The Clarifier is the publication of the Wisconsin Wastewater Operators’ Association and is intended to inform and educate the membership on issues related to the treatment and control of wastewater. The Clarifier is produced five (5) times each year: February, April, June, September, and December. All members are encouraged to contribute to the mission of the Clarifier.

The Wisconsin Wastewater Operators’ Association is a non-profit organization dedicated to educating, informing, and advancing the wastewater profession. WWOA has approximately 2,000 members divided throughout six regions: Southeast, Southern, Lake Michigan, North Central, Northwest, and West Central.
Presidents message: You are crucial to your community

Greetings to all of my professional wastewater colleagues! Many of you enjoyed a great annual conference with us at the KI Convention Center in Green Bay in October. We had very good attendance, with 866 registered attendees. Thank you to everyone that presented, moderated, competed, took photos, handled registration, helped set up or take down, or assisted with the conference in any other way. It is through all of your collective efforts that we can make this annual conference such a success each year.

As I’m writing this article I’m enjoying a beautiful fall day. For all of you outdoors enthusiasts out there, we know that along with the cooler temperatures and falling leaves comes some great deer activity, duck migrations, and fall fishing opportunities. Even if you don’t enjoy hunting or fishing fall can be a great time for camping, bird watching, and walks to enjoy the peace and serenity nature has to offer. I hope you found time in your busy schedule to experience all of these great things this season.

We are fast approaching the holiday season. So often many of us get caught up in the hustle and bustle of the season, shopping, decorating and traveling. As an adult the season doesn’t always seem quite as magical as when we were kids. This year, take some time to enjoy the season, cherish the time you get to spend with family and friends while enjoying family traditions or creating new ones. This season is truly what we make of it, so when January rolls around this year, I’d love to have everyone reflect back and be pleased about how much they enjoyed their time together.

For those who do not know me as well, I’m a UW-Stevens Point grad (Go Pointers!!), and I have spent the last 19 years working in various roles at NEW Water, the brand of the Green Bay Metropolitan Sewerage District. I started my career as an intern, then worked as an Apprentice Operator, a Treatment Operator, and Treatment Leader, before moving into the Watershed Programs Manager role, and most recently the Director of Environmental Programs.

All of my roles have allowed me to focus my efforts on water, which I’ve had a deep passion for since I was young, like many other fellow WWOA members. I have had the privilege of serving and being a part of this great organization for my entire career. I am truly looking forward to the opportunity to work with a great Board of Directors this next year to plan and organize another great year of training sessions, workshops, and the next annual conference.

As we think about each of our roles in the wastewater industry, take a moment to reflect on just how crucial your role is to the community you serve. Take pride in your work, and try each day to make a difference. I would like to share the vision statement of NEW Water: “Protecting our most valuable resource, water”. I truly believe each and every member of this organization lives out that vision each day in their role.

Wishing you and your family a safe and blessed holiday season. Stay warm, and enjoy what the season has to offer.

Jeff Smudde

Clarifier deadlines 2020

<table>
<thead>
<tr>
<th>Issue</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>February</td>
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<td>April</td>
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<td>June</td>
<td>May 15</td>
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<tr>
<td>September</td>
<td>August 14</td>
</tr>
<tr>
<td>December</td>
<td>November 13</td>
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</tbody>
</table>
Short in stature, large in life

I met Jim Shaw when I was attending the WWOA Convention over twenty years ago. Jim Shaw and Carol Strackbein were the head of the exhibit, manufacturers and consultants committee. I was invited by them to join the committee. I did not realize how much being a part of that group would change my life.

Jim was a mentor and like a second father to me. He was not shy about expressing his opinions. Jim felt an obligation to pass along his wisdom and for that I am forever grateful. The key was to listen and take the advice he offered. A high-quality individual, he was as knowledgeable and as respectful as they come. Frankly, I was honored and often questioned why he chose to align himself with our company over fifteen years ago. I believe he saw a young company that he could have a great effect on and assist in growing a business the right way. The Jim Shaw way.

In our industry, Jim had a great influence on many people. In 1997 WWOA awarded him the Koby Crabtree award one of the highest awards in our industry. This award is given to members who are pioneers in their research and take that information and share with fellow members. He had an incredibly strong work ethic, and he truly led by example. He was a person that chose to be heavily involved. He is a life member of the American Society of Civil Engineers, Central States Water Environment Association, American Water Works Association, and Wisconsin Wastewater Operators’ Association. He graduated from Marquette University; taking great pride in being a Marquette Warrior. In 2014 he received the service award from the College of Engineering.

We were colleagues, business partners, but most importantly great friends. When Jim retired, we continued to stay close and in touch. We would regularly meet up to have breakfast, lunch, or a beer. Jim would frequently stop by and pop into our office. He would bring popcorn and tell stories of the old days of business. Those were special days. We are all better off that Jim was a part of our lives. He was unique, and an extremely special blessing.

During our meet ups, he talked so fondly of his grandchildren, children, and his partner in life, Denise. God Bless you my friend. You will be missed.

Tom Mulcahy
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City of Manitowoc Wastewater Treatment Facility

History and Upgrades
The City of Manitowoc Wastewater Treatment Facility is located on the shore of Lake Michigan adjacent to the South pier and car ferry dock of the Manitowoc harbor. It has been a fixture in the community since 1939 when the first treatment facility was constructed. The City of Manitowoc has a population of 34,443 and has 13 lift stations positioned throughout the city to transport wastewater within 190 miles of sanitary sewers to the wastewater treatment facility.

The WWTF has had multiple upgrades throughout the years to continue to provide efficient treatment as population grew and technology advanced. The first plant upgrade occurred in 1959 which added capacity and secondary biological treatment. Secondary treatment was achieved using trickling filters with rock media. Remaining solids and sloughings from the rocks were removed in three new rectangular final clarifiers. The cost was approx. $1.43 million.

The upgrade that occurred in 1976 brought the current aesthetics and blueprint that defines the wastewater treatment facility. Construction brought in more fill to the south and multiple buildings were constructed to house the new treatment structures and associated equipment. The old final clarifiers from 1959 were converted to Primary Clarifiers. Secondary treatment capacity was enhanced with the addition of the Stack/Trickling Filters and effluent quality enhanced by three new circular Final Clarifiers. The addition of the Tertiary Filtration building was also added to provide one more layer of solids removal that continues on page 8.

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then removes BOD and P. A new chlorine contact chamber was constructed to disinfect the final effluent with chlorine addition at the head of the chamber and sodium bisulfite added at the end to remove any residual chlorine before outfall to Lake Michigan.

In 2001, the upgrade highlights included: a new Preliminary treatment building (Headworks), an additional circular primary clarifier, a new pump station for the rock filters, a fourth circular final clarifier, and incorporation of a SCADA system. New belt presses and digester covers were added. Also, there were various replacements or rebuilding of pumps and facility equipment.

The most recent upgrade concluded in 2019. The 1959 rectangular clarifiers were removed and a new circular primary clarifier was installed to spec of the 1998 primary clarifier. Additional equipment installed was a new efficient fourth boiler, a new efficient final effluent pump, and a new heat exchanger. All new MCC panels, switchgear and associated transformers, circuit breakers, and controls were updated. Also, new HVAC units and associated controls were installed in multiple buildings.

