52nd Annual W.W.O.A. Conference
October 16-19
Grand Geneva Resort, Lake Geneva
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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.
Spring is around the corner. As I write to you, Punxsutawney Phil said six more weeks of winter February 2, that was seven weeks ago. The clock had to spring ahead one hour. The official start of Spring is March 20. Last, but not least, the Brewers open the 2018 season in Milwaukee April 2. So, as the season of renewal begins, let us also renew our pledge to keep our water clean and the supply plentiful. With every Spring comes a warmth and burst of energy to get us motivated, to get moving again on all those warm weather projects that ended last fall because it was getting too cold. As the sun rises higher into the sky it gives us the hope of another great year to come. My friends, one thing is sure, the plans are set for another prosperous and busy year. Don’t forget to contact the schools in your area, offer them tours of your facility or an in-school talk about this great profession we are a part of. Without our help, the clean water supply wouldn’t be what it is today. Clean lakes to swim and fish in. Clean rivers to canoe down. Clean streams and ponds to replenish that water supply.

The Technical Committee and Chair, Jeff Smudde, have met and put together another fantastic program for everyone. All of us will have abundant opportunity to enhance our operational skills and get the credits needed to continue serving our communities. We have added a fourth track of classes to give you the best opportunity to see the great presentations that were submitted. Septage is again on the schedule for the haulers to stay ahead of the changing rules and earn their credits. Mark your calendar – attendance registration will open on Monday, June 4, 2018. Conference Program Booklet will be mailed to everyone middle of May.

The Operators Competition coming off of another record year of teams, is hoping that we will supply them with more teams than last year. Rick Mealy, Committee Chair, said commitments are already coming in for teams. If you are thinking about it, jump in, we know the water is clean. Tell your Regional Officers you are willing to meet the challenge and be part of the team! It will be an outstanding event and a great time to be had by all.

I would ask that when you see our vendors and sponsors, thank them for their continued support of WWOA and its members. I can tell you that they are planning a special event for the Annual Convention in Lake Geneva. Hospitality rooms were abundant in years past but times have changed that. I would suggest, when the registration opens for the Conference, you check the events schedule. Look for something different for Wednesday after dinner. And if you haven’t done already so, make sure to reserve your room(s) at the Grand Geneva Resort. Hotel registration information is on the WWOA website under Organization and then click on Annual Conference. Don’t miss out on what is shaping up to be an excellent conference.

As the temperature continues to rise and our energy level rises with it, please don’t be afraid to raise your hand. Volunteer to do something new, branch out into areas that are of interest to you. Help someone that will benefit from your kindness and generosity. Be the person that everyone looks to when there is a job to be done and they know it will done right. WWOA members are the cream of the crop. Rise to the top and get the jobs done. You will all be better for it. Have a great Spring!
Greater Bayfield Wastewater Treatment Plant

By Josh Pearson, plant operator

Clean Water for a Superior Lake is the motto for the Greater Bayfield Waste Water Treatment Plant (GBWWTP). Stewardship of Lake Superior is a high priority to the City of Bayfield and Pikes Bay Sanitary District (PBSD) who enjoy its recreational and tourism benefits throughout the year. To protect this resource, GBWWTP applies technologies that provide wastewater treatment “above and beyond” what would normally be required. The Great Lakes Protection Fund (GLPF) and Wisconsin DNR have identified the GBWWTP as a “Demonstration Plant” that showcases environmentally friendly technologies. The GBWWTP also has many energy saving features such as high efficiency motors, LED lights, aeration, UV disinfection, and is considering using Cheq Bay Renewables to put up a solar array to offset electrical costs. The GBWWTP is a satellite station owned by Greater Bayfield that has been online since January of 2006, and it has consistently achieved its treatment goals, met permit requirements and exceeded expectations even at start up.

Approximately 70% of project costs were covered through grants from the Wisconsin DNR, the Great Lakes Protection fund, and the US Army Corps of Engineers. Approximately 21% of the project was financed by zero-interest loans and 9% through low-interest loans through the DNR. These loans will be repaid over a 20-year period through revenue collected by the City Of Bayfield and PBSD.

Waste water treatment at GBWWTP goes through a series of steps in order to provide crystal clear effluent with minimal continued on page 6
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phosphorus values, nitrogen levels, BOD, and TSS. It all starts with the influent conveyance to the plant. Wastewater from the city of Bayfield is pumped up to GBWWTP through a 9,000-foot-long 12-inch force main along Hwy 13. Waste Water from PBSD is pumped through their intermediate lift station through a 2,000-foot-long 4-inch force main. GBWWTP also provides wastewater treatment service for customers who have holding tanks and septic systems. GBWWTP treats around 2.5-million gallons of hauled waste annually.

As the wastewater enters the GBWWTP facility it passes through the preliminary treatment building where Parkson Corporation Hycor automated screener works to provide a 1/8-inch screening, which removes a significant amount of inorganic debris. Screenings are then washed, pressed and bagged for removal. After the effluent has been screened, Oxidation ditches

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wastewater is mixed with Return Activated Sludge from the final clarifiers as it enters the Biological Phosphorus Removal (BPR) tanks. By depriving the wastewater of oxygen at this stage, microorganisms in the activated sludge consume phosphorus. The wastewater then enters the oxidation ditches which utilize high efficiency mixers supplied by Eimco model TR36 and a aerator built by Eimco combined with a VFD to provide mixed zones for aeration. This stabilizes the waste, and mixed zones for “anoxic” (non-aerated) treatment, which removes nitrogen. The wastewater then passes through the covered final clarifiers to allow more solids to settle out. Next wastewater flows into the filtration building. Inside the filtration building the effluent from the final clarifiers passes through a Aqua Disk Cloth Disk Filter.

