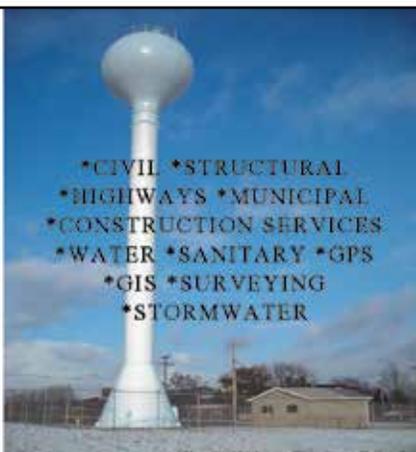
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Gary Bauer, President

Hello to everyone from the Northwest Section, during this busy time of year. Our final summertime event was our annual Friends And Family Day, which was held at Cedar Point in August. This year we had 45 people attend for a great day which included a picnic buffet, a presentation on asset management, and all the park rides you wanted!

Our October section meeting was held at the City of Lima WWTP. A big "Thank You" to the City and all the staff members for allowing us to visit and tour the treatment facility. We offered four contact hours, which included a tour of the Lima WWTP, presentations on their recent system upgrades and timely information from Ohio EPA on Revised Rules for Operators. In addition, our fall meeting included our annual pancake breakfast, with the proceeds going to Water for People. For about 12 years now, we have established this tradition that is unique to our section. This fundraiser doesn't bring in a tremendous donation, but it accomplishes three important goals:

- (1) It raises awareness of Water for People
- (2) It provides a chance for long time section leaders to serve and interact with the section meeting attendees, and
- (3) It's a small way of showing member appreciation (as we don't charge, only take free will donations).

The NW Section also held its legendary Operator Education Day on November 2nd at the Northwest Ohio EPA Office in Bowling Green. The review sessions were organized by Nelson Bear and designed for wastewater and collection system operators or trainees planning to take the certification exams. Grizzled veterans of wastewater

treatment taught three separate sessions: one for the Class I exam, one for the Class II and III exams, and one for the Collection System Class I and II exams.

The NW Lab Analysis Committee has been very active. On average, their meetings have been bringing 45 to 50 professionals together. They not only provide credit hour opportunities, but networking opportunities to give advice and help to our members with issues they may be having in their labs. Our Co-chairs Tony Hintze and Terri Brenner have also started a Facebook Group called "NWOWEA Lab Analysis Committee." On this page, they post relevant information for both lab personnel and operators. They keep members informed of events and members can also post and reach out to each other to ask questions.

The NW Young Professional group has a new chairman in Kevin Connor from Defiance. Kevin brings a fresh perspective to the NW Executive Committee. In August, YP hosted our first event in the last couple of years at the Lucas County Water Resource Recovery Facility. We had 16 people attend an hour long plant tour, followed by a meet and greet at the Beer Barrel at Fallen Timbers. Our event had a good mix of operators and engineers and we look forward to future events while hoping to increase the number of our participants. We are in the process of organizing a joint YP event with AWWA's northwest section in the near future.

The NW section is also very committed to offering training opportunities for the operators involved with small systems. The previous two years we have provided Lagoon Troubleshooting Workshops, which have included both classroom and hands-on training for the attendees. Plans are in the works to provide additional small system training programs in 2019.

By the time this is published, we will already be past Thanksgiving. From all of us in the NW Section, we wish you all a safe and happy holiday season. We are planning some great events and activities and look forward to serving our membership in the new year. Keep an eye on your email for details to come!

Gary Bauer gbauer@jheng.com



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Brenda VanCleave, President

Hello from the Southeast Section EC! Thank you to everyone who attended our Watershed Workshop at the Appalachia Ohio Alliance's Marsha Gunder Schneider Preserve. We were given a tour of the wooded grounds that described how our watershed is being preserved and restored downstream of the City of Columbus. A special thank you to our presenters and to Chris Tarr for coordinating the event.

The State OWEA EC has given the Sections a new challenge. We are to coordinate a college student design competition following WEF guidelines. The winner of our Section's competition will be given a free ticket to the OWEA State Meeting in June to compete for a chance to represent Ohio at WEFTEC. Details are still forthcoming, but we plan to hold the first competition in 2020. If you are interested in becoming involved, please contact either

Jamie Mills or myself.

