Aerial view of Kenosha Wastewater Treatment Plant
Kenosha Wisconsin During Construction

50th Annual W.W.O.A. Conference
October 11-14, 2016
LaCrosse Center/Radisson Hotel
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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.
Springing into summer in wonderful Wisconsin

Another typical spring in Wisconsin and just when we get spoiled with some warm dry weather, it turns around to cold damp days reminiscent of early April. I think the weather has had a direct impact on both the Minnesota Twins and Milwaukee Brewers as they both have had more cold streaks than warm! By the time this is out in print, the weather should be warmed up comfortably, the gardens in, and the laborious, continuous task of weeding has commenced.

Hopefully we receive some regular precipitation to keep things alive and maturing at a steady pace. The good news is that it won’t seem long and we can put things back into winter mode! Yes, if you forgot, I do like winter. I guess the downside to that is my term as WWOA President is well over half way done.

From message to message it really is amazing all the events that have taken place. The spring round of regional meetings have come and gone and you can now look to schedule the summer and fall training events. (As a reminder, all these training events are listed on the WWOA website in the training calendar.)

I’ve managed to take in a few of the regional meetings and I have been very impressed on the speakers and topics each region has put together for their programs. If you get the opportunity, I highly recommend you take some time to meet and thank your regional officers. They have stepped up to put the extra time and commitment to keep opportunities available to not only those within their region but also from other regions.

Along the same lines, if you are at a meeting and happen to see a new face, welcome them and take some time to pass along what the organization offers its members. I might sound like a broken record (or scratched CD for those in my era) but remember, the friends you make through the organization will stand with you for your entire career. You never know when you might need some operational advice, assistance, or maybe even something picked up and delivered by a friend in a distant community (right Mr. Bond!). The rewards of knowing friends like this are priceless.

Have I mentioned that we will be celebrating 50 years of the organization at the conference in October? You should have received or will be receiving shortly, the conference information and registration booklet.

A few changes you may want to note and pay attention to is the option of a single day conference registration. We hope that this allows some flexibility to those that can’t commit to being gone from their operations for multiple days. To commemorate the special anniversary, a special edition polo shirt with 50th logo will be available to pre-order. Look for the order information in the conference mailer or on the WWOA website. Reserve your commemorative shirt today!

Wade Peterson has done an outstanding job organizing and directing the special 50th committee to make sure the conference will truly be special to honor the history of this great organization!

If you have ever thought about partaking in any of the pre-conference outings (golf, sporting clays, bike), this would be the year you may want to get out there and socialize with your fellow members as special things are being arranged to accompany the recognition of the anniversary! Check out each events special registration page for more information.

The host hotel, the Radisson, has been full for a while now and several more local hotels have made rooms available for a WWOA group rate. Some of those added do include shuttles to the La Crosse Center. For the accommodations that do not provide a shuttle, a bussing schedule has been arranged and can be found in the conference informational packet.

What else special is coming for the 50th? You might just want to get registered now to ensure you find out! Until next time, I hope everyone is able to get out and enjoy abundance of summer opportunities throughout the state!

WWOA President, Lyle Lutz
The Kenosha Water Utility (KWU) provides water and wastewater service to nearly 110,000 people in the greater Kenosha metropolitan area of Southeastern Wisconsin. The plant is located along Lake Michigan between Chicago and Milwaukee. The wastewater treatment plant was put into service in the late 1930’s and currently treats an average of 22 mgd with a permitted annual average design flow of 28.6 mgd.

The original plant consisted of a pump station, grit tank, mixing tanks, primary clarifiers, anaerobic digestion and sludge drying beds.

In the 1960’s the first major plant expansion occurred. This project added extra grit removal, primary clarification, aeration tanks, anaerobic digestion and secondary clarification. Also, WAS thickening, dewatering and chlorine disinfection was added as part of this expansion. Finally, in the 1980’s the last major plant expansion occurred. This project added new infrastructure including bar screens, an influent pump station, grit removal, new blowers, RAS pumps, onsite sludge storage and an addition to the administration building. In addition to new infrastructure additional primary clarifiers, aeration tanks, final clarifiers, WAS thickening and dewatering facilities were incorporated into the design.