This allows the clarified wastewater to be further polished, which allows the plant to reach its goals of <2mg/L BOD and TSS. It also helps to remove some remaining phosphorous in the effluent. Finally the wastewater pours over into a ultraviolet disinfection run where any pathogens remaining are disabled prior to discharge into Lake Superior.

Utilizing biological treatment does create excess sludge, so GBWWTP manages the sludge in different ways. The majority of settled sludge from the final clarifiers is returned to the oxidation ditches as “RAS”. To keep solids in balance in the activated sludge system, a portion of the sludge is “wasted” to the aerobic digesters fed by EAI blowers. This provides for further mixing and stabilization of the solids.

The stabilized solids are then pumped to the biosolids reed beds, where natural transpiration through the reeds allows the solids to dry in an energy efficient manner. The method of sludge management and storage provides for approximately seven years or more of storage.
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These reed beds are a topic of discussion for GBWWTP and surrounding area treatment plants who used the phragmites australis subs. Australis or HALO type M to treat the digested sludge. This sub species of phragmites makes for an excellent way to get the sludge dewatered, and in a typical municipal sludge application the reed beds will reduce water content 95% or so of the incoming sludge, to less than 55% for the final product. Needless to say this system is phenomenal and has very low cost associated with running and maintaining the beds.

Originally when installed the reeds were believed to only spread by root. So containing them in a concrete barrier with multiple liners seemed adequate. Unfortunately small isolated populations started to grow around treatment plants in the area that were utilizing these reeds. This indicated that the plant was using its seeds to reproduce. Being an invasive plant it was important to the area/watershed to remove these reeds. Working with Red Cliff Band of Lake Superior Chippewa Treatment Plant (operator Mike Balber), the City Of Washburn Treatment Plant (operator Joel Weber), and The EPA we plan to remove the invasive strand of phragmites and replace it with seedlings from a native strand of phragmites subs. americanus commonly found around Green Bay and the Bad River Indian Reservation.
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During the construction with the reed beds out of commission GBWWTP will be hauling digested sludge to neighboring Ashland Wastewater treatment Plant, as well as possible field spreading in order to deal with the space requirements associated with digested sludge. When the new native reeds are planted in the summer GBWWTP will be responsible for nurturing the seedlings until they are mature. We will need to have 80,000 gallons of digested sludge available at 1.5- 2.0% total solids for start up. This sludge should be digested to 65-73% volatile solids before it is applied. The goal of this project is to protect our biggest resource which is Lake Superior. If we can effectively remove these invasive reeds and replace them with a native strand that can do the same job, I feel like we will be successful. GBWWTP will have to continue to do site survey in and around the plant to keep track of the small populations around the site. With future treatment of these small populations utilizing herbicides I believe we can decimate all three of the populations found in and around our facility.

I, Josh Pearson (Plant Operator) am the only staff member at GBWWTP. I am responsible for managing the treatment plant, and running our own lab. I am also in charge of grounds maintenance, records keeping, and equipment maintenance. It is important to me obviously to meet permit requirements set by the DNR, but also to go above and beyond and see how clean I can get this effluent.

I need this lake to stay clean. I love fishing, boating, and my daughter swims in this lake. I am passionate about my job and keeping the effluent clean and my processes efficient. It

continued on page 14
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takes around 100 years for a drop of water to work its way out of Lake Superior, so it's my responsibility to make sure that all my effluent from this plant is as clean as I can get it. I make sure it is cleaned in the most efficient way possible utilizing the least amount of energy required. It's also my job to keep up to date with the latest regulations, stay on top of the newest technologies available for treatment, and to look into renewable resources that are available to us. 🌍

Josh Pearson

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If you have moved, changed jobs, have a new email address, whatever, don’t forget to update your membership information.

Send an email to secretary@wwoa.org with your updated information.

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Menomonie WWTP hosts February 20 West Central meeting

WWOA West Central Meeting Feb 20th 2018 – Hosted by Menomonie WWTP (Dean & Sues Bar Menomonie Wi)

Meeting was called to order by New Chair Steve Reed. A special thank you to both Steve Skinner w/New Richmond and Rick Weikel w/Black River Falls and to all other volunteers for all the time given to the WWOA West Central group. Your participation and time is greatly appreciated.