We featured our YPs on October 11, 2018 and co-hosted with the Central Ohio Branch of the American Public Works Association (APWA). Attendees received a guided tour of Columbus' Southerly Wastewater Treatment Plant followed by a social at The Brew Brothers. This was a great opportunity to network and meet local working professionals, especially for students or someone looking to get into the field.

This year's Friends and Family event has been set for January 13, 2019 at the Columbus Blue Jackets game against the New York Rangers. Thank you to all of our Patron Program sponsors for making this event possible. The registration announcement for the Friends and Family Event will be coming soon.

Our February meeting will be hosted at the Sofidel facility in Chillicothe. Sofidel is one of the world leaders in the tissue paper production market for hygienic and domestic use: toilet paper, napkins, and kitchen paper towels. April's Section Meeting will consist of a tour of four wastewater facilities. The May Section meeting will be held up in Delaware and will be our annual Awards and Officer Elections meeting. More information to follow on these events.

Certification Update

by Kathy Richards

Hello all! I hope this finds you enjoying the cooler weather and fall foliage as we head into the holiday season!

I must admit right now that my age is showing – I once again neglected to acknowledge and congratulate the individuals that passed their examination way back in April. Please accept my most sincere apologies and understand that this omission does not in any way detract from your success!

As I compose this, I do not yet have the results from the October testing, but promise I will remember to recognize those who pass in the next Buckeye Bulletin! Additionally, I want to let everyone know that the test dates for 2019 have been set. The spring test will be on April 19th, applications must be postmarked by March 22nd. The fall examination will be on October 18th and applications must be mailed by September 20th. As always, the \$95.00 application fee is to be submitted with the application and is non-refundable. Please make certain you review the minimum requirements before you apply, and should you have any questions regarding your eligibility contact me prior to sending in your packet.

Class I

Dana Cavallaro
Kenneth Griffiths
Taryn Hanna
Jason Hoff
Darren Johnson
Brian Lusk
Jessica McGrain
Jessica Rogers
Michael Shaeffer
Philip Warren
Jessica Wilson

Class II

Kevin Connor
Kimberly Laquatra
Angela Reischman
Todd Saums
Thomas Zocolo

Class III

Thomas Fritz

Class IV

Nicole Erkkila

Industrial Inspector

Jerome Wright

Kathy Richards
Director, Board of Certification
KRichards@AkronOhio.gov

CALL FOR PAPERS

The Northwest Section of the Ohio Water Environment Association is excited to host the 2019 OWEA Annual Conference at the Sawmill Resort and Convention Center in Huron, Ohio from Monday, June 24th through Thursday, June 27th. Our members and conference attendees face many challenges with new and current regulatory requirements, development of emerging technologies and cost effective alternatives for routine operations and maintenance activities at their facilities. They are also faced with addressing aging infrastructure while striving to deploy new green and more efficient technologies – all while managing their most valuable resource, their staff.

These issues and challenges are important to our attendees and are captured in the technical program tracts (listed below). We are only accepting online submissions of abstracts in order to streamline the submission process and the gathering of your information. Please visit www.ohiowea.org to submit an abstract. Please remember to provide concise information and submit the required abstract (600 words in either Microsoft Word or PDF format) and biography information. This information will be used to review and select presentations for the conference technical program.

Please note: Presentation time slots will be 45 minutes long. Actual presentations should be 40 minutes in length allowing 5 minutes for questions.

Once again, we are very excited about the upcoming conference and look forward to an excellent technical program!

Kim Riddell - Furry
Technical Program Chair
kim.riddell@alloway.com



June 24-27, 2019



Sawmill Creek Resort, Huron

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Operations / Operator Ingenuity

VISIT WWW.OHIOWEA.ORG TO SUBMIT YOUR ABSTRACTS ONLINE BY MONDAY, DECEMBER 3, 2018

Plant Operations Update

by Joe Tillison and Walter Ariss, Co-Chairs

This has been an extremely busy last couple months for the plant operations committee. We hosted our Ohio Ops Challenge invitation at the One Water Conference, held a 3-day Activated Sludge Workshop in Fremont, OH, worked with three Ohio teams competing at the WEFTEC Operations Challenge, and hosted our annual Plant Ops/Laboratory two day workshop at the Nationwide Conference Center.