A unique aspect of the new clarifier is that it can me run in one of two modes. It can be used as a traditional Primary clarifier to remove solids, grease and BOD loadings from the influent prior to the trickling filters. The second mode is to put the clarifier in Intermediate mode. In this mode the influent flow is from the trickling filters effluent. In Intermediate mode the clarifier removes solids and BOD loadings from the trickling filters and the attached biological sloughings that release from the media. The sloughings formerly built up in the Rock Filter wet well and had to be vacuumed for removal. Another benefit is the biological sloughings accumulate in the clarifier in Intermediate mode and are pumped to the anaerobic digesters. Additional gas production has been observed from this mode and utilized in the boilers.

**Flow Schematic Description**

The wastewater from the city comingles into a 60" pipe that enters the wastewater facility. An influent sampler collects the wastewater before entering the raw wet well ahead of three screw pumps. Each pump is rated for 19 mgd. The current average flow is around 7.5 mgd.

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Raw wastewater enters the Preliminary Treatment Building (Headworks) via the screw pumps and flows through one of two Fine Screens. The screens have 1/8” spacing between the fixed and moving lamellas. Level transducers ahead and behind the screens activate the screens to run based on channel level. The screenings that are collected are dumped into the washer-compactors. The screenings are washed to remove the organics and compressed to dry before being transferred to a nearby dumpster for disposal. The flow then enters the grit chambers for removal of sand, grit, and other inorganics. The grit is pumped as slurry to the grit classifier and augured into the dumpster.

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continued on page 12

How healthy is your wastewater?

Nutrient Facts

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Amount Per Serving</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOD</td>
<td>250 mg/L</td>
</tr>
<tr>
<td>Total Solids</td>
<td>700 mg/L</td>
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<tr>
<td>Dissolved</td>
<td>500 mg/L</td>
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<tr>
<td>Suspended</td>
<td>200 mg/L</td>
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<tr>
<td>Nutrients</td>
<td>50 mg/L</td>
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<tr>
<td>Nitrogen</td>
<td>40 mg/L</td>
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<tr>
<td>Phosphorus</td>
<td>10 mg/L</td>
</tr>
<tr>
<td>Chloride</td>
<td>50 mg/L</td>
</tr>
</tbody>
</table>

Ingredients: Wastewater (domestic, industrial, commercial, agricultural), runoff, stormwater, sewer /l.

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MADE IN
The flow enters a channel outside the Preliminary building and flow is measured through a Parshall-Flume before entering a splitter box that allows variation to directing flow to the Primary Clarifiers. The new Primary Clarifier has the option to run as a Primary or Intermediate Clarifier. Primary clarification removes settleable and floatable solids along with grease. The solids are concentrated and pumped to the anaerobic digesters.

Primary effluent enters the Trickling Filter wet well where one of three pumps lifts it up to the two trickling filter structures. Water flows out the distributor arms over the plastic synthetic media. Aerobic fixed bacteria affixed to the media consume the organic matter, reproduce, and eventually break off (slough) and are carried down to the Intermediate clarifier (if in mode) or the Rock filter wet well.

Approximately 85-90% of BOD removal occurs in this step. Trickling Filter effluent enters the Rock Filter wet well where it is pumped into one of two Rock Filters. Again,
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this is a trickling filter process that utilizes a 6 foot depth of varied rock sizes to “polish” the remaining organics and remove another 5-15% of BOD.

The treated water is then pumped back up to a channel that feeds the chlorine contact chamber. Chlorine gas is introduced at the head of the contact chamber and sodium bisulfite is used at the end of the chamber to remove any residual chlorine before discharge to Lake Michigan.

Solids Handling
There are two Primary Anaerobic Digesters where solids produced from the treatment of the wastewater are sent for proper digestion. Anaerobic Digesters have to be maintained at a temp range of 92 to 99 degrees to promote acid forming bacteria and methane forming bacteria to breakdown the organic matter in the sludge. Methane gas is produced during this process and is utilized by the boilers. The boilers generate heat and a closed-loop hot water pipe system is used onsite to heat the Primary Digesters along with all the buildings at the facility.

When the digester levels reach a certain level the sludge is transferred to a Secondary Digester. This is a holding tank for the sludge. Supernate is drawn off when available to concentrate the sludge to higher solids concentration. The sludge is then hauled to either sludge lagoons for storage or land applied on agricultural fields.
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Notes
There are 23 Permitted industries in the Pretreatment Program. The Wastewater Treatment Facility is operated 24hrs a day. 1st, 2nd, 3rd shift operators

Staff
The staff at the City of Manitowoc consists of 15 employees: Superintendent, Assistant Superintendent, Mechanic Electro Mechanic, Electrician Daytime Relief Operators (3), Shift Operators (4), Lab Chemist – Pretreatment Coordinator, Lab Assistant – Safety Coordinator, and an Administrative Assistant.

Manitowoc Wastewater Treatment Facility Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Design Capacity 2019 Data of WWTF</th>
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<tbody>
<tr>
<td>Population</td>
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</tr>
<tr>
<td>Flow Design (mgd)</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>15.5</td>
</tr>
<tr>
<td>Max 24 hr</td>
<td>25.9</td>
</tr>
<tr>
<td>Peak Hr</td>
<td>30.9</td>
</tr>
<tr>
<td>BOD (lbs/day)</td>
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<tr>
<td>Average Daily mg/l</td>
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<tr>
<td>TSS (lbs/day)</td>
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<tr>
<td>Average Daily mg/l</td>
<td>220</td>
</tr>
<tr>
<td>P (lbs/day)</td>
<td>1160</td>
</tr>
<tr>
<td>Average Daily mg/l</td>
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</tr>
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WPDES Effluent Limits (Monthly Average)

<table>
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<tr>
<th>Parameter</th>
<th>Limit</th>
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<tr>
<td>BOD, mg/l</td>
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</tr>
<tr>
<td>TSS, mg/l</td>
<td>30</td>
</tr>
<tr>
<td>P, mg/l</td>
<td>0.9</td>
</tr>
</tbody>
</table>

Contact us today!
American Water Works Association
Veteran’s Workforce Initiative

By David M. Kelter-Relief Operator- Appleton Water Utility and WIAWWA Regulatory Committee Vice-Chair.

Like a number of you reading this article, I stepped forward, raised my hand and gladly pledged service to our great nation. I served a four year enlistment to the United States Air Force after graduating High School in 1992. (For those reading this article that have served or continue to serve, thank you.)

A young, unfocused yet well-intentioned teenager was about to leave his life of leisure and comfort (sort of) and enter a world of regiment, detail, and calisthenics. Lots of calisthenics. An eye opening transition to say the least as many fellow Veterans can attest to.

Fast forward to March 1996, my enlistment was nearing its end. It was time to start preparing for yet another major transition- a soldier leaving the military lifestyle for that of a private citizen. Fortunately the Air Force had a very good transition assistance program that made this process much less stressful, and helped prepare me for the working world.

We were taught how to create a resume, how to prepare for and conduct an interview, and the best places to look for employment opportunities. And as many of you remember from those days that meant scanning piles of newspapers, clipping job ads and filling out applications until your hand simply went on strike.

One point our transition coach emphasized is no matter how well you have marketed yourself to the working world, there is no guarantee that you will be hired. You are one of any number of candidates for a particular position. Your experience and Honorable Discharge won’t necessarily get you to the front of the pack. As he put it, “You have to hope they like hiring GIs.”