Speakers for the meeting were as follows:

1. “The Gut Bug Connection” presented by Greg Paul with Op2Myz,LLC (greg@op2myz.com, 608-788-5748)

2. “Collection System Odor & FOG control” presented by Brian Peterson, Technical Application Specialist with Hawkins Water Treatment Group. (brian.peterson@hawkinsinc.com, 612-991-9227)

3. “Process Control & Remote Devices” presented by Dale Broeckert, PE, Contols & SCADA Sales Engineer with Altronex Control System a division of L.W. Allen (dbroeckert@lwallen.com, 608-628-3163)

4. “Phosphorus Pollutant Trading” presented by David Sauer, Professional Engineer with Cedar Corporation. (dave.sauer@cedarcorp.com, 608-358-7140)

5. “How to Take & Prepare for Certification Exam” presented by Jim Miller, Wastewater specialist with Wenk (jmiller@wenk.com, 612-961-2505)

6. David Voss with Focus on Energy spoke briefly with partnering with Wisconsin Utilities where applicable. Focus on Energy provides expert Energy Advisor assistance and financial incentives to make all aspects of production and operation more energy efficient and cost-effective. (dvoss@cesa10.k12.wi.us, 715-720-2166)

The Meeting ended with tour of the Menomonie Waste Water Treatment Facility with the assistance Paul Sterk with the City of Menomonie and staff, Thank you!
Attention All Golfers – Operators Golf Outing
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Cost: $90 per person includes Lunch, Dinner, 18 holes of golf with cart.
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Domtar Paper hosts North Central WWOA Meeting March 1

The North Central Region held its winter meeting on March 1st. The meeting was hosted by the Domtar Paper Company and was held at the Northcentral Technical College in Wausau. Andy Ott opened the meeting by thanking all in attendance for coming and thanking Domtar Paper for their help. He also thanked our vendors for their support and encouraged everyone to visit them during breaks.

Jon Butt from Symbiont was up first with the presentation, “Can the Multi-Discharger Variance work for a small community”. From a small wastewater treatment plant perspective not all of the options to meet the new low level phosphorus limits are reasonable or practical. A number of options exist that move the focus away from mechanical treatment at the plant, and the associated high capital costs, to watershed based approaches like Adaptive Management, Water Quality Trading, and the MDV.

Of all the watershed based approaches, the MDV has the potential to provide for the most predictable operating costs and the lowest overall costs over time. It also has less of the risks associated with Adaptive Management or Water Quality trading. It isn’t tied to improvements of the receiving water in the same way as Adaptive Management, and it doesn’t rely on third parties following and maintaining best management practices (BMP’s) like Water Quality Trading. The MDV does include scheduled reductions in allowable phosphorus discharges over the course of several permit cycles, and it requires some kind of commitment to offset the difference between their actual discharges of phosphorus and an assigned target value. To demonstrate this offset the discharger may choose to implement a watershed project similar to Adaptive Management. Alternatively, they may direct funds to their county for use in new or existing projects at a rate of $50/pound similar to Water Quality Trading. In order to select the MDV a community must also demonstrate an economic hardship.

Paul Zouski with Clark Dietz gave the next presentation, “Arc Flash, Understanding Who is at Risk”. Paul first defined an arc flash and then showed a number of videos illustrating the extreme hazards associated with them. At up to 35,000 degrees Fahrenheit, arc flashes can measure three times as hot as the surface of the sun, and occur in fractions of a second. Arc flashes can also travel dozens of feet away from the point of incidence and eject molten metal up to 10 feet or more. Because life changing 3rd degree burns can occur in less than 1 second and at only 200 degrees Fahrenheit, the dangers of arc flashes cannot be understated.

Paul next reviewed the two primary options available to protect workers from arc flashes. The first and most simple option is to never perform live electrical work. Before any electrical panel is opened the power supply is disconnected.

continued on page 20
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and all stored electrical devices, such as capacitors, are allowed to discharge. This is easy to do when installing new equipment, but much harder when trouble shooting electrical problems in existing equipment. If no live electrical work is to be allowed by treatment plant staff, then a qualified electrician must be hired to perform all trouble shooting activities.

If necessary, electrical codes do allow for treatment plant staff to perform live electrical work, however the proper training and personal protective equipment must be provided by the employer before any live work can be done. The employee must have a good working knowledge of the equipment being worked on and all employees not trained and outfitted must leave the area.

Tina Sebold from Strand Associates gave the last presentation before lunch on “Phosphorus Trading Plans”. Like Jon before her, Tina emphasized the importance of looking at “outside the fence” options to complying with new low level phosphorus limits. Nutrient credit trading for phosphorus can be a viable option for large or small facilities depending on a number of variables including location in the watershed, predominant land use types, trade ratios, and willingness of potential trading partners.

Tina presented a couple of case studies illustrating different approaches to phosphorus. One focused on a municipality generating credits for itself by repurposing existing unused settling ponds into storm water treatment ponds and redirecting runoff from adjacent farm fields to the ponds for treatment. Another focused on partnerships with farmers to install buffer strips and crop rotation patterns to reduce phosphorus runoff at the field level.

Tina emphasized the need for a “boots on the ground” approach to developing a phosphorus trading plan. Although trading plans by necessity incorporate a lot of technical modeling software and legal contracts, trading plans are often driven by the relationships between the discharge community and the surrounding land owners. A lot of work must be done building trust and understanding into these relationships.

After lunch Andy Ott held our regular business meeting. Andy thanked the speakers for taking the time to share their presentations with us. He also thanked Domtar Paper for hosting the meeting and NTC for providing the venue. Andy presented the treasurer report submitted by Ken Bloom and recognized new steering committee members Diane Thoune and Eric Donaldson. He welcomed State WWOA board member Jeff Simpson who highlighted a number of upcoming WWOA meetings and events.