On September 11-13th the committee held our second offering of the hands on troubleshooting activated sludge course we introduced last year. This course was again well received by those who attended and got a chance to get down and dirty with activated sludge sampling and analysis. The skills learned are immediately applicable by the operators to their daily jobs at their respective plants. Special thanks to our instructors and the City of Fremont for hosting the event at their plant.

A huge thanks to the OWEA Executive Committee and all OWEA sponsors for sending all three Ohio WEA teams (the NWWSD Dirty Deeds, the Columbus Outfalls and NEORSD Insane in the Force Main) to WEFTEC this year in New Orleans, October 1-2 to represent Ohio in the national Ops Challenge competition! 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!

Congratulations to the Columbus Outfalls for placing 15th overall in Division II and to the Northwestern Water and Sewer District Dirty Deeds for placing 17th overall in Division II. Our new team for this year from the Northeast Ohio Regional Sewer District, Insane in the Forcemain finished in 23rd place overall in Division II. These are outstanding results given the field of 44 teams in Division II from across the county and worldwide. NEORSD Insane in the Forcemain also managed to bring home some trophy hardware by placing 3rd in the Process Control event. Excellent job for a first year team! Some additional statistics from the competition are: NWWSD Dirty Deeds placed 4th in the lab event barely missing the podium, and also finished 6th in the safety event; the Columbus Outfalls placed 8th in the Laboratory Event, and 9th in the maintenance event. We know all the hard work you put in preparing for the competition, AND IT SHOWED! Great job ladies and gentlemen!

Not only did we have teams compete, but Ohio was also very involved in the judging of the Ops Challenge event at WEFTEC. Two of the competition events are coordinated by representatives from Ohio and we had volunteers helping to judge in every event except collections. It was truly awesome to see Ohio so well represented not only in the competition but also in the judging.

Test Your Knowledge – Take the Operations Quiz

- 1.** Because septic waste is already partially treated, it tends to be lower in concentration or strength than typical domestic wastewater influent.
 - a. True
 - b. False
- 2.** This test measures the amount of free water in grit and screenings.
 - a. Biochemical oxygen demand
 - b. Mesh size
 - c. Total suspended solids
 - d. Paint Filter
- 3.** At a minimum, how often should screens be checked for visual or audible indications of malfunctioning?
 - a. Daily
 - b. Weekly
 - c. Monthly
 - d. Annually
- 4.** Fine screens capture more organic material than coarse screens.
 - a. True
 - b. False
- 5.** One consequence of allowing excess organic materials to be removed along with rags and other debris is _____.
 - a. Reduced disposal costs
 - b. Increased disposal costs
 - c. Generation of odors
 - d. Increased oxygen requirements

Adapted from WEF's Wastewater Treatment Fundamentals I – Liquid Treatment, 2018 Available online through WEF

**Answers noted below.
Have questions, comments, or want to submit a suggested question? Email OWEA at info@ohiowea.org.**

Answers: 1-B; 2-D; 3-A; 4-A; 5-C

Also a big thank you to all of the WEFTEC attendees that managed to stop by and cheer on our teams as they competed. I know they greatly appreciate the support you showed them.

The committee also held its annual Plant Operations and Laboratory workshop on October 11th and 12th, 2018 at the Nationwide Conference Center. With a large number of construction projects nearing completion or finishing up across the state we reached out to each of the sections for a plant profile. Many thanks to speakers from Fremont, Wadsworth, Eaton, and Pataskala for sharing information about their plants. Attendees also heard from the Ohio EPA Certification Unit on updates included in the recently effective Op Cert rules along with a potpourri of topics including computer modeling, new plant start up, phosphorus control, and career planning. Day One was rounded out by our cocktail hour roundtable discussion and recap in which all speakers participated. Day Two included an intensive session on change management, a look back at 30 years at the Newark WWTP, sewer line assessment, plant optimization, and capitol planning. This year the Laboratory committee provided concurrent sessions throughout both days, instead of just the second day. Many thanks to them for helping plan such a great workshop and to our presenters for sharing their knowledge with us. The committee is already starting to put some great ideas together for 2019 so please plan to put money in your budget to attend next year.



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 Joe Tillison at 419-354-6274 or Walter Ariss at 614-644-3075. If you are an existing team or considering having a team in 2019, 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!