Now I was very fortunate to have spent my time in the Air Force as a Utilities Systems Journeyman. Nearly four years of classroom training and on the job experience with plumbing, water treatment and distribution and wastewater collection and treatment. An occupation with great security whether I chose to be a career Airmen or a regular citizen.

A career serving a great purpose and one that provided long term security are a few of the reasons I chose this amazing profession. That is why I believe Vets are a great fit for the water industry and vice versa. Providing the gift of clean water to our communities is a never ending quest that offers tremendous opportunity for many years to come.

In August 2017, The American Water Works Association created a Veteran’s Workforce Initiative to investigate ways to help veterans secure jobs in the water industry.

The AWWA believes military members are a great fit for the water sector because of their technical expertise and experience working nontraditional hours in a regulated environment. The program has two aspects:
1) A volunteer support network consisting of Section members who will serve as the critical connection between local water industry entities and separating military personnel interested in water industry careers.
2) Toolkits
   • One for personnel separating from the military (How to find a job)
   • One for utilities (How to hire a Veteran)

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For additional information regarding this initiative, I invite you to visit awwa.org/veterans. Or you may contact me by email at David.Kelter@appleton.org or veterans@awwa.org. As the volunteer for the Wisconsin Section, I would be happy to answer any questions you may have or share any additional information you may need regarding this initiative.

Now I do not mean to take anything away from those applicants who represent other walks of life. After all, every organization hopes to hire those that have the right combination of talent, education, experience and team-chemistry that best matches the continuity of the organization. But the focus of this article however is to promote Veterans and highlight a number of critical attributes they possess that are quite beneficial to public sector utilities.

First, a service before self mentality. Regardless of our job titles, we are public servants first and foremost. A service before self mind set is at the very core of everything we as public utilities do.

Second, familiarity with organizational structure. Also known as “Chain of Command.” The similarities between these two structures make for a more seamless process for both the employer and the Veteran.

Third, working towards a common goal. Regardless of the individual political, religious or philosophical viewpoints that make up a workforce, Veterans know all too well the importance of working towards a common goal and achieving your mission as part of a team.

Last, a sense of pride that just can’t be found anywhere else. I like to view PRIDE as an acronym: Productive, Responsible, Innovative, Dependable, and Ethical. All characteristics that are always welcome within a positive and prosperous work environment.

Now obviously the list of positives could continue on for quite a while, but I wanted to focus on some of the more pertinent and relatable attributes. The ones that are character based and not merely credentials. All of which only make any organization stronger. The intangibles that may not show up in a resume or on an application, but rest assured they are there in a selfless abundance.

Thank you for your time. Have a great rest of your 2019.
Kenosha Water Utility hosts September southeast meeting

The meeting of the Southeast Region of Wisconsin Wastewater Operators’ Association (WWOA) was held on September 18, 2019 at 5500 1st Avenue Kenosha, WI 53140 with the Kenosha Water Utility hosting the meeting. There were 67 members, 22 non-members, and 12 exhibitors in attendance.

The meeting started with Mayor of Kenosha, John Antaramian, welcoming the group to Kenosha. John talked about some of the history of Kenosha specifically, the challenges the City faced with industry leaving in the 70's and 80's. The example he gave was the neighborhood that the meeting was hosted at. It was a former industrial site that was left abandoned. The City had to reinvent itself many times and the point that John wanted to drive home is that people in the water and sewer industry have very much been a part of that.

Our first presentation was about aeration evaluation and blower improvements in Kenosha given by Nathan Cassity of Donohue & Associates. In 2015 Kenosha did an aeration evaluation to see if there were ways to become more efficient to cut operation costs. Essentially, they were looking for the low hanging fruit. Initially, they found that simply making some blower upgrades that there was the potential to save some money. Focus on Energy got involved and they then looked at a possible blower and diffuser upgrade. Kenosha conducted off-gas testing to see what the oxygen transfer efficiency was. What they found is that replacing the diffusers could offer substantial savings as well. In the end, they added two blowers and replaced their ceramic diffusers with membrane ones and estimate a project payback of about 8 years with over $100,000 in electric savings a year.

Our second presentation was given by Chris Kincaid of Enviro Care and Kate Karow of KWU. They talked about Kenosh’s screening upgrade. They started by offering some background information on original the screening process. The facility was constructed in 1982 and consisted of a ¾” mechanical bar rake system. The screen stopped big objects, but in heavy flows allowed a lot of undesirable items such as wipes to flow through, which was a maintenance nightmare. Kenosha evaluated many types of screens and decided on a through-flow band screen. The screen offers a high capture rate and excellent flow capacity. Since the completion of this project they have not had any more failures in their primary clarifiers due to grit and thrash.

After a short break, we continued with our next presentation about Kenosha’s solids handling given by Melissa Arnott. As in our previous presentations the theme remained the same, Kenosha was looking for ways to become more efficient. They were also looking to produce a high-quality class A sludge. They did this by way of centrifuge. They use centrifuges for both primary and WAS thickening. They also invested in a PONDUS TCHP, thermo-chemical hydrolysis. The process essentially conditions the sludge in an alkaline environment that is heated to about 160⁰. Other parts of this project included bio-gas scrubbing, combined heat and power engines, dewatering centrifuge and a bio-solids dryer.

Before taking a break for lunch, we had a DNR update and our business meeting. Nick Lent with the DNR started by filing everyone in on the Lake Michigan discharge update. Interim phosphorus limits have been set for .06 mg/l. There is also talk that there will be changes to disinfection testing in the coming year or so. The DNR is looking to move to testing E-coli instead of fecal coliforms. PFAS was another topic and the DNR is looking at how it can be addressed at the source. The State Lab says they have developed a standard procedure for testing for PFAS even though there is not one that has been accepted by Standard Methods yet. After the DNR update, we began our business meeting.

The minutes and the treasurer’s report from the Lakeland meeting were both approved. WWOA State Representatives talked about the Operator’s Competition. We filled everyone in on the direction of the Tuition Aid Program. We had elections for Vice-Chair and Treasurer. They were won by Theresa Brown-Williams and Dave Bogie respectively. We

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recognized for Donohue for beverages, Envirocare and LAI for breakfast, Melissa Arnott for hosting the meeting, Nate Tillis as the past Chair, and Paul Gagas for all his years serving our region.

After lunch the meeting resumed with a presentation about Kenosha’s trials to reduce ferric chloride use and odors given by Mike Nelson of USP Technologies and Tim Bunker of KWU. In 2015 Kenosha began trials to reduce odors while fine-tuning the amount of ferric chloride they use.

Kenosha’s Wastewater plant is in the middle of a highly residential area and receives odor complaints often. They also wanted to achieve greater phosphorus removal while using less ferric chloride.

They noticed that most of their odors came from open tanks and hauled waste so, they focused on those areas. They tried potassium permanganate with no luck. They also tried peroxide and ferric.

What they found was by splitting dosage of ferric between the hauling station and grit basin they had the best results. Ultimately, they found a way to optimize their ferric dosage while reducing odor complaints.

We ended the day with a motivational and leadership development profession. Alonzo Kelly of Kelly Leadership Group presented about Maintaining Our Sanity in a Climate of Change.

Alonzo talked about leading your learning. “Ask people what they see and allow them to be right. Let me understand why you are right.” He went on to explain that we all learn differently and that it’s a waste of time to argue about who is the “rightest.”