After the business meeting a drawing was held for a number of door prizes donated by our generous vendors as well as some clothing items donated by the region. A drawing was also held to award two new memberships to the WWOA sponsored by the Northcentral Region. Congratulations to William Sundstrom and Jordan Sundstrom, both of
PRESCRIPTIVE BONUS DETAILS:

• Offering is eligible up to $1,000 bonus/project (not to exceed $5,000 annually per customer)
• Prescriptive projects must be submitted by December 31, 2018

CUSTOM BONUS DETAILS:

• Offering is eligible up to $5,000 bonus/project
• Custom projects including paperwork and invoices must be submitted by December 31, 2018
• Custom Projects must be completed by December 1, 2018 to receive the bonus

Water & Wastewater Bonus on all Projects

Focus on Energy will be providing a special 20% incentive bonus on all prescriptive projects and a 10% incentive bonus on all custom projects to municipal water and wastewater customers in 2018.

The first presentation of the afternoon was by Greg Schwartz from Aquafix. Greg's presentation focused on the causes and cures of filamentous foaming. Greg used two common filamentous bacteria, Nocardia and Microthrix, to highlight the conditions under which filamentous bacteria thrive, low food/micro-organism ratios, high sludge age, cold temperatures, and the presence of fat, oil and grease (FOG).

The importance of creating a “competitive advantage” between the good bacteria and the filaments was highlighted. Because it is not always possible to control things like temperature and influent BOD concentrations, the focus should be on proper wasting to control the F/M ratio and sludge age. Too much FOG is best reduced at the source, although a healthy good bacteria population can handle moderates amounts.

Greg talked about the potential use of bacterial supplements and enzymes during extreme cases of foaming, and also about the benefits and hazards associated with chlorination of return activated sludge. He briefly touched on the nitrification/denitrification cycle as it relates to a healthy good bacteria population and the control of filaments and stressed that complete removal of filaments is not desirable as they do serve a function in settleability.

The final speaker of the day was Matt Tlachac of the Domtar Paper Company.

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The treatment process utilizes pH adjustment, jet aeration and nutrient additional for biological treatment, final clarification for secondary treatment, and 2 belt filter presses for sludge handling. Dewatered sludge is beneficially reused in a new biomass boiler for energy production, with land application as a secondary use when the boiler is down for maintenance.

Matt highlighted some of the challenges associated with an industrial wastewater plant like Domtar’s including a nutrient deficient, high temperature influent, and variable loadings dependent on paper production schedules. They also have high sulfur and organic acid loadings due to the paper manufacturing process which can lead to problems with filaments, septicity, and corrosion.

Like most discharges in the state, low level phosphorus limits will become an issue soon, and they are eagerly awaiting the results of the Wisconsin river TMDL.

The meeting was adjourned and a short safety video was played for those attending the tour of the Domtar WWTP, which followed directly.

Submitted by Chris Helgestad, WWOA NCR Secretary

New funding for water infrastructure projects

The US Environmental Protection Agency (EPA) announced the availability of funding that could provide as much as $5.5 billion in loans, which could leverage over $11 billion in water infrastructure projects through the Water Infrastructure Finance and Innovation Act (WIFIA) program. Prospective borrowers seeking WIFIA credit assistance must submit a letter of interest by July 6, 2018.

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Troubleshooting Corner Vol. 4: Microthrix parvicella challenges

Author: Ryan Hennessy, Microbiology and Operations Specialist for Midwest Contract Operations and WWOA board member rhennessy@mco-us.com

In this month’s issue we’d like to dedicate a small amount of time to pay our respects to the monster of a filament known as Microthrix parvicella. This filament can cause trouble through sludge bulking and/or foaming.

There are 3 main factors that Microthrix parvicella needs to proliferate:

• Fats, Oils, Grease (FOG)
  In general >80 mg/L in influent and problems are likely to be encountered

• Septicity
  Under an anaerobic conditions FOGs are converted to unsaturated forms which become easier for Microthrix to access
  Under these conditions (once septicity is introduced) concentrations much lower than 80 mg/L of FOG can cause considerable impact

• “Longer” Sludge Age
  Many textbooks site sludge age of <8 days to control Microthrix but in common practice this is not always successful for control and also not always feasible to maintain nitrification and BOD removal.

General Control/ Troubleshooting Strategies:

• Reduce Fats, Oils, and Grease at the source
  Grease trap ordinances
  Industrial pretreatment
  Septage often contains high FOG concentrations
  If a plant is battling Microthrix it generally recommended to suspend intake of septage

• Foam Removal
  Ideally Microthrix foams should be physically removed from the surface of the aeration basin
  Disposal options include
  • Mix with sludge disposal
  • Haul to nearby facility for removal
  • Add to empty tank, chlorinate heavily and bleed the contents of the tank back into the plant at a very slow and controlled rate
  Note that the foam can act like a DAF (dissolved air flotation) and trap viable bacteria needed for treatment. If foams linger they can get worse over time and if too much inventory of bacteria are trapped within the foam this can also compromise treatment
  Foam removal works best when there is a “slug” of FOG
  If there is a constant amount of FOG entering the facility Microthrix foam is likely to come back quickly after removal

• Foam Control
  Defoamers are not a cure but sometimes needed to prevent foam from acting like a volcano and overflowing the aeration basin
  Chlorination by spraying foam 1-3 times per day at 50-100 mg/L often successful
  Chlorination of foam through constant spray with 1 mg/L chlorine (per influent volume) has also been proven successful

• Operational Changes
  Increased wasting/ lowering the sludge age often helpful
  Chances for success improve significantly with this option if microscopic evaluation confirms an “older sludge”
  • Typically with presence of moderate or higher amounts of low F/M filaments (type 0041, 0675, and 1851)

RAS Chlorination
  Dosage rates vary depending on chlorine demand
  • Typical starting dosage of 3 lbs. chlorine/1000 lbs. MLVSS/day
  If applied properly can lower SVI and reduce foaming
  • Disclaimer: Microscopic evaluation for chlorination impact is essential to prevent over chlorination.