Due to aging infrastructure as well as an effort to combat ever rising natural gas and electric utility costs and landfill disposal fees, KWU began to explore emerging technologies as a means of becoming more energy independent while also reducing the volume of biosolids in need of disposal. The results of our exploration led KWU to publish a request for proposal (RFP) for a system that would help us accomplish these goals. The objectives outlined in the RFP are summarized as follows:

- Increase the generation of methane gas from anaerobic digestion of sludge;
- Generate electricity from the methane gas to produce greater than 500 kW of continuous power to be interconnected to the existing plant power network;
- Use the electricity generated to offset peak energy pricing during high demand periods;
- Use the electric and thermal energies generated to dry the biosolids so as to reduce the volume of KWU’s biosolids by producing 90% dry solids;
- Reduce the volume and cost of biosolids land filled;
- Produce high quality biosolids that meet the criteria for Class A biosolids allowing for beneficial reuse;

continued on page 6
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• Recover and utilize waste heat as the main thermal energy supply for the facility;
• Maintain existing effluent quality of the plant;
• Not increase ambient noise level, odor or particulates beyond the waste water treatment plant;
• Obtain a performance warranty for the system.

DESIGN APPROACH
Due to the complexity of the project and the varying technologies necessary to accomplish the above objectives, a request for proposals was solicited as a design build approach. This project was structured as a design/build project as opposed to the typical design-bid-build structure that normal municipal contracts require. A specific Wisconsin State Statute (62.15) allowed for the design/build approach due to the resource recovery nature of the contract.

In the RFP the design/builder was tasked with preparation of the design, assisting KWU in obtaining all necessary permits, procuring, constructing and installing all components, integrating the new system with the existing plant supervisory control and data acquisition (SCADA) network, startup and commissioning, preparation of operations and maintenance manuals and warranting the System. Ultimately KWU contracted with a local firm, Centrisys Corporation, in the fall of 2014 to complete the project outlined above.

The Kenosha Water Utility has partnered with Centrisys on several projects since 2009. The first piece of equipment we purchased from their firm was a dewatering centrifuge to replace our plate and frame presses for sludge dewatering. This project was extremely successful. Not only did the

continued on page 8
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centrifuge meet or exceed all the design criteria, it also reduced operational costs and reduced labor thereby generating a one year payback for KWU. The plate and frame presses required an employee dedicated solely to operating this equipment. Also, the presses required the addition of lime and ferric to accommodate the dewatering process and the disposal of these chemicals after the dewatering was complete. In total, operating costs were lowered by over $500,000 per year by replacing the three plate and frame presses with one Centrisys dewatering centrifuge.

Based on the success of this project as well as the fact that Centrisys is headquartered in the City of Kenosha, we began a partnership with them to function as a research and development site for their technology. This benefited KWU by allowing us to implement cutting edge technology at little to no cost as well as have excellent local product support. This also benefitted Centrisys in that they could field test their new products locally; they could bring clients to the site to see their units in operation, and they could get feedback from plant staff on the operation of their units and potential areas of improvement.

In 2011 Centrisys installed their first thickening centrifuge at our plant. The intent of this unit was to replace the existing dissolved air flotation thickening (DAFT) system we used to thicken our waste activated sludge stream prior to digestion. Once again this partnership was a major success.

Based on the past partnerships with Centrisys as well as their strategic relationships with manufacturers of other waste water treatment technologies KWU entered into the contract with Centrisys on the “Energy Optimized Resource Recovery Project” at our WWTP.

The design engineer for the project was Donohue & Associates. They were already working on the design for upgrading our aging solids handling building when we partnered with Centrisys for the project and were a great addition to the team in developing the overall system.

TECHNOLOGIES IMPLEMENTED
There were multiple technologies that were implemented to help us achieve the goals outlined in the RFP. An overall summary of the individual technologies that make up the program is on page 10.
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new system and how they function together are summarized in the following diagram.

A more detailed description of individual technology and the effect on the biosolids operation at the Kenosha wastewater plant is summarized on the next pages.
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High Solids Anaerobic Digestion:
Previously the WWTP utilized six anaerobic digesters (4 primary digesters and 2 secondary digesters) with a total capacity of over 4.4 million gallons. Under the new operation only three of the six onsite anaerobic digesters are utilized (2 primary and 1 secondary). This is able to be accomplished through a series of process modifications including further thickening of the primary and WAS by means of thickening centrifuges, hydrolysis of the WAS by means of a thermo-chemical lysing system, and hydraulic mixing of the material within the digesters. To accommodate anaerobic digestion, the material within the primary digesters is heated to roughly 100°F year round. Due to the climate in Wisconsin the digestion process is the main thermal energy consumer at the WWTP. The reduction in functional digesters from six to three greatly improves the heat balance for the WWTP.