The meeting was adjourned, and the day ended with a plant tour of the Kenosha Wastewater Treatment Plant.

A big thank you to Kenosha for hosting the day, and to all who sponsored the meeting.

Submitted by Wayne Castle, Southeast Region Secretary.

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Everywhere you look
City of Ripon hosts August southern regional meeting

WWOA Southern District Meeting 8/7/19
Hosted by City of Ripon
Thank you to SEH for sponsoring the meeting and providing refreshments.

The Mayor of Ripon, Gary Will, welcomed all in attendance. Autumn Fisher from CLEARAS was the first speaker of the day, and she talked about the benefits and selection of advanced biological nutrient recovery for phosphorus. Autumn explained how CLEARAS began as an algae growing and harvesting company, and along the way discovered that the process was beneficial for nutrient removal from wastewater streams.

Since 2008, CLEARAS has completed approximately 55 pilot plants. The process functions like a traditional activated sludge process to remove excess contaminants and increase dissolved oxygen. The waste activated algae can be utilized for soil amendments, food and feed, bioplastics, biofuels, and biochemicals. CLEARAS partners with the facility to find the buyer and does the marketing and communications, sales, contracting, and logistics management for the waste algae. Two current CLEARAS projects include one in Roberts, WI and Waupun, WI.

The next speaker was Dan Shaefer from SEH. Dan discussed regulations, variances, source reduction measurements, and alternative compliance paths regarding chlorides. The DNR primarily looks at toxicity for the fish and aquatic life for setting limits in WI. 757 is the limit for acute toxicity and 395 for chronic toxicity. Variances are put in place when it has been demonstrated that achieving the limit is not feasible due to reasons such as naturally occurring chlorides, discharging to low flow streams, dams and diversions, natural features, and would provide widespread social and economic impacts. One path to compliance is source reduction.

The following speaker was Dave Roskowic from ChemScan with his presentation on the importance of online nutrient analyzers. Online instruments are powerful tools for both water and wastewater applications that help reduce operation and chemical costs. One problem that can arise is the optimization of the chemical feed process. The benefit of online instrumentation is the ability to measure process chemistry for the sake of controlling it. The main focus was on the effluent ortho P analyzer which is primarily used in WI. This can reduce the cost of the chemicals since it adjusts based on concentration not flow.

Laura St. Pierre from YSI-Xylem reviewed the science of ORP, the applications for monitoring, the technology for monitoring, case studies, and sensor care. ORP indicates the water’s relative state to receive or gain electrons. One of the applications for monitoring ORP are when combined with DO it can tell if the plant is in conditions for denitrification or fermentation. By monitoring ORP we can understand how close the plant is to the denitrification and nitrification process.

Southern District Business Meeting and DNR Update
Amy Garbe gave the DNR update. She talked about the PFOS letter which was sent to 125 municipalities. The DNR is pairing with UW Madison to do a fate and transport study to see where the PFOS is going and in what quantities. Participating in the study is not required but recommended. The Department’s intent is to understand how widespread the issue is.

The Southern District Business Meeting started at 11:30 am. Corrections were made to the Treasurer’s Report that was continued on page 21
given at the Lake Mills meeting. The May meeting minutes approved.

The current Treasurer’s report was given.
- Alex Krause, and operator form FDL WWTF, is the secretary for 2020.
- The Winter 2020 host is TBD, Spring 2020 meeting will be in Fennimore, the Summer 2020 meeting will be in Mount Horeb
- Anyone interested in hosting a meeting in the future, please let us know.
- Presented Chris Liveris with plaque for hosting the meeting

A motion was made to adjourn meeting and seconded at 11:56 am.

Thank you Cody Schoepke for your service to Southern District the last 3 years.

Josh Gable from Centrisys gave the last presentation of the day on sludge thickening and dewatering technologies. Josh discussed the costs of dewatering and the different equipment utilized. The thickness depends on the equipment and the destination of the solids.

Centrifuges can generate a drier cake without using as much polymer, and they can also tolerate a thinner solid entering. The majority of the focus was on the use of centrifuges and how they work. Waste activated sludge is the best material to put through a centrifuge and the simplest.

Others that can be used but are more difficult are primary sludge and digested sludge. He also mentioned the things you should know when looking at centrifuges: daily operation, power consumption, wear protection, and maintenance.

City of Ripon WWTP Facility Tour at 560 Aspen Street
Ripon, WI 54971.
Laboratory Limelight: What does traceability really mean?
By Rick Mealy, RGM Lab Consulting

One of the most commonly cited deficiencies identified in wastewater labs is the failure of the lab to maintain “adequate” documentation: “The laboratory does not consistently document records to ensure that method and code traceability requirements are met.” [Citation Reference: NR 149.39]. Sound familiar?

Interestingly enough, the words “trace” or “traceability” only appear a single time in the lengthy citation reference (s. NR 149.39), and it references the requirement that there must be traceability of standards and reagents used to perform analysis. This deficiency is used far more extensively than for just reagents and standards. Clearly, auditors are over-extending their authority, or at the very least, confusing the issue with word choice.

The real issue at hand is spelled out in s. NR 149.39(3)(a). This section of the rule specifies that labs must maintain records “necessary to allow historical reconstruction of all laboratory activities that contributed to generating reported results.” Now that is significantly less nebulous than stating that traceability requirements have not been met.

The current DNR Lab Certification philosophy seems to be that every painstaking detail should be included on the analytical benchsheet, from reagent and standard codes to “checkmarks” designed to demonstrate that something required to be done was indeed done.

The devil’s advocate in me asks the question, “does a checked box on a benchsheet really ensure that a requirement has been fulfilled?”

That approach is really designed to simplify the auditor’s job, when they arrive to evaluate the lab every 3 years or so. What typically happens however, is a different auditor comes in the next time and s/he wants something additional or different to be documented on the benchsheet. If a lab worker attempts to open a dialog, asking whether the change is really necessary—or if the information must be specifically on the benchsheet—the mystical question of “what if your data winds up in court?” is inevitably invoked.

When was the last time that routine wastewater monitoring data wound up in court? More to the point, at least in court the analyst would get an impartial assessment of whether their protocols satisfied the lab certification requirements.

But is the way lab information is documented designed to make the auditor’s job easier? The old adage goes that there is more than one way to skin a cat, and similarly there is more than one way to document that some specific aspect of testing has been addressed. The spectre of “having one’s lab data go to court” is not all that frightening, as it happens so rarely, particularly for a wastewater treatment plant lab.

The role of an auditor should be to evaluate the systems that the lab has in place to address a perceived lack of traceability in the records. The role of the lab analyst is to be respectful but insist that the auditor consider how things work in their lab, and how there may be an alternate pathway to traceability than what the auditor desires.

There should never be fear of retribution for respectfully questioning something. And if the lab can demonstrate that all requirements have been fulfilled in some manner—regardless of how impractical it may appear to the auditor—that should be sufficient, and no deficiency should be cited.

Alternatively, the auditor could choose a softer approach by indicating that, “while your practices show that you can trace [this information], I recommend that you add something to your benchsheet to make the traceability easier to establish.”

The bottom line here is that auditors need to understand that wastewater labs are different than drinking water labs and commercial labs. One size of audit approach definitely does not fit all labs.