Future Committee Endeavors

If you are looking for a place to plug yourself in within OWEA, the Plant Operations and Maintenance Committee might just be that place! In addition to Operations Challenge and our annual 2-day workshop, we have held a 3-day course for Activated Sludge Process Control the last two years. We have also developed a short course (3-hours) to be presented in the sections by Bob Brown. We hope to begin offering this course in 2019 So in addition to our regular committee activities, we have lots of new and exciting places to get plugged in! We need you – so call or email Joe and Walter and we'll get you in touch with our specific project leaders. We look forward to hearing from you soon!

Mark your calendars for all the Plant Operations activities for 2019! The Operations Challenge competition will be held at the annual OWEA Technical Conference and Expo at Sawmill Creek Resort in Huron on June 24th and 25th, 2019.

The Plant Ops committee would like to offer our most sincere gratitude to Kim Riddell-Furry, our former Co-chair. Kim has moved on from the committee in order to prepare for becoming President of OWEA. Through Kim's guidance and leadership, the Plant Ops committee continues to offer excellent knowledge from respected sources within the wastewater community at our events and workshops, and has grown our annual Ops Challenge competition into one of the premier invitational events in the nation. Kim, even though you will always be close at hand to offer support, we will miss you!

By Joe Tillison and Walter Ariss, Co-Chairs



Lab Analysis Committee Update

by Denise Seman and Melodi Clark, Committee Co-Chairs

Hello all! Have you had a busy and productive year? Is it just me, or has this year flown by?

Who's ready for the holidays, cold weather, snow.....

Do you have any areas of concerns? I have heard comments relative to updating SOPs to the new EPA standard and the need for lab certification review and preparation classes. What are your topics of interest? Please reach out and let us know how we can best help you in your endeavors. Our contact information is to the right.

Have a great one!

SW LAC – Karen Tenore and Jim Davis

Please check the calendar for upcoming events.

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 one of the co-chairs or a committee member.

NE LAC – Beverly Hoffman and Tom Zocolo

Greetings and salutations, my fellow laboratory dwellers!

Coming up shortly, we will be hosting a joint NE/NW Lab analyst committee meeting in Oberlin. At the time of this writing the broad details are finalized; we are to have sessions worth three O&M hours lined up, as well as a drinking water plant tour generously led by Bill Albrecht. Session topics are to include Lab Hazardous Waste Management, a specialized TDS and TSS workshop, and a Database Management/Control Charts training session. This is all to coalesce in most harmonious fashion on Thursday, November 15th, at the Oberlin Fire Department's new training facility. More detailed information will be forthcoming on our section website – nesowea.org

In the next year we hope to engage in further collaboration with our compatriots in the NW section. So far we have quite a few ideas on the brew but nothing quite concrete. Keep your eyes peeled for additional NE section meetings as well – we are committed to providing as many free O&M hour training opportunities as feasible.

As always you can reach us via nesowealac@gmail.com with your thoughts, questions, and concerns. You may also reach me through my CoA email address: tzocolo@akronohio.gov

Good tidings and accurate analytics to you all!

SE LAC – Melodi Clark

Hello fellow lab analysts! As I write this One Water has finished up. It was a huge success! I want to thank all the lab people that helped throughout the conference with the Ops Challenge, moderating tech sessions, and presenting. I am hoping to have one more SE meeting before the end of the year. We are also trying to put together a one day workshop to help people get ready for the Lab Analyst exam. If anyone has any suggestions or would like to help with the planning of the workshop please let me know. We will hold it here in Columbus at the Surveillance Lab.

NW LAC – Terri Brenner and Tony Hintze

Hello from the Northwest Section. We hope to see you at our next meeting, which will be a joint meeting with the NE LAC in Oberlin, Ohio on November 15th. This is a great chance to meet up with our neighbors and earn some free credit hours. If you haven't signed up yet, hurry before registration is closed.

Our email list keeps growing, so don't get left out. If you would like to be added send your info to (thintze@fremontohio.org) or to (tbrenner@ci.perrysburg.oh.us). Joining this list will keep you up to date on upcoming meetings along with any important information pertaining to the Lab. We look forward to hearing from you.

That's all we have this time around. We look forward to seeing you at the next meeting. And of course, always remember, working in the lab is just like cooking in your kitchen, just don't lick the spoon!