Mechanical Hydraulic Mixing (Rotamix by Vaughan)
A gas mix system was previously installed in the anaerobic digesters during one of the previous plant expansions. Due to the required maintenance as well as the limited operational improvements these systems were no longer utilized by plant staff. As part of the energy optimization project a Rotamix system was installed within the three active digesters. The Rotamix system uses the combination of a chopper pump and internal digester piping and nozzles to mechanically mix the material within the digesters. Through the installation the hydraulic mechanical mixing system the previously unmixed anaerobic digesters are fully mixed to improve volatile solids reduction, reduce sludge volume and increase gas production.

Primary Sludge Thickening (THK 200 by Centrisys)
Previously the gravity thickened primary sludge was pumped directly from the primary clarifiers into the primary digesters. On average the primary sludge was 3.3% solids being pumped into the digesters. In order to reduce the number of functional digesters KWU needed to further thicken the primary sludge to 7% solids concentration. In order to achieve this, a thickening centrifuge was installed. Instead of pumping the primary sludge directly from the primary clarifiers into the digesters we now pump it into the solids handling building, it goes through a grinder, gets thickened by means of a centrifuge, blends with the thickened lysed WAS and finally gets pumped into the primary digesters.

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Waste Activated Sludge Thickening (THK 200 by Centrisys)

A WAS thickening centrifuge was previously pilot tested and installed in 2011. Prior to that date, a dissolved air flotation thickening (DAFT) system was utilized to thicken the WAS flow stream from roughly 1% solids to 3.5%-4.0% solids before being pumped into the primary digesters. Prior to the project we replaced the entire DAFT system which has a 1,000 m² footprint with one thickening centrifuge consisting of a 10 m² footprint.

Due to downstream limitations the WAS flow stream was thickened to roughly 5% solids with the thickening centrifuge and no polymer was utilized by this unit to achieve this solids concentration. This project allowed us to further thicken the WAS flow stream to 7% solids. Small amounts of polymer are currently being added to test improvements on the capture rate, however it is not needed to thicken to 7% solids. The thickened WAS flow is discharged into a thermo-chemical hydrolysis process prior to being blended with the thickened primary sludge and pumped into the primary digesters.

Thermo-chemical Hydrolysis (PONDUS by CNP-Technology Water and Biosolids Corp.):

An important component of the new system is the thermal-chemical hydrolysis process marketed under the name PONDUS. This technology hydrolyzes the waste activated sludge stream by introducing sodium hydroxide (caustic soda) and heat into the thickened WAS stream.

continued on page 16
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By injecting a small dose, roughly 2 liters of NaOH per cubic meter of thickened WAS, the pH of the solution is increased to roughly 11. After the chemical addition, the introduction of heat to bring the WAS stream to 150°F and a detention time of just over two hours causes the cell walls of the WAS to break apart. By breaking the cell walls the internal organic acids are released bringing the pH of the sludge stream back to neutral (around 7). This hydrolysis process makes the WAS stream more digestible resulting in additional solids destruction and biogas production. With the PONDUS system online, there has been an increase of biogas production of about 20%. It is estimated this value will increase to 30% as the system is optimized. Other benefits of this process are an increased dewaterability of the digested sludge, lower sludge viscosity affording lower mixing energy requirements and higher digester loading rates. The heat which is recovered from the co-generation units is used to generate hot water under atmospheric pressure to heat the thickened WAS to the temperature necessary to accommodate hydrolysis. The hydrolyzed TWAS is then blended with unheated thickened primary sludge in order to achieve a temperature of approximately 100°F which is ideal for the anaerobic digestion process. The PONDUS hydrolysis does not increase the thermal energy demand for the plant. All of the energy required for the hydrolysis process is transferred into the digesters.
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The heat exchanger that is used to heat the WAS during the hydrolysis process utilizes a corrugated tube in tube heat exchanger to transfer heat from the hot water system to the sludge stream. The corrugated walls serve two purposes. First, it increases turbulence within the flow streams which increases the heat transfer between the fluids. Second, the turbulence also reduces the potential of fouling the surfaces within the heat exchanger. The ends of the heat exchanger are easily removable for inspection and cleaning of the interior of the heat exchanger.