Wastewater lab personnel need to feel empowered to explain their facility’s policies and protocols and how they relate to the ability to make the link from raw observations to reported results. In turn, auditors need to be open to the possibility that THEIR way of documenting something may not be the ONLY way to achieve coveted “traceability.”
2019 WWOA conference KI Center Green Bay
2019 operators of the year award

Lake Michigan region

Holly Blazer (Presenter),
Marc Stephanie (Award Recipient)

West Central region

Jared Greeneo (Presenter),
Kurt Wood (Award Recipient)

Southeast region

Kathy Bates (Presenter),
Nate Tillis (Award Recipient)

Southern region

Troy Larson (Presenter),
Leif Spilde (Award Recipient)
Newcommer of the year

John Fales (left) and Ben Brooks (right) (Presenters),
Alex Zenner (center) (Award Recipient)

Region of the year southeast

Don Lintner (left) (Presenter)
Kathy Bates, Mike Penkwitz, Paul Gagas (Award Recipients)
George F. Bernauer 2019

Jeff Bratz (Presenter),
Jim and Stephanie Smith (Award Recipients)

Past Bernauer

Jim Smith, Lamont Albers, Pete Albers, Dan Busch

Past service members

Back row: (l to r) Lamont Albers, Pete Albers, Wade Peterson
         Randy Herwig, Marc Zimmerman.
Front row: (l to r) Kay Curtin, Dale Neis, Joe Gehin,
          Carol Strackbein, Dan Busch Tom Mulcahy

Kolby Crabtree 2019

Dan Busch (Presenter)
Bruce Bartel (Award Recipient)

Past Kolby Crabtree

Kathy Bates, Roy Lembke, Kay Curtin, Dan Busch, Bruce
         Bartel, Paul Lange, Rick Mealy, Troy Larson

Honorary members

Dan Busch, Carol Strackbein, Pete Albers
Past presidents

Back row: (l to r) Lyle Lutz, Randy Herwig, Lamont Albers, Pete Albers, Bruce Bartel, Wade Peterson, Kelly Zimmer, John Bond
Front row: (l to r) Dale Neis, Kay Curtin, Dan Busch, Carol Strackbein, Joe Gehin, Jeff Bratz, Jeff Simpson, Kevin Freber

2020 board of directors

Front Row: Caley Mutrie, Association Manager; Marc Stephanie, Director; Jeff Simpson, Past-President
Back Row: Josh Voigt, Director; Jeremy Cramer, Director; Ben Brooks, Director; Don Lintner, President Elect; Jenny Pagel, Director; Rick Mealy, Vice President; Jeff Smudde, President
Service award

Randy Langer (l) and Cody Schoepke (r) (Presenters)
Marc Zimmerman (center) (Award Recipient)

Membership award

Caley Mutrie (Presenter),
Jeff Simpson (Award Recipient)

Lifetime members 2019

Back row (l to r): Roy Strehlow, Bill Hess, Brian Erickson, Bill Oldenburg
Front row (l to r): Brian Vander Loop, Brian Helminger, Kevin Skogman, Joan Hawley

Lifetime members

Back row (l to r): Lamont Albers, Pete Albers, Mike Penewitz, Dale Neis, Marty Dierker, Jim Smith, Wade Peterson, Paul Lange, John Bond, Don Lintner, Randy Herwig
Middle row (l to r): Jerry Kitelinger, Roy Lembke, Carol Strackhein, Joe Gehin, Kay Curtin, Bruce Bartel, Dennis Egge
Front row (l to r): Bob Moser, Dan Busch, Jeff Bratz, Jeff Simpson, Kevin Freber, Joan Hawley, Tom Mulcahy
Scholarship recipients

WWOA scholarship

Rick Mealy (Presenter), Christopher Sarns (Award Recipient)

Crane scholarship

Jeff Simpson (Presenter), Haley Albrecht (Award Recipient)

NCL scholarship

Mike Raynovic (Presenter), Baily Miller (Award Recipient)

NCL scholarship

Mike Raynovic (Presenter), Daniel Rider (Award Recipient)

WWOA scholarship

Award Recipient Maria Huber not present at the 2019 conference
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The front cover of every issue includes the following statement:
“The Clarifier is the publication of the Wisconsin Wastewater Operators Association and is intended to inform and educate the membership on issues related to the treatment and control of wastewater. All members are encouraged to contribute to the mission of the Clarifier.”

Submitting an article can be as easy as mailing a letter or sending an email. Perhaps you are not a typist or do not have access to a computer? No problem, just write your thoughts down on a piece of paper and we will do the rest.

Or give me a call and we will figure something out.

Jon Butt, Clarifier Editor
c/o Symbiont, 6737 W. Washington St., Suite 3440
Milwaukee, WI 53214
Jon.butt@symbiontonline.com
Office: 414-291-8840

Call for technical papers 2020

The WWOA Technical Program Committee is requesting your assistance in developing the Technical Program for our 54th Annual Conference to be held October 20 – October 23, 2020, at the Kalahari Resort, Wisconsin Dells.

Technical papers are being solicited at this time for the Technical Program. The Committee is especially encouraging members actively involved in the day-to-day operations of a wastewater facility to prepare and present technical papers at the Conference.

It has been several years since we’ve received enough presentation submittals to put together a technical session devoted to lab practices. Subsequently, we are specifically encouraging those of you that work with or in a wastewater laboratory to consider submitting an abstract. We are certain that many people can share some great information!

The following is a list of categories that have been used as major presentation topics in the past. Presentation topics not on this list are also welcome and will receive consideration by the Committee.

1. Activated Sludge
2. Biosolids: Process & Handling
3. Nutrient Removal: Biological/Chemical
4. SCADA/PLC: Design & Utilization
5. Design Concepts and Implementation
6. Staff Training and Development
7. Utility Supervisory Skills
8. Computerization: Internet & GIS
9. Industrial/High Strength Waste Treatment
10. Maintenance Practices & Methods
11. Safety & Health Issues, Personnel & Process
12. Regulations, Watershed Issues
13. Laboratory Practices
14. Plant/Process Upgrades
15. Utility Benchmarking
16. Receiving Water Quality Issues
17. Collection System O&M/Programs Management
18. Operator Ingenuity and Everyday Problem Solving
19. Other

Submit your outline(s) on the 2020 Conference Submittal Form (via e-mail) by January 17, 2020 to: Technical Committee Chair, email: tech.chair@wwoa.org

continued on page 31
continued from page 30

Please consider responding to this request or forwarding it on to someone who may be interested in participating.  

_The strength of the WWOA is in the sharing of ideas and information._

The success of this organization is dependent upon you the individual member. Please consider making a difference!

Sincerely, Rick Mealy, Vice President 2020 Technical Program Committee Chair

---

**54th Annual WWOA conference submittal form**  
**Oct. 20-23 Kalahari Resort, Wisconsin Dells**

Major Subject Area*  
*Pick subject area from previous page. If other please explain

Technical Presentation Subject  

Author(s) / Presenter(s)  

Employer / Affiliation  

Address  

Email Address  Phone  Fax  

Author is actively involved in the day-to-day operation of a WWTP? Yes______ No______  

Author is an active member of WWOA? Yes______ No______  

Brief Description of Presentation (please type or print clearly; attach additional pages if necessary):

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Operator competition 2019 - A huge success!

This year’s Operators Competition was a huge success. This year, we introduced cash prizes (provided by WWOA regions) of $200 for each member of the winning team, $100 for each member of the 2nd place team, and $50 for each member of the 3rd place team. In addition, the winning teams have its name and region inscribed on the Jim Miller Memorial Trophy.