Committee mission statement:

The OWEA Laboratory Analysis Committee (LAC) strives to provide relevant and timely information on laboratory regulation and policy for the collection and analysis of wastewater and surface water samples. We strive to provide training in a relaxed, stress-free manner, to ensure the ability for participants to gain knowledge and skills to benefit them in their professional environment.

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.

LAC Contact Info

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NE Co-Chair

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NE Co-Chair

Tom Zocolo
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OPERATOR RENEWALS

Starting this year, ALL PWO MUST renew their license through the OEPA eBusiness Center. Don't wait until the last minute to review the accuracy of YOUR uploaded hours. Take a moment now and check out the OEPA eBusiness Center at <https://ebiz.epa.ohio.gov/> to see your hours from all training providers. OWEA can only address questions regarding OWEA state and section courses.

Have questions about how to view your hours?

http://www.epa.ohio.gov/Portals/28/documents/opcert/How_To_Renew_a_Certificate.pdf

Did you know that you get one hour towards your PWO renewal just for being an OWEA member? This is absolutely free and all you have to do is enter OEPA-B398593-X and attach a scan of your WEF Member Card in the OEPA E-Biz site. This site is your one stop to view all of your hours from ALL providers.

This free contact hour is just one of the many perks of being an OWEA member. We appreciate your support and look forward to continuing to serve you.

Best,

The OWEA Team

SAVE THE DATE - MAY 2, 2019

**COLLECTION
SYSTEMS
WORKSHOP**

Young Professionals Committee Update

by Lindsey Hassenauer, OWEA YP Committee Chair

Do you want to attend next year's 2019 OWEA Technical Conference & Expo for FREE? The OWEA Young Professionals (YP) Committee is pleased to announce that each OWEA Section is sponsoring the Young Professional Award for 2019.

The award winner will receive paid full conference registration from OWEA and an award from your Section.

To enter this competition, just submit an abstract for the 2019 OWEA Technical Conference & Expo to be held June 24-27 in Huron, Ohio. One winner will be selected from each Section. Visit ohiowea.org to submit your abstract by November 16, 2018.

Make sure you state the following info in your bio so we know you're applying for the YP Award:

State you're an OWEA Young Professional

Include your OWEA section (NW, NE, SE, SW)

Are you a YP and already submitted an abstract? Email OWEA YP Chair Lindsey Hassenauer at lhassenauer@hazenandsawyer.com.

Northwest Update

 Kevin Connor, NW YP Chair

The Northwest YP section recently held an event at Lucas County Water Resource Recovery Facility. We had a great turnout at the plant tour and at the happy hour event afterwards at Beer Barrel Pizza & Grill. We are in the process of planning our next event and are hoping to do a joint event with AWWA's YP group sometime this winter. So keep an eye out for future emails!

Just a reminder that young professional events are open to anyone looking for contact hours or anybody looking to network with other wastewater professionals, not just YPs! If you are looking to attend northwest YP events or have any ideas for future events feel free to email me at kconnor@cityofdefiance.com to get on the mailing list.



Southeast Update

 Jamie Mills, SE YP Chair

The Southeast YPs toured the Southerly WWTP on October 11, then headed over to Brew Brothers afterwards for a social/networking hour. It was a great opportunity to connect with other YPs in the wastewater field!

Contact Jamie Mills at Jamie.Mills@strand.com to receive information about upcoming SEOWEA YP events.

Southwest Update

 Lindsey Hassenauer, SW YP Chair

The SWOWEA YP Committee is hosting a social and networking gathering following the Plant Operations Seminar in Cincinnati on November 15. All SWOWEA members are welcome to attend – even if you're not a YP! Contact Lindsey Hassenauer at lhassenauer@hazenandsawyer.com for more information and to receive YP updates and events.

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Jamie Mills

Strand Associates

Jamie.Mills@strand.com

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OWEA 2018 Student Design Competition

by Krishna Chelupati, PE

The 2018 Student Design Competition winning team received an all-expense paid trip to attend One Water conference in Columbus. The students presented their project Please Do Not Feed-Medicare the Fish: Pharmaceuticals in WRRF Effluent on Tuesday, August 28, 2018. At the conference, the students attended the YP event and After Party at Brothers to interact with water professionals. They also networked with several industry representatives at the exhibitor booths, learned about career opportunities in the industry and attended various technical sessions on leading water and wastewater topics. The students expressed deep appreciation for the opportunity and shared their experience below–