**Biosolids Dewatering (CS 21-4HC by Centrisys):**
A dewatering centrifuge was installed at the WWTP in 2009. This centrifuge replaced three plate and frame presses that were used to dewater our digested sludge prior to disposal at a landfill. The plate and frame presses required a lot of labor to operate and a large cost for the chemical (lime and ferric) addition and disposal. The dewatering centrifuge has consistently achieved 28% solids on the cake material which has historically been disposed of at a landfill. Due to the addition of PONDUS the goal is to produce 30-32% solids which we hope to achieve through process optimization.

**Drying of biosolids (Compact belt dryer by Sulzle-Klein):**
Prior to this project the dewatered biosolids were manually loaded into a truck and disposed of at a local landfill. In an effort to reduce the volume of biosolids in need of disposal as well as allow the product to be beneficially re-used KWU wanted to achieve Class-A designation. To meet this goal we installed a low temperature, compact belt dryer. The dewatered material leaving the dewatering centrifuge is dried using the waste heat from the co-generation units as the thermal supply. The dryer achieves all the requirements of Class-A material (temperature, duration, and moisture content) and KWU is currently in the process of getting our final biosolids product re-classified with the Wisconsin Department of Natural Resources. The dried product is discharged into a conveyor system and automatically deposited into the bed of a dump truck. KWU is currently pursuing options for the beneficial re-use of this product.

**Biogas Conditioning (Gas conditioning and siloxane removal by Unison Solutions):**
Prior to this project the raw biogas produced from the digestion process was used as a fuel for our raw water pump engines, hot water boilers or flared to the atmosphere. Knowing a more efficient utilization of our biogas would be...
critical to an effective energy optimization project, a package system capable of removing moisture, particulates and siloxane was incorporated to condition and compress the biogas prior to use as a fuel source in the CHP generators.

Generation of Electric and Thermal Energy (CHP Generators by Kraft Power):
Prior to this project the electricity needed to run the equipment at the WWTP was purchased exclusively from the local utility. In addition, any heat needed for our operations were provided by our boilers using either natural gas or biogas as their fuel source. To better utilize the biogas produced during the digestion process we installed two combined heat and power (CHP) generators. These generators utilize the methane produced in the anaerobic digestion process as a fuel source to generate electricity as well as thermal energy. The CHP units are each capable of producing 330 kW of electrical energy and 422 kW of thermal energy. The electricity produced powers the new system as well as supply the excess electricity to the main
plant power network for beneficial use elsewhere throughout the plant. The thermal energy is utilized by the PONDUS system, the belt dryer and the central WWTP heating loop.

Odor Control System (by Sulzle-Klein)
Due to the wastewater plant being located adjacent to a residential neighborhood odor control was also incorporated into the design to ensure odor levels were either maintained or improved at the property boundary. A robust odor control system which utilizes water, sulfuric acid and caustic soda was installed to treat the exhaust air from the belt dryer as well as the aspiration air from the primary sludge mix tank, blended sludge mix tank, PONDUS reactor, primary sludge thickening centrifuge, WAS thickening centrifuge, dewatering centrifuge and dryer feed pump. Water is utilized to cool the exhaust and remove particulates from the air. The sulfuric acid is used to reduce or eliminate the ammonia odors from the biosolids process. Caustic soda is used to reduce or eliminate the odors from sulfur compounds such as mercaptans in the exhaust stream.

RESULTS
Although optimization of the new biosolids process is ongoing initial projections are that this project will save the KWU wastewater treatment plant roughly $635,000 per year. The majority of the savings can be attributed to the reduced amount of electricity purchased from the local utility as well as the reduced biosolids management costs. A breakdown of the anticipated cost savings are summarized in the table on the next page.

In addition to the savings listed above, added savings may be achievable due to reduced polymer usage in the dewatering process, reduced natural gas purchasing from the local utility, and the sale of the final Class-A biosolids product.