With a record eight (8) teams competing, it was bound to be a very tight competition. The 8 teams worked through four challenging events prepared for them with focus on Collection Systems, Maintenance, Laboratory and Process Control.

There are a number of moving parts to bring the Operator’s Competition together. First and foremost, we would not be able to hold the Competition without the generous donations of supplies and materials from our vendors. So, thank you to all these sponsors:

Central States Water Environment Association,
Core & Main,
Ferguson Waterworks,
Flygt a Xylem Brand,
Mulcahy Shaw Water, and
NCL of Wisconsin

A special thanks to our volunteers who acted as Judges for the events. We would like to acknowledge and thank
Matt Schmidt, Mark Duerr, Marc Zimmerman,
Holly Blazer, Jeff Mayou, Krista Edmuns,
Aaron Eichhorst, Josh Voight, Bobby Zepnick,
and Troy Larson
for their hard work and time making this another excellent event. In addition, we wish to recognize Jake Becken who volunteered to serve as stand-by judges.

Last, but not least, we could not hold the competition if we didn’t have teams, so thanks to all the competitors!

<table>
<thead>
<tr>
<th>Team  #1 Three Musketeurs</th>
<th>Team #3 Fecal Minded</th>
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<tbody>
<tr>
<td>Captain Alex Krause</td>
<td>Captain Jared Loofboro</td>
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<td>Captain Ryan Masek</td>
<td>Team #4 The Deuce is Loose</td>
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<td>Cody Kerr</td>
<td>Captain Brian Slate</td>
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<td>Casee Kleven</td>
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<td></td>
<td>Dustin Trewyn</td>
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<tr>
<td>Team #2 Fecal Unicorns</td>
<td>Team #5 The Underdogs</td>
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<td>Captain Hunter Willis</td>
<td>Captain Emilio Gonzalez</td>
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<tr>
<td>Captain Mike Lewis</td>
<td>Wayne Rafflesen</td>
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<td>Captain Megan Jacquette</td>
<td>Eric Kamps</td>
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<td>Team #6 F-Bombs</td>
<td>Team #7 Poo Fighters</td>
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<td>Captain Kayli Van Effen</td>
<td>Captain Bryan Thomoson</td>
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<td>Matt Pamperin</td>
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<td>Team #8 Freshwater Bandits</td>
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<th>Team #7 Poo Fighters</th>
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<tr>
<td>Captain Bryan Thomsom</td>
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<td>Corey Evers</td>
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<td>Matt Pamperin</td>
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<th>Team #8 Freshwater Bandits</th>
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<tr>
<td>Captain Alyssa Widowski</td>
</tr>
<tr>
<td>Noel Crowder</td>
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<tr>
<td>Dragan Pavlovic</td>
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</tbody>
</table>

Coach Kathy Bates MATC

CONGRATULATIONS to all the participants, well done!

After all the dust cleared...

In 3rd place, was the Poo Fighters, from the Lake Michigan Region

In 2nd place, was the F-Bombs, from the Lake Michigan Region

And the winner of the 2019 Operators Competition, and repeat champion, is... The Deuce is Loose (Southern Region)

The Collections Event had the teams fixing a section of 8” PVC pipe with another piece of 8” PVC pipe using an Inserta-Tee. Each section of pipe had to be cut and made by the teams. Finally, they had to set up a flow meter in a flume to send a signal to the sampler to sample at a given rate.

*continued on page 33*
The Maintenance Event was replacing a seal in a submersible pump. Teams had to lift the pump with a tripod, set it in the work area, disassemble the pump, replace the wear parts, reassemble it and reinstall the pump into its original location. This proved again, to be a great event, challenging the team’s mechanical knowledge and skills.

The Lab Event involved a mock lab audit of the BOD test. Instead of demonstrating technique for the test, teams were asked to put on an auditor’s hat and use their knowledge of testing to identify deficient practices. This event also included a written test.

The plant Process Control Event tested the team’s knowledge of plant operations and problems that are encountered in treatment facilities.

2019 operators competition winners

1st place: The Deuce is Loose

2nd place: F-Bombs

Third Place: Poo Fighters

Judges (left to right)
Holly Blazer, Bobby Zepnick, Mark Duerr, Josh Voigt, Jeff Mayou, Marc Zimmerman, Matt Schmidt, Krista Edmunds, Jake Becken, Aaron Eichhorst
Not in group photo: Troy Larson
Thank you 2019 exhibitors for your support of the conference

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Mi-Tech Services, Inc.
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The WWOA would like to recognize the following individuals and organizations for their special contributions to the 2019 WWOA Annual Conference:

Registration: Mary Kunde (City of Fond du Lac WWTP), Teresa Lintner (New Holstein), Chris Meifert (Plymouth), Steve Meifert (Sheboygan WWTP), Lori Rogers (Robert E. Lee)

Signage: Troy Larson, Randy Langer, Olivia Sailer, and Strand Associates

Photography – Tom Crouse
(Donohue & Associates)

Awards – Randy Herwig
(MSA Professional Services)

The WWOA Board of Directors offers special thanks to everyone that contributed to the Conference. Your hard work is appreciated by all!

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2019 WWOA annual sporting clays shoot

The Sporting Clays Shoot this year was a huge success with a record attendance of 80 shooters. The event was held at J&H Game Farm in Navarino on Tuesday October 8, hosted by owners Diane and Steve Redmon. The shoot consisted of a 50 bird sporting clay shoot at 13 different stations. Attendees also had an opportunity to win special door prize tickets at a 10 bird novelty shoot.

After the shoot was over, everyone enjoyed grill-your-own steaks and all the fixings, along with some great camaraderie. This year the Top Gun prize for the best individual shooter went to Ben Propson after a shoot off to break a tie with Bucky Walters. Both shooters had a perfect round of 50 out of 50!

The first place team was Jim Larson, Tom Stebbins, Jim Riege, and Bucky Walters. Everyone that attended won a door prize. As a result of all the generous donations, there were 5 guns and several large gift cards given away, along with many other great door prizes.

Special recognition goes out to the major sponsors for the event: Bright Technologies, Crane Engineering, Donohue Associates, Watertech of America, J.F. Ahern, Jacobs Engineering, Sabel Mechanical. Thank you also to our station sponsors: Aquachem, Kraft Power Corporation, L.W. Allen MSA Professional Services, Northern Pipe, Peterson and Matz, Visu-Sewer Inc, and Wisconsin Pump Works.

The committee that planned and organized the 2019 event included Tom Stebbins, Bucky Walters, Jim Thalke, and Jeff Smudde.

A huge thanks to Tom and Bucky for all of the time and effort they put into making this the most successful shoot yet.
2020 WWOA conference information at Kalahari Resort

Hotels
Hotel reservations are now open for the 54th WWOA Annual Conference Oct. 20 – 23, 2020 at the Kalahari Resort & Convention Center Wisconsin Dells, WI

Make your hotel reservations online at https://book.passkey.com/event/50014104/owner/49796246/landing

We encourage you to use the online reservation service, but should you prefer to make your reservations by telephone, call 1-877-525-2427 and reference our group “WI Wastewater Operators”.

For more information about the 2020 WWOA Annual Conference, visit our website at www.wwoa.org.