Settling aid
  Polymers/ Coagulants
  • Added to aeration basin outfall prior to clarifier
  • Note: jar test needed to verify potential for success
  Also as conditions change chemical demand likely to change
  Some operators have reported foam control by light cationic polymer dosing of the RAS line

continued on page 25
continued from page 24

May help bring Microthrix back into the floc where it can be removed by wasting
• Some operators have reported success with PAX-14 application
  Personally I have been involved in some instances in which this seemed to help and others in which no major differences were observed
Reducing septicity
  Preventing formation of VFAs (volatile fatty acids) in the collection system where possible
  Accomplished by raising ORP (oxidation reduction potential) in areas that are septic. (VFAs can form in conditions in which there is negative ORP).
  Minimizing sludge blankets and sludge retention time in primary clarifiers
  Elimination of co-thickening secondary sludge in primary clarifiers
  Increasing dissolved oxygen if this is not present at high enough levels in the aeration basin and fermentation is occurring there
In some instances in which permits do not call for biological nutrient removal or if chemical removal can be substituted for bio P removal elimination of the selector zone or anaerobic/anoxic fill (in SBRs) has been successful

Notes: Microthrix parvicella control continues to be one of the largest challenges that many wastewater plants encounter. In municipal wastewater systems this often becomes most prevalent when frost begins to melt, warmer weather occurs, and oil and grease trapped in the collection system re-solubilizes back into solution and goes downstream. Best of luck to everyone, especially those who can relate to these challenges!

References: 3rd Edition Manual on Causes and Control of Activated Sludge Bulking, Foaming, and Other Solids Separation issues (Jenkins, 2004); Activated sludge problems and their control (Richard, 2009); and personal troubleshooting experience.

**Clarifier Deadlines**
June issue ...................... May 11
Sept. issue ..................... Aug. 10
Dec. issue ...................... Nov. 9

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Saukville WWTP hosts Southeast meeting Feb. 1 at The Bog

The first SE District meeting of 2018 was held Feb 1 at The Bog in Saukville and it was hosted by the Saukville WWTP. The Village of Saukville’s City Administrator, Dawn Wagner, welcomed the guests and David Arnott, Ruekert-Mielke, gave a brief overview of the wastewater treatment plant before the sessions began.

Mike Keleman, former 20 year wastewater treatment plant operator and Manager of Environmental Engineering at Grind2Energy, described opened the technical sessions and provided the following information:

- If you live in the heavily populated areas of the United States where land is at a premium, residents and businesses face higher fees to take their waste to landfills. (Our cost in the Midwest is about 25% of the east and west coasts).
- A large percentage of waste going to a landfill is food waste.

Grind2Energy, a subsidiary of Insinkerator garbage disposals, has developed a large commercial device which is designed for grocery stores and restaurants that have large volumes of food waste. This waste has the same density as water, is about 10% TS, 90% TVS and has a COD of 150,000 mg/L. It is being trucked to anaerobic digesters where it is a good product to increase the amount of biogas or compressed gas that can be produced.

Of the 1724 anaerobic digesters in the U.S., 51 accept food waste. Sendiks grocery stores in SE Wisconsin have installed the Grind2Energy system and that consistent food slurry has found its way into digesters in our district. Mark Hughes, PE, Aqua Aerobic Systems, Inc. followed Mike with a presentation that pertained to the different types of filtration systems that are in the market place and how they can be used to remove phosphorus from our waste streams.

Many factors come into play when removing TP from the water such as:

- Converting soluble P to a particulate, concentration of P prior to the filter (a key factor), metal salts to precipitate P, chemical injection points, filter design, particulate size and flow path.

A nice break in the sessions gave operators an opportunity to visit the displays provided by 14 vendors and it gave them an opportunity to chat amongst themselves.

Scott Fischer, US Water Regional Manager, provided a nice reminder of the chemical hazards we encounter in our workplace for those of us who have been trained and for those who are new to the industry. Because we have always done it that way doesn’t make it safe!

Acids, bases, flocculants, coagulants and bio augmentation can react among one another. Chemicals are categorized as irritants, corrosive, sensitizers, carcinogens, flammable, toxic and combustible.

PPE and engineering controls can mitigate injuries associated with the handling of chemicals and reduce the cost of lost time accidents.

A good source of locating the hazards and identifying the handling procedures for chemicals can be found on the SDS form for each chemical (formerly MSDS sheets). These forms are provided by the supplier and can be found online, as well. It is a good practice to provide rescue personnel access to the SDS sheets at your facility and it is a good practice to have them visit your facility so they know what and where the hazards are located. Locate these sheets next to the chemicals for the employee’s reference.