Grant
Due to the nature of the project KWU was awarded over $500,000 in grants for implementing the above-mentioned technologies. The local utility, WE-Energies, has a subsidiary called Focus on Energy. This organization is funded by the
state’s investor-owned energy utilities and participating municipal and electric cooperative utilities and tasked with providing incentives for individuals and businesses to install cost-effective energy efficiency and renewable energy projects. The installation of the thermo-chemical hydrolysis system, co-generation units, and LED lighting all qualified for the largest grant this organization has ever awarded.

CONCLUSION

With the project construction and equipment startup complete KWU is now moving towards optimizing the new biosolids process. During the one year optimization period outlined in the contract, the system will be operated under a wide variety of operational scenarios that will allow data to be collected to substantiate the effect each individual component has on the treatment process along with the system as a whole. Optimizing multiple pieces of new equipment at the same time is no small task. It takes a team effort and the plant staff has been exceptional in learning the operation of the new system and assisting with ideas and input for optimizing.

Through innovative thinking on behalf of the Board of Water Commissioners, KWU staff and the design/builder, the Kenosha wastewater treatment plant is much more energy efficient and less reliant on the local utility to provide the electrical and thermal demands necessary to operate the wastewater treatment plant. The implementation of energy

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**Projected Annual Cost Savings**

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<td>Cake Sludge (wet tons)</td>
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optimizing technology to replace aging and antiquated equipment will allow KWU to remain in compliance with all regulations.

Teams needed for Operators Competition

By: Kris August, Competition Coordinator

We need you and your co-workers!

Get those Operators Competition teams together. Connect with your regional president and let him know you have a team. The Lake Michigan Region took first in a tight competition last year. Show them they aren’t the only team that can win the competition. Entry forms are available on the WWOA website: www.wwoa.org.

We will be offering four events to the competitors again this year. Everyone that has done this event in the National Competition will tell you how much fun it is. Check it out on WEFTEC.ORG.

I would like to have all entries for the event in by our WWOA Board of Directors meeting in August 2016. Again, entries are available on the WWOA website.

If you are interested, don’t hesitate to get your team together and enter the event. Contact Kris August, Competition Coordinator at, (920) 894-2909 ext105 or email me at gm@ci.kiel.wi.us and I will get your team in.

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<table>
<thead>
<tr>
<th>Men/Women</th>
<th>Size</th>
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Shipping if applicable

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50th Annual WWOA update

There will be many outstanding sessions to choose from at this year’s conference. Topics include phosphorus, SCADA, biosolids, laboratory, and collection systems, to name a few. The pre-con sessions look to be just as outstanding with Fear No Lab Math and CMOM – O&M and Flow Monitoring for Effective Rehabilitation. Other events held in conjunction with the conference include the Golf Outing, Sporting Clays and the Bike Ride. Tours of the City of LaCrosse Treatment Facility and the Milk Processing Facility for Kwik Trip will be offered on Thursday afternoon. The Manufacturers and Consultants will be raffling of a TV at the Annual Meeting on Thursday.

I have attended two of the WWOA 50th Anniversary Committee meetings and they are working very hard to make this a very special event. This will be a conference you don’t want to miss. The Conference Registration Booklet is just about complete and will be at the printers soon. You may have received it by the time you get this issue but, if you didn’t, go on line at wwoa.org and get registered. More news to come in the next issue of the Clarifier.

Jeff Bratz, Chair 2016 Technical Committee

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On Thursday May 12th, the City of Plymouth Wastewater treatment plant hosted the WWOA Southeast regional meeting at the Amore Banquet Hall in Plymouth. The day started off with coffee and doughnuts courtesy of Energetics. Mike Blazejosky, WWOA Southeast region chair, gave a brief welcome and introduced Brian Yerges, City Administrator/Utilities Manager from the City of Plymouth. Brian, gave a brief history of Plymouth Utilities, which survived a 2010 attempt to sell the utility operation. Since 2010, the City has built a new utility operations center, new water reservoir (first since 1941), new well (first well since 1986), and biogas system at the wastewater treatment plant. The 2016 marks the 115th year of the utilities.