Exhibits
Exhibitor registration for the 2020 WWOA Annual Conference in Wisconsin Dells will open on January 15, 2020.

Starting January 15th, the exhibitor brochure and registration form will be available on the WWOA website.

Have questions? Contact Caley Mutrie at the WWOA offices at c.mutrie@wwoa.org or call 414-908-4950 x104.

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Marinette hosts Lake Michigan August regional meeting

The August 15th Lake Michigan District meeting at the Marinette WWTP was another great meeting with over 39 operators, along with 8 equipment and process vendors. A special thanks to North Central Labs for sponsoring the treats during the breaks.

The first presentation of the day was given by Mike Raynovic of North Central Labs, who spoke on BOD Troubleshooting in the Lab. As a part of Mike’s updated presentation, he covered a lot of what typically goes wrong, including troubles with the dilution water, problematic seed, and differences in lab techniques. Mike emphasized that getting to the bottom of bad blanks should be the first and foremost step to ensuring good results on BOD readouts. To go a step further, Mike explained that producing an acceptable GGA relies on solving the blank problem, and then moving towards improving both precision and accuracy. This updated presentation helped to provide a lot of valuable strategies and tips to help LMD operators make the most of their time in the laboratory.

Next on the agenda was Dale Braun from Vacuum Pump and Compressor. Dale’s presentation was titled Marinette WWTP Blower Package Install. Dale began the presentation by giving an overview of the variables that can be gathered from standard instrumentation and discussed how they can affect blower performance. Dale then went on to explain the benefits of quantitative testing and data logging. After that, Dale walked the group through possible blower component and system changes that may increase the blower’s efficiency. Dale finished his presentation by discussing the recent blower and aeration system improvements made at the Marinette WWTP and how the improvements lowered energy costs.

The third presentation of the day was by Michael Sobotik of Synergy Sales. Michael’s presentation was titled Cellular SCADA. Michael first discussed the history of SCADA systems and how the technology improved over the years. Michael described how a SCADA system works and provided examples of the different data that can be monitored and gathered. Michael then went on to explain the different types of SCADA systems and the differences between the systems. In addition, Michael covered the pros and cons of the different SCADA systems. Michael provided lists of information on how cellular SCADA differs between providers. Next, Michael explained the different ways alarms can be transmitted to the operators. Michael ended his presentation by discussing some previous projects, and how cellular SCADA systems can be cost-effective and used in a variety of applications.

Holly Blazer called the WWOA-LMD business meeting to order. Last quarter’s minutes and treasurer’s report were approved.

The next item on the agenda was the WDNR update by Roy Van Gheem. First off, for the DNR update, the next exam offering will be held on Wednesday, November 6th and applications will be available online by the end of August.

The second item is that there have been recent staffing changes within the DNR. Patricia Dofflenger is the new Statewide Operator Certification Coordinator. The position was previously held by Mallory Palmer. The third and final item is that the DNR has currently made a voluntary request of WWTPs to test infrequent and effluent for PFAS.

Following the DNR update, Josh Voigt gave the WWOA Board of Director’s update.

The last presentation of the day was by Rhett Squires of RKI Instruments. Rhett’s presentation was titled: Comprehensive Atmospheric Monitoring & Safety for Water & Wastewater Systems.

Rhett started off by talking about when to use a portable or stationary gas detector. Rhett then went into talking about how a gas detector works. Rhett noted to be continued on page 39
aware of stratification and to make sure you test all levels like in a manhole. Rhett then explained properties and characteristics of the different gases that can be tested by the gas detectors.

Next, Rhett talked about the maintenance requirements of the different styles of gas detectors. Lastly, Rhett finished the presentation by covering the frequency that gas detection equipment needs to be calibrated.

Warren Howard, the Wastewater Plant Manager, gave an introduction of the WWTP by describing the flows, loadings, treatment processes, and current PFAS issues.

A guided plant tour followed the plant introduction.

The next meeting date is December 12th, 2019 at the Weyauwega WWTP.

Thanks to the Marinette staff for hosting the meeting.

Minutes submitted by Josh Stiefeck, Lake Michigan District Secretary/Treasurer and Kate Marnul Lake Michigan District Vice-Chair

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Lakeland University hosts May southeast meeting

The meeting of the Southeast Region of Wisconsin Wastewater Operators’ Association (WWOA) was held on May 16, 2019 at 3718 South Drive Plymouth, WI 53073, with Lakeland University hosting the meeting. There were 52 members, 5 non-members, and 8 exhibitors in attendance.

David Black, PhD, President-Lakeland University, was the welcome guest. While giving a brief history of the University he stated that Lakeland had been founded in 1862. He went on to talk about how Lakeland is a co-operative University, meaning that students attend for 12 months out of the year instead of 9 months. The students spend 2-3 months working with local industries in their field of study. This allows students to get credits while working which helps towards the University’s goal of graduating students with no loan debt.

Tim Palet, Better Managed Safety by Design was the first speaker of the day and offered an interactive discussion on fall protection. Tim talked about the importance of having a long-term fall protection plan, which included things like having the right equipment and having the proper training.

He went on to talk about anchor points, guard rails, cables, and rigging. Tim wrapped up his conversation with explaining the importance of properly using equipment such as hoists for their intended use as prescribed by the manufacturer.

Jim Rummel, Senior Product Manager for Large Diesel, Kohler Power Systems was the second presenter of the day. Jim gave a brief history on Kohler and how started out in the plumbing industry in the late 1800's and then joined the power generation industry in the 1920s. He explained the basics of a generator and how they produce power. Jim continued to talk about different types of generators and how they are utilized in all kinds of industries.

After a short break to meet with vendors Gary Tomlinson, Drylet LLC gave a presentation titled Using Bioaugmentation to Enhance Wastewater Operations. Gary explained that microbes are the engine of wastewater treatment.

There are 8 factors impacting microbial population which include: temperature, pH/alkalinity, sludge Age, redox conditions, nutrients, oxygen, HRT, and food. Bioaugmentation enables placement of beneficial microbes in a treatment process. Augmented microbes can be used to enhance processes like: hydrolysis (Breakdown of solids), fermentation, methane formation, nitrification, settling, etc. He finished by explaining regardless of conditions in the treatment process, Bioaugmentation allows the right microbes to be supplied to the treatment process.

Before taking a break for lunch we had our business meeting. After introducing the Region Officers, we started with Old Business. A motion was made to approve February 12, 2019 Business Meeting Minutes and Treasurer’s Report, and both were approved. We moved on to New Business where the DNR gave an update on personnel changes within the organization. WWOA State Representatives talked about the Operator’s Competition. A vote was taken and passed to approve the Southeast Region Tuition Aid Program. Putting teams together for the Operator’s Competition was discussed which included covering fees.

We recognized Synergy Sales for sponsoring breakfast, and Bruce Neerhof of Lakeland University for hosting the meeting. Other topics discussed include Southeast Operator of the Year Nominations, Vice Chair and Treasurer openings in September, Bernauer, Crabtree, and Newcomer Awards.

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Before ending we asked for any meeting ideas and asked for any additions to the business meeting. We reminded everyone of upcoming meetings before adjourning.

After a delicious lunch catered by Lakeland University John Godbert, Project Manager, Cardinal Environmental Gave a presentation on How to Collect Mercury and VOC Sample.

John talked about the fact that Mercury and VOC testing require a somewhat special sampling technique due to the ease in which samples can be contaminated from the surrounding environment.