Before the business meeting, Curt Nickels, SE District DNR basin engineer, provided the group links for the Milwaukee River TMDL and WPDES Permit Process Improvement Study Group, Source Reduction Measures, Operator Study Guides, The new LOD Rule for labs, and NCCW GP Phosphorus Requirements and Arsenic Monitoring Requirements for Lake Michigan or harbor discharges. If you have a new NCCW GP you may want to refer to that link, too.

Business Meeting:

The treasures report and meeting minutes were approved and Mary Ellen Mortensen was nominated and voted in as the new secretary for the SE District. Welcome Mary Ellen.

Jeff Simpson, WWOA State Board member, noted all of the upcoming meetings that are posted on the website and are available to be attended by us along with the deadlines associated with annual awards.
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Chris Seitz, Focus on Energy Facilities Management reminded the group that renewable incentives are still available in water and wastewater.

Kathy Bates, Instructor for Environmental Health and Water Technology at MATC reminded the group that there is an open house at the school March 20 from 5:30 to 8:30 celebrating the 50th anniversary of the Wastewater Program. All are welcome to attend at the Mequon Campus and if you have photographs from your era at the school get them to Kathy. batesks@matc.edu.

Lunch was served and what a great lunch it was. Just ask those that attended.

Chris Lawson, PhD Candidate, Civil and Environmental Engineering, UW Madison gave us a presentation on what he has learned about the Anammox bacterium that can be naturally found in our environment. Once introduced into the waste stream and allowed to reach their optimum concentration these bacteria are useful in wastewater treatment plants throughout the world in removing nitrogen and decreasing the amount of oxygen that is needed to digest waste in the aerobic process along with reducing sludge by 90%. This presentation was a good example of how our students are taking science to new levels to help our industry.

Larry Henderson, PE. Energenecs, gave us a good overview on what polymers are made of in this day and age compared to years ago and the properties associated with them. Hard water, chlorine, TSS and temperature affect the operating properties of these chemicals. Hydrocarbon oil is a large fraction of the composition of polymer and mixing stages from high energy to low energy are required to free up the polymer to get the oil out. Two stage polymer mixers are replacing one stage mixers in the market place. Like most things, read the directions on the polymer label for its mixing and dilution recommendations.

After Larry's presentation, Ray Hartmann, Superintendent Saukville WWTP and his staff offered a tour of their treatment plant to the 100 attendees.

Renew Your Membership

Please remember to renew your WWOA membership. To do on-line, you will need your member number and password.

If you don't remember either, please contact Karen Harter, 608.355.3081 or email to secretary@wwoa.org.
Valders WWTP hosts Lake Michigan meeting Feb. 15

The February 15th Lake Michigan District meeting at Valders WWTP was another successful meeting with approximately 90 operators and septage haulers, along with 12 equipment and process vendors. A special thanks to Xylem, Inc. for sponsoring the treats during the breaks.

The first presentation of the day was by Brian Richichi of Clearas Water Recovery who spoke on Advanced Biological Nutrient Recovery (ABNR). Brian started by explaining the background of Clearas’ ABNR technology. Next, Brian went into discussing the problem that the ABNR is trying to correct like serious environment concerns and tightening of water quality regulations. Brian then covered the system benefits; for example, sustainable approach to nutrient recovery, total phosphorus recovery, and easily expands to meet increased demands. Brian presented multiple graphs of test data from various plants across the country. The last item Brian discussed was algal biomass production. He explained how the biomass could create a revenue stream at the treatment facilities. Brian ended the presentation by showing the different types of products the biomass could be turned into.

Next on the agenda was Paul Schuette of Aerzen USA. Paul had a presentation titled Valders Blower Upgrade Project. Paul began the presentation by describing the different styles of blowers that one would typically see at a WWTF. Paul then went on to discuss the different design principles and evolution of positive displacement blowers, turbo blowers, and centrifugal blowers.

Aaron Eichhorst called the WWOA-LMD business meeting to order. Last quarter’s minutes and treasurer’s report were continued on page 30.
approved. Following the approval of the last meeting's minutes, Aaron's item of new business was that the Lake Michigan District fielded two operator competition teams at the 2017 conference. Aaron gave the DNR update on Dick Sach's behalf.

First off, for the DNR update, applications for the May 2nd Operator Certification exams are now available. The second item was that the EPA has revised rules for how labs determine a MDL. The new rules go into effect in September, and the DNR will be offering multiple training sessions to educate beforehand. Following the DNR update, Jeff Bratz gave the WWOA Board of Director's update. Jeff reminded everyone to get the Operator of Year nominations turned in early.

Secondly, Jeff asked everyone to start thinking about fielding operator competition teams again. The third item was to remind everyone that WWOA has scholarship applications available. Lastly, Jeff stated that there were still rooms available for the annual conference. Before the business was adjourned Holly Blazer presented Aaron Eichhorst with a plaque as thanks for his two years of service as an officer of the LMD.

The third presentation of the day was by Dennis Barnes of Xylem. Dennis' presentation was titled Vorelodos, Automated Aerobic Digestion.

Dennis described the impact that aerobic digestion has on a WWTF. Dennis provided descriptions of the different aerobic digestion processes. Dennis went on to discuss the Vorelodos aerobic digester system and the typical equipment that it could contain. Dennis ended his presentation by exploring the results of two case studies.