Rusty Schroedel from AECOM was the first speaker of the day. He began by giving a brief reflection of past and future of wastewater treatment. Today’s wastewater treatment plants are facing many new challenges, including new regulations and the possible future need to address items like micro-constituents. He then gave a brief history of liquid treatment which first began with an Imhoff tank, basically a clarifier and digestion, in the late 1800’s, activated sludge in the 1920’s, and UV disinfection in the 1970’s. Rusty expects that utilities are going to be considered an asset by becoming energy neutral and harvesting nutrients. Today’s wastewater treatment plants are facing lower limits in phosphorous, nitrogen, and ammonia which require move energy and chemical usage, as well as tank space, increasing effects on wwtpl’s budgets. Wastewater treatment plants are beginning to harvest phosphorous, of which the world’s easily mineable supply is expected to be exhausted in the next 20-80 years. Biosolids management has come from the ocean disposal in the 1950s to today’s current thinking of resource and energy recovery. Carbon management may become the future of wastewater treatment plant, is it best to be used for energy or nutrient removal.

Next to speak was John Nelson from the Nature Conservancy, who gave a presentation on how to find Nutrient credits on farms. Along with John was, Steve Richter who is trying to work with municipalities and farmers on phosphorous reduction. Two current provisions in place are adaptive management, which is working with point and non-point phosphorous reduction and the other is by trading nutrient credits. John stated that since the 1970’s the Sheboygan river has had a 70% reduction in phosphorous, but is the last 30% which is presents the greatest challenge. Credits in reducing phosphorous, one credit is not always a one to one, more like a two to one, two documented equals one credit. Pounds are normally determined by using a SNAP model, which looks at before and after actions is taken. The model takes into account, soil characteristics, slope and proximity to water, crop rotation, tillage strategy, nutrient application, presence or absence of buffer, and the calculation of phosphorous. Best management practice examples are, Buffers and waterways, nutrient management plans, tillage changes, managed grazing, cover crops, and crop rotation. The credit cost ratio is highly variable in which the search to obtain them can be highly variable. There are several options for reaching your goals.

After a short break, Fred Hegeman from the Wisconsin Department of Natural Resources gave a presentation focusing on nitrogen calculations. Fred broke down NPK labeling for fertilizer, Nitrogen, Phosphorous, and Potassium. Nitrogen while in many wastes, he discussed the three types of wastes he is involved with: biosolids, septage and industrial wastes, which include inorganic and
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organic nitrogen components. He referred to A2809, from the Wisconsin Soils Department as a guide to incorporating nitrogen needs of crops based on soil type. Determining nitrogen needs is done by a ratio of lbs/acre to achieve expected yield, which is determined from a soil test. There is also a preplant nitrate test that can be done to improve the efficiency of nitrogen, by using the 3400-054 form. Nitrogen in waste can be determined by using the ammonia and Total Kjehl Dhal Nitrogen (TKN) tests. Mineralization rate factors then can be used to estimate the amount of nitrogen available to crops as the organic nitrogen decomposes.

Mike Blazejovsky, began the business meeting by introducing the officers. There was a motion to adopt and approve the February 11th Delevan Lake agenda and minutes. Paul Gages gave the treasurer’s report, and there was a motion to accept. Mike Blazejovsky, recognized Mike Penkwitz from the City of Plymouth wastewater treatment plant, in appreciation of hosting the meeting. Curt Nickels from the Wisconsin Department of Natural resources, gave a DNR update. A few items that were discussed were changes to NR 114, new study guides, a link on the DNR’s website with items that should be included in your CMOM, and that Milwaukee River dischargers permits will not be delayed because of the TMDL. Mike also brought attention that the southeast region is still looking for two more team members for the 2016 Operators Competition. Mike finished the business meeting by inviting all members to the August Pig roast which will be hosted by Union Grove.

After lunch Ted Rulesch from TPO Magazine gave an overview of “The Fire Chief Project”, which was designed to raise the awareness of our line of work and to change the way we look at our industry. The awareness is needed to recruit new blood and turn around public opinion about water treatment. Operators don’t have fire chief status due to the fact that people rarely see what it is that we actual do. Operators help keep us safe by keeping water clean and reusing resources. There are several agencies that are...
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coming along with the times, by changing names from words like sewage, to water recycling. Several ways to make operators achieve fire chief status is by having a clean facility, dressing professional, invite the public in, and to get out and educate you community.