Some takeaways are with VOC sampling the bottle requires a zero head space meaning the there cannot being any air bubbles when the vial is filled. Mercury sampling should be done with the clean hands dirty hands technique which requires two people. The presentation was concluded with a demonstration of the sampling techniques.

The last presentation of the day was How Lakeland’s Wastewater Plant can be Monitored Online by Hal Henderson, Synergy Sales. Hal gave a demonstration of how Lakeland can go online and log into there SCADA system.

This system is hosted offsite, so all their information is secure and backed-up. This system receives signals from sensors and transmits them via a cell phone signal. They can receive alarms and view all sorts of trends.

The meeting was adjourned, and the day ended with a plant tour of the Lakeland Wastewater Treatment Plant. A big thank you to Lakeland for hosting the day, and to Synergy Sales for sponsoring the morning breakfast.

Submitted by Wayne Castle, Southeast Region Secretary.

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Troubleshooting Corner: Nutrient demand
By Ryan Hennessy, Microbiology and Operations Specialist for Midwest Contract Operations
rhennessy@mco-us.com

As part of the reaction that occurs when bacteria remove carbonaceous BOD, new cellular material is produced. For this to occur, the necessary nutrients must be available for the bacteria to produce new cellular material.

If nutrients are limited, rather than generation of new biomass, growth is shunted to extracellular polysaccharide (slime). Excessive buildup of polysaccharide can result in “slime bulking”, foaming, and loss of treatment.

Nutrients can be classified as Macronutrients and Micronutrients. Macronutrients needed by the bacteria are Nitrogen and Phosphorous (some literature also references iron as a macro nutrient). Micronutrients include potassium, iron, calcium, magnesium, sulfur, sodium, chloride, zinc, manganese, copper, molybdenum, and cobalt. Source: Grady, C.P.L., Jr. et al (1999) Biological Wastewater Treatment 2nd ed., Marcel Dekker, New York, 109.

Micronutrient deficiency is rarely encountered as the necessary concentrations of micronutrients are typically naturally occurring in source water. One instance in which micronutrients were limited involved an industrial wastewater process using distilled water for production. Upon switching back to city water the issue was alleviated (Richard, 2019).

Macronutrients are rarely limited in domestic wastewater as adequate BOD: N: P ratios are typically present. It should be noted that with increasingly stringent P limits plants that remove P chemically in the primary clarifier (s) must be careful to leave enough available phosphorus for the bacteria at the front of the aeration basin. It is commonly stated (e.g., Metcalf and Eddy, 2003) that sufficient macronutrients are available when the aeration basin feed ratio of BOD: N: P ratio is 100:5:1.

Additional factors that influence macronutrient requirements are the sludge age and the temperature of the wastewater. (Jenkins, 2004). At higher sludge ages more endogenous activity where re-release and internal recycling of macronutrients is encouraged which lowers the nutrient demand.

At higher temperatures the metabolic rates of the bacteria are higher and as they begin to focus more on cell maintenance rather than cell growth internal recycling of nutrients also occurs. Therefore the actual nutrient demand is often less as the sludge age and the temperature increase.

Nutrient deficiency is not always a constant occurrence. Often nutrient deficiency occurs in situations where nitrogen or phosphorus is fed manually and adjustments to feed rate are not increased as the BOD loading increases. Nutrient deficiency has also been observed in plants that struggle with inhibition and toxicity upon recovery once the concentration of the inhibiting substances becomes below the active threshold and the bacteria begin to again rapidly take up BOD.

Nutrient addition should be monitored based on influent testing and residual concentrations. Because nitrogen and phosphorus can be re-released by bacteria if septic conditions occur in the clarifier (s) it is recommended to filter the mixed liquor prior to the clarifier to test for nutrient residuals. Typically a TIN (total inorganic nitrogen: ammonia + nitrate + nitrite) residual of >1 mg/L and a residual orthophosphate concentration of >0.5 mg/L are recommended at all times.

Note that it is important orthophosphate rather than effluent total P is used to determine residual phosphorus. Keep in mind that the bacteria consist of roughly 2-3% P by dry weight and as effluent solids increase the effluent total P concentrations also increase. If increase of effluent TSS is related to lack of available P this is only reflected in orthophosphate giving a false indicator of phosphorus if only looking at effluent total phosphorus. Nutrient feeding can be optimized, however it is generally recommended to be more conservative in these practices in proportion to how much variance there is in influent loading characteristics.

Overfeeding of phosphorus does not negatively impact the microbiology, however this can raise costs for chemical

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Save the Date! Feb. 20, 2020 WI Government Affairs seminar

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The CSWEA-WI Section, WWOA, Wisconsin DNR, League of Wisconsin Municipalities, and Municipal Environmental Group-Wastewater Division are finalizing plans for the next Government Affairs Seminar scheduled for Thursday, February 20, 2020 in Fond du Lac.

This seminar will have updates on familiar topics like phosphorus compliance along with plenty of "breaking news." Agenda items include:

- A “One Water” overview and perspectives from drinking water, storm water, and agriculture

- What trends and patterns for phosphorus compliance are we seeing across the state?

- Water quality trading through a clearinghouse or using updated guidance – why this might be relevant to you in the future

- Hiring, retaining, and training great employees in a changing work environment

- Compounds of emerging concern like PFAS

- A jam-packed DNR update on new, revised, and pending regulations

The seminar will have something for everyone, whether your facility is large or small, and whether you are a regulator, operator, manager, or consultant. Experts will be available to field questions throughout the day.

We have a new location! The newly renovated Radisson Hotel and Conference Center, 625 W Rolling Meadows Drive, is on the SW edge of Fond du Lac.

For reservations call toll free 1-800-333-3333 or 920-923-1440. Discounted and government rate rooms are available if reserved by Jan.27, 2020 if you ask for the 2020 Government Affairs Seminar room blocks.

Stay tuned for conference agenda and registration information, which will be sent by email and will be posted on CSWEA-WI (www.cswea.org/wisconsin/events/upcoming-events/) and WWOA (www.wwoa.org/) websites.

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removal depending on permit limits. Overfeeding of nitrogen can result in nitrification and associated aeration costs for nitrification or potential for denitrification in the final clarifier(s).

There is often confusion associated with causes of polysaccharide build up or “slime” bulking. Zoogloeoa bacteria grow on certain alcohols and organic acids and favor high F/M (food to microorganism) ratios at the front end the aeration basin. These bacteria contain a thick slime (polysaccharide) capsule and appear elevated upon staining (reverse India ink stain). When nutrients are limited polysaccharide is produced (rather than new bug mass). Under nutrient limited conditions Anthrone analysis (a test commonly used in paper mills and industrial wastewaters) will typically show higher than normal carbohydrate levels (>20-25%). Also several ous bacteria have multiple causes which can include limited nutrients. The Anthrone test and judgement of polysaccharide as observed on the reverse India ink stain in addition to looking at the rest of the “big picture” (what other indicator organisms are growing etc.) may help differentiate possible causes of these filaments.

If nutrient deficiency is diagnosed, the lacking nutrient must be determined (often suspicions can be gained through microscopy and confirmed through testing). Once the nutrient is added at the necessary concentration new cellular material rather than polysaccharide will be produced by the bacteria. Full recovery from these conditions may take up to 1-2 sludge cycles once optimum growth conditions have been reestablished for the bacteria.