The last presentation of the day was by Thad Lawrynk of Sealing Systems, Inc. Thad's presentation was titled I & I: Identification and Prevention in Manholes and Catch Basins. Thad started off by giving the definitions of inflow and infiltration. Thad then went on to list the typical leakage sources and described the problems they cause.

Thad explained using different photo examples how to identify the specific I & I problem source. Thad then went on to discuss WWTP treatment costs due to I & I and areas where to reduce I & I. Lastly, Thad presented different products and methods to help reduce I & I in a collection system.

Marc Stephanie, Village of Valders Director of Public Works, gave an introduction of the WWTP by describing the flows, loadings, and treatment processes. A plant tour followed the plant introduction.

The next meeting will be on May 17, 2018. Special thanks to the Valders' utility staff for hosting the meeting.

Minutes submitted by Josh Steffeck, Lake Michigan District Secretary/Treasurer

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<td>Northwoods Collection System Seminar</td>
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Dodgeville WWTP hosts Southern meeting on February 13

The winter 2018 Southern District meeting of the WWOA was held in Dodgeville, Wisconsin on February 13, 2018. There were 71 individuals attending and nine vendor booths were on display.

The meeting opened with a few words from the City of Dodgeville Director of Public Works, Greg Lee, who welcomed everyone to Dodgeville.

Dustin Esser of Town and Country Engineering provided the first presentation, which focused on geographical information systems (GIS) and global positioning systems (GPS) and the relationships between the two. Dustin noted that accuracy needs to be considered when using GPS systems and that better accuracy costs more. He said the typical phone GPS is not very accurate, and it is unlikely that a phone can get within 1-foot accuracy.

Dustin then discussed GIS systems. He noted that ArcReader is a free version that can be used to view ESRI GIS files. You cannot edit with ArcReader, however.

Dustin provided an overview of the GIS system in the Village of Oregon through the web browser. The web browser provides mobile access to the GIS system. He also showed how a closed-circuit television (CCTV) video can be linked to the GIS system. He showed how inspection data for manholes and sewers can be incorporated and tracked in GIS. He demonstrated how custom maps can be created and printed and how the system can be used by various departments within the community.

Dustin also discussed using drones. Licensing through the Federal Aviation Administration is required if a drone is used for commercial purposes. He showed aerial photos from the City of Fennimore Wastewater Treatment Plant (WWTP) project and the City of Richland Center WWTP that were captured with the drone.

The next presentation was by Dale Broeckert of LW Allen LLC/Altronex Control Systems who presented on Control Devices and Supervisory Control and Data Acquisition (SCADA) Systems. LW Allen provided the motor control centers and supervisory control centers at the Dodgeville WWTP. Dale recently took photos of several control devices from the Dodgeville WWTP to discuss during the presentation. Dale said his goal for his presentation was that by the end everyone knows the difference between a digital and analog signal in a control system. He started the presentation by identifying several common devices and switches used at WWTPs. He also identified which devices were digital and which were analog. Digital signals are typically “on or off” or “open or closed”. Analog signals are variable, with analog devices typically having a varying 4-20 mA signal. For example, a flow meter might put out a 4 mA signal which may mean 0 flow or 20 mA signal meaning 5 mgd. The variability in the signal will tell the variability in the flow rate. He then showed pictures of and explained the functionality of several devices at the Dodgeville WWTP. He concluded his presentation with a quiz regarding which devices used an analog versus digital signal.

Morning break and refreshments were sponsored by Town and Country Engineering.

Following the morning break, Mike Zelinsky from Flygt-Xylem presented. His presentation was titled Identifying Beneficial Applications to Utilize Variable Frequency Drives (VFDs). Mike started by providing a basic background on pumping hydraulics including a description of a pumping head curve and a system head curve. He also explained efficiency curves and power curves. Mike explained that a VFD is a

continued on page 33
variable frequency drive which is an electronic device used to change the speed of the drive. Mike explained how flow rates, system pressures, power requirements, and efficiencies are affected as a speed of a pump is adjusted. Mike explained that specific energy is the amount of power used per unit volume pumped. If static head in a system goes up, VFDs become less beneficial from an energy savings perspective. For systems that have significantly variable influent flows, two different size pumps may be considered, rather than similar sized pumps with VFDs. Mike discussed various guidelines for selecting a VFD.

Nathan Wells from the Wisconsin Department of Natural Resources (WDNR) provided the WDNR update at the meeting. He focused on what to expect with the new collection system certification subclass.

Nathan introduced himself and provided some background on his career. He was originally at the Wausau WDNR office, but now is located at the WDNR office in Fitchburg. Kaitlin O’Connell also presented. She is working out of the Dodgeville office and is currently working with communities in Grant and Lafayette Counties.

Nathan mentioned that operator certification study guides will soon be released for A5-Anaerobic Treatment of Liquid Waste, N-Nutrient Removal-Total Nitrogen, and SS-Collection System. Expanding on the collection system subclass, Nathan indicated that owners of treatment plants will be required to have a designated collection system operator in charge that is in responsible charge of the collection system operations. The SS subclass requirement will be included in renewed Wisconsin Pollution Discharge Elimination System (WPDES) permits starting in May, 2018. Compliance will be required within 5 years of when the requirement is first included in the permit. DNR encourages owners of collection systems to obtain the subclass as soon as possible.