Attending One Water conference was an absolute blast, and I am so grateful to everyone who helped facilitate my group's attendance. It was so exciting to be surrounded by professionals who are working every day to solve the issues we learn about in class. I think the Student Design Competition is an excellent way for students to apply their skills to real world issues and meet industry professionals along the way. I would recommend more students get involved in them. ~ Madeleine Harris, CWRU

Attending One Water Ohio was a great experience for me, especially as I begin my career. I learned so much in just a few days, from the technical sessions to the exhibition hall to the 5S induction ceremony. The highlight for me was getting the chance to meet and learn from so many experienced and knowledgeable water professionals. I left the conference confident that the water environment industry is the right place for me. ~Nicholas Merchant-Wells, CWRU

One Water was a phenomenal experience for me and my team. In addition to presenting on our project for the WEF Student Design Competition, I had the opportunity to attend numerous technical sessions and talk to industry professionals throughout Ohio at both the YP networking event and the evening event at Brother's. Seeing so many people come together to celebrate accomplishments and address challenges in water and wastewater has reinvigorated my love of both the subject and the industry. My team and I are unendingly grateful to OWEA for such a formative and exciting experience so early in our careers. ~William Worsham, CWRU



The student winners at WEFTEC



The winning team also received an all-expense paid trip to attend WEFTEC® in New Orleans. The team represented Ohio for the first time at the WEF Student Design Competition and competed with 22 teams from the United States and around the world on Sunday, September 30, 2018. The students also attended Ohio Mixer, interacted with experts in the water industry and attended the career fair.

Thank You OWEA and NESOWEA executive committee, Jamie Gellner, Fred Smith, Ted Baker, Kathy Richards, Jim Cooper, Paul Solanics, Dawn Kennedy, and Dr. Kurt Rhoads for your support in sending our team to One Water and to OWEA at WEFTEC® this year!

Akron's Blue Heron Homecoming

by Heather Bolestridge, PMT Communications Manager, Akron Waterways Renewed!

Each year, the City of hosts a day-long Environmental Festival and Open House that celebrates the accomplishments of Akron's efforts to clean up the local waterways and the flock of great blue herons that after many years of leaving the area, have returned and made the area near the Water Reclamation Facility into a rookery – a breeding place for heron families.

The Blue Heron Homecoming allows community members a chance to learn about the Akron Waterways Renewed! (AWR!) program and features representatives from the City of Akron, firms involved with the AWR! program, and partners such as local non-profits and environmental groups. The 2018 theme was "Be a Water Hero," and attracted more than 1200 visitors.

The event was held on May 5, 2018 at the Akron Water Reclamation Facility. This family friendly event included sign-ups for free rain barrels for the first 250 Akron families, sign-ups for free trees, walking tours of the Water Reclamation Facility, trolley tours of the KB Bio Facility and trolley tours to the Blue Heron Rookery on Bath Road, free lunch and a "theater" with videos of Akron's tunnel boring machine "Rosie."

"The Blue Heron Homecoming is one way we can continue to inform and educate the public about our commitment to improving our environment," said Mayor Dan Horrigan. "It allows us to tangibly show attendees

what their sewer dollars are being used for and why it is so pertinent to this and future generations."

Some of this year's other highlights included a place for children and adults to make their own rain sticks, two models of "Rosie," Akron's tunnel boring machine, scavenger hunts, prize giveaways, and several environmental exhibits from local consultants using "Project Wet."

Blue Heron Homecoming 2019 will be held in conjunction with the 50th anniversary of the "Burning River," joining several other local entities who will be celebrating how far Northeast Ohio has come with water quality.

The festival is named for the great blue herons that nest near the Water reclamation facility. The four-foot-tall bird is native to the area, but its population was declining due to the poor water quality of the Cuyahoga River. Since efforts were made to improve water quality, the great blue heron has seen a resurgence in the area, and is commonly seen along the Towpath Trail, Ohio & Erie Canal, Cuyahoga River and Little Cuyahoga River. This resurgence is a testament to the work that's been done so far, and serves as a reminder of the positive impact that the AWR! program is having on the local environment.



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 For questions, please call 330-375-2949.

Government & Regulatory Affairs (GARA) Update

by Dale Kocarek and Jason Tincu

The GARA and its sister committee, the Nutrient Committee, have been diligently working on a series of initiatives.