Nathan mentioned that the Central States Water Environment Association (CSWEA) collection system award nominations are open.

Nathan also provided an update on the Wisconsin River TMDL and told the group about upcoming webinars and listening sessions.
Kaitlin discussed the January 2018 variance letter that was sent to facilities that currently have a variance. WDNR is currently working on developing templates for Source Reduction Measures (SRM) plans and Pollutant Minimization Programs (PMP). They stressed that good documentation of SRMs and PMPs will be necessary for reissuance of a variance with the next permit.

Nathan concluded his presentation by discussing changes to staff responsibilities at WDNR. Jake Zimmerman will be focusing solely on permit calculations and will no longer be serving as a basin engineer for any communities. His communities are being offloaded to other basin engineers.

Following the WDNR update, the Southern District Business Meeting was called to order. The past meeting minutes and treasurer’s report were discussed. The plaque for hosting the Southern District Meeting was presented to the Dodgeville WWTP staff.

Under old business, the Southern District Tuition Reimbursement fund was discussed. The Southern District is offering a $250 per year tuition reimbursement for qualifying courses.

Under new business, the Southern District is trying to promote participation in the operator’s challenge by Southern District members.

A motion was made to encourage Southern Region member participation in the operator’s competition by awarding the highest placing Southern Region team members $100 each. In the case of a tie, the team who submitted their application first will win the tie breaker. To be eligible for the prize, the entry form must be filled out on time and the team must also nominate an operator for the Operator of the Year award. The motion passed on a voice vote.

The next meeting will be held May 24, 2018 in Monroe, Wisconsin. A bearing and seal training course will be held on March 20, 2018.

Following lunch, Andrew Synhorst of Vulcan Industries presented on Screen Selection and the Important Considerations of Screenings Handling. He discussed the type of bar screens which include manual bar racks, trash baskets, climber or reciprocating rake screens, multi rake screens, link style or catenary screens; and the various types of filter screens which include continuous belt screens, stair screens, perforated plate screens, spiral screens, rotary screens, and rotary drum screens.

Andrew talked about design considerations for screens. Velocity must be controlled to prevent grit deposition caused by low velocities or screenings being pulled through the screen by high velocities. Channel profiling can be used if facilities have very high peaking factors. Andrew discussed considerations for design of screenings conveyance equipment. Applicable technologies include conveyor belts, screw conveyor, sluice troughs, and washing press/screw press. Screenings wash presses typically reduce screenings volume by 75 percent and organics by 90 percent, reducing the volume of screenings that need to be removed. Screenings treatment also significantly reduces odors.

Andrew showed the stair screen at Dodgeville WWTP, which is a 1/8-inch stair screen. They also have a screenings wash press following the screen in order to treat the screenings prior to disposal.

Ben Heidemann of Town and Country Engineering provided the last presentation of the day, which was focused on the City of Dodgeville WWTP. Ben explained that the original WWTP was constructed in 1956, and was upgraded in
continued from page 34

1978, 1998, and most recently in 2016. The 2016 upgrade was completed by Staab Construction, which included mechanical upgrades at the WWTP including work at lift stations (contract A). Contract B was completed by Rule Construction which included replacement of an undersized forcemain.

The facility is designed for .9 mgd and is currently in the third year of its phosphorus compliance planning. The facility anticipates pursuing the multi-discharger variance.

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“The Clarifier is the publication of the Wisconsin Wastewater Operator’s 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.”

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MATC celebrates 50 years

Milwaukee Area Technical College (MATC) celebrated 50 years of education in the fields of Environmental Health, Water and Wastewater Technology, Environmental and Pollution Control Technology, and Environmental Health and Water Quality Technology.

Among the graduates of these programs attending were WWOA members Andy Helm (Crane Engineering), Nate Tillis (Waukesha WWTP), Mike Penkwitz (Plymouth Utilities), Pete Petersen (Milwaukee Water Works), and Kathy Bates (MATC School of Business-Instructor, Department of Environmental).
CALLING ALL INVENTORS

It’s time to TOOT Your Own Horn!

At this year’s WWOA Annual Conference we will feature an expanded “Tricks of the Trade”

So now is the time to showcase your invention, innovation, ideas, “tool of all tools”, management practice, etc.

Possible categories of Tricks of the Trade include Sampling/Monitoring, Improved Accessibility, Process Control, Containment/Algae & Odor Control, Cleaning, Preventive Maintenance, Safety, Public Education & Watershed Awareness, Automation, Signage & Communication, Data Management, and Training & SOPs

Please submit your Tricks of the Trade topic to Sharon Thieszen, sthieszen@newwater.us, by October 11. If you don’t like the limelight that’s fine, we will assist you or present your topic for you. Just submit a few PowerPoint slides or photos and we’ll help you put it all together.

For more information or to discuss your topic you can also contact Sharon Thieszen at (920) 458-1151.

“Tricks of the Trade” session will be Thursday October 18, 2018 at 10:00 am.
**Hotel information for 2018 WWOA convention October 16-19**

Main rooms are at the Grand Geneva Resort in Lake Geneva, WI  
The Timber Ridge is located on the grounds of the Grand Geneva Resort  
The Villas at the Grand Geneva are located on the grounds of the Grand Geneva Resort

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Afternoon Session
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