Nutrient Forum at the One Water Conference: This event brought together 12 subject matter experts across a diverse slice of the water quality sector as well as an experienced facilitator to better ‘understand Ohio’s nutrient puzzle.’ The session was well received, well attended and critical in opening up the conversation about how Ohio should attack nutrient management. A session debrief is located on 46-47.

Nutrient Workshop: Members from both committees are actively working to plan the Nutrient Workshop. This workshop will focus on nutrient solutions across any and all segments of Ohio’s land and water use.

Nutrients in Large Rivers Early Stakeholder Outreach: GARA is performing a review and comment letter for the Ohio EPA’s recent release: https://epa.ohio.gov/Portals/35/rules/ESO%20fact%20sheet_large%20river%20nutrients_aug18.pdf. This report and commensurate rule may have a large impact for our membership. Look for more information regarding this deliverable across the coming weeks.

We wish to provide a more even and consistent input to the Ohio EPA on proposed rules. In the past, we have been effective in reviewing and commenting on rules, but our original Technical Assistance Group has changed in recent years. We have a group of technical advisors for nutrients, but we need others for wet weather issues, integrated planning, biosolids and others. If you have an interest in being part of this group, please contact Dale Kocarek at dale.kocarek@stantec.com.

We derive information and direction from the WEF Government Affairs Committee. We are working with

them to develop a policy and position statement on Climate Change at the direction of the Board of Trustees. After that, we will develop a position statement. Since the original position statement on climate change was developed in 2006, WEF has been part of additional efforts pertaining to resiliency and extreme event impacts.

The WEF Government Affairs Committee (GAC) reports USEPA is evaluating and possibly amending the flow blending strategy to allow more flexibility. Under the current approach, blending may be practiced by POTWs on a case by case basis as part of a defined wet weather operational control strategy. WEF GAC has also reported interest in lengthening NPDES permits from 5 years to 10 years. The logic is that this would help states control backlog of permit renewals. It would also provide more certainty for POTWs for project planning to meet new requirements.



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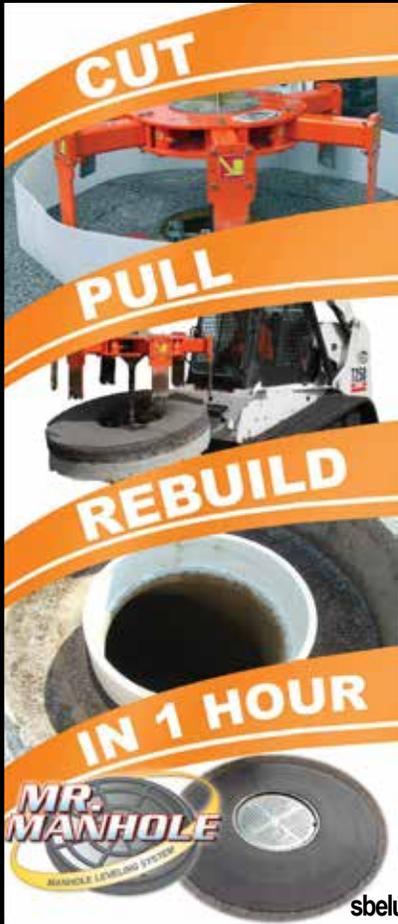
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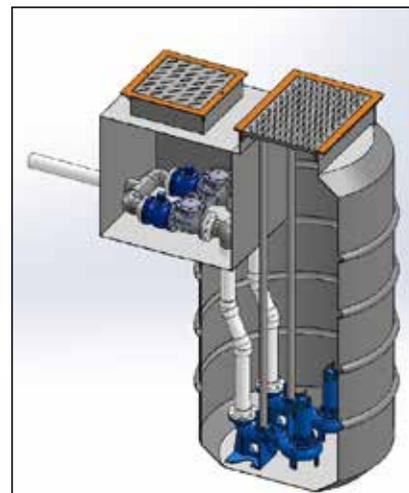
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Allied Pump Rentals	31
Allied Underwater Services	94
Alloway	84
Baker & Associates	35
BissNuss, Inc.	43
Black & Veatch	47
BNR	79
Brown and Caldwell	41
Buckeye Pumps	49
Burgess & Niple, Inc.	47
CDM Smith	95
Chesley Associates, Inc.	25
CT Consultants.....	89
CTI Engineers, Inc.	57
DA Van Dam	82, 85
Delaney & Associates.....	51
DN Tanks	43
DLZ	19
E & I Corportation.....	57
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J.G.M. Valve Corporation	57
Jones and Henry Engineers	79
Jones and Henry Laboratories	98
K.E. McCartney and Associates.....	95
Lakeside Equipment Corporation.....	86
LiquiForce.....	91
MASI Environmental Laboratories.....	19
Medora	97
Mid Atlantic Storage Systems, Inc.	28
Mixing Systems, Inc.	Inside Back Cover
Mott MacDonald.....	88
ms consultants, inc.....	43
ms process.....	66
North Shore Pump and Equipment Co.	28
OHM Advisors	31
Penn Valley Pump	90
Pelton Environmental Products.....	94
Prime AE.....	89
RA Consultants, LLC.....	35
RootX.....	43
Schultz Fluid Handling Equipment, Inc.	88
Smith Environmental, Inc.	86, 89
Stantec Consulting Services, Inc	85
Strand Associates, Inc.	51
T.C.C.I. Laboratories, Inc.	70
T and M Associates.....	45
The Bergren Associates	31
Umbaugh.....	28
Underground Rehab Solutions	82
USA Bluebook.....	Inside Front Cover
Wessler Engineering.....	79

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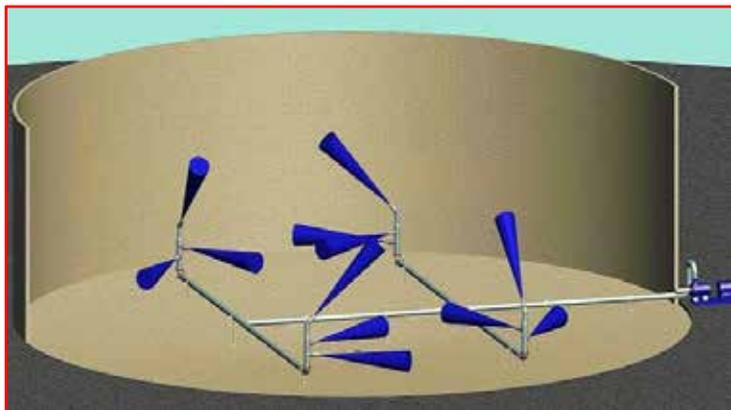
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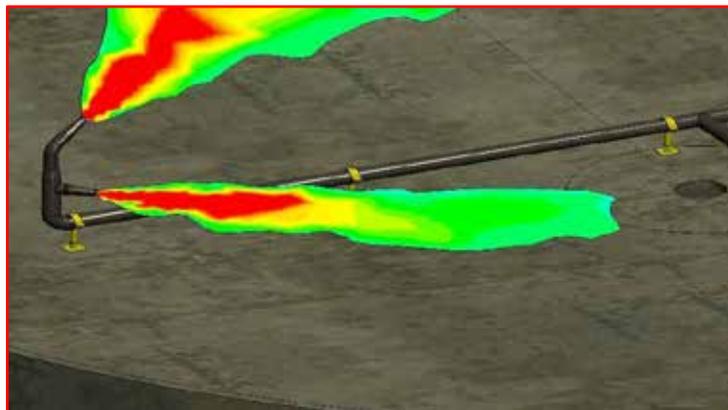
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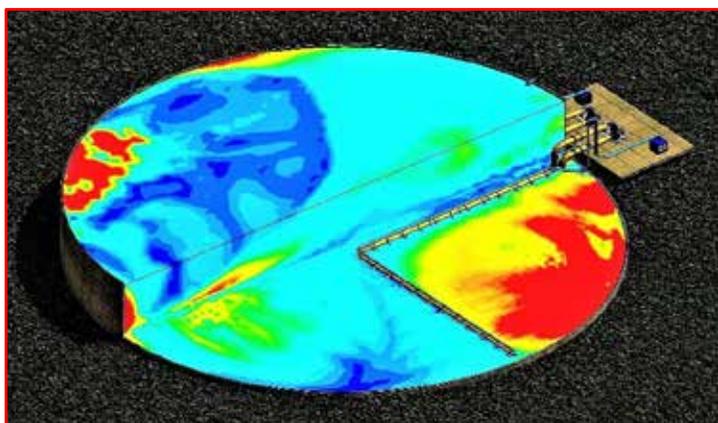
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