The final speaker of the day, Everett Russell from Dorner Valves and Automation, gave a presentation on valve identification and maintenance. All valves need to be cycled to ensure normal operation. When there is a problem first visibly inspect valves, and ask “what’s wrong”. Find or research the appropriate information on your valves, by using O&M manuals, smart phones, and drawings.

Make sure you identify all equipment effected by the valve. Ask yourself, “If I turn this valve, what will this effect”. When working on valves you often have to look past you normal tool box, do I need a hoist or an electrician.

Types of valves typically found in wastewater are plug, butterfly, check, gate, and knife. Actuators types include manual, hydraulic, electric and pneumatic. The key to valve maintenance, is to look and listen, record you serial and tag numbers, review all process conditions, review all energy sources, retrieve and review documentation, consider improvements or upgrades, rely on local representative support, and always keep safety first.

The meeting was followed up with a plant tour at the Plymouth wastewater treatment facility.

Upcoming Regional Meetings

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Staff changes at McMahon

NEENAH, WI – McMAHON has announced that Tony Kappell, PE. has been named an Associate to the firm.

Kappell is a Project Engineer in the Process Department with 13 years of experience in planning, design, and project management of wastewater treatment, biosolids management, and water supply, treatment and distribution projects.

His experience spans municipal, industrial and private sector applications. Tony has a Master of Science Degree in Environmental Engineering and a Bachelor of Science Degree in Civil Engineering, both from the University of Minnesota. He is a registered professional engineer in Wisconsin and Minnesota.

McMAHON is also pleased to welcome back Kari Dennis, PE, as Director of Marketing for the firm. Kari was previously with McMAHON from 2004 to 2011 as a Project Engineer in the company’s Process Group.

She brings 17 years of experience designing and managing municipal projects, with an emphasis on drinking water and wastewater treatment. In her new role, she will be responsible for marketing and business development for the firm.

McMAHON is recognized as a leading engineering and architectural firm in the Midwest, with 160 employees located in offices in Wisconsin, Illinois and Indiana.
Black River Falls hosts West Central district meeting

President Steve Skinner called the meeting to order at 8 am. Steve welcomed everyone to Skyline Golf course in Black River Falls with 37 in attendance. Steve announced that we are in need of host cities for next year and to please contact him or Rick for possible meeting sites, there is a membership booklet at the sign in table please take time to look at it to make sure your information is correct and its that time of year for nominations for Operator of the Year, let myself, Rick or Joe with your nominations.

Mike Raynovic from NCL was our first speaker of the day, his topic was “Make sure your Ph & D.O. meters are working correctly”, Mike talked about everything you wanted to know about Ph – nomenclature, types of probes and the advantages of different type probes (gel filled versus refillable). Probes should respond very fast in buffers and everyone should do a 2 point calibration, he then showed how the 2 buffer calibration worked and calculated. When receiving a new probe he said that we should never write dates on the new box, read the how to condition new probe directions and to follow them along with proper storage of probes, do not use old filling solution ALWAYS USE THE FILLING SOLUTION THAT COMES WITH THE NEW PROBE. Proper calibration is always with 2 buffers, change buffers daily (at least change storage buffer after calibration), stir at a slow uniform speed using a stir plate and buffers should be at the same temperature. Mike also talked about warranties and warranties start when you receive the probe so its not a good idea to order 2 and to have one as a spare.

Mike ended his presentation with some troubleshooting tips. Always check meter first, check power supply, check for missing segments on data screen, connect the shorting cap on the back of the meter (meter should lock between 0.2 & -0.2mv in 10 seconds or less, if not the meter is bad).

Richard from Wi. DNR was the next speaker, his topic was “15 things you can do to save money or your health”. Richard talked about working smarter not harder. Do not analyze extra QC samples unless you have the time to address issues generated from the tests. He mentioned that the new LDO probes work very good and are reliable and discussed the pros and cons of the LDO probe versus the standard membrane probes. When doing ammonia testing he said we should consider switching to the colorimetric method instead of the membrane probe. Operators should buy reagents instead of making them as they are relatively cheap and frees up your time. When doing nutrient testing one should try to do batch testing instead of testing single.

Always remember to work safely 10% HCI or bleach is a health hazard and should be treated as such, wear proper safety clothes, eye wear and have adequate ventilation. He then mentioned the following 1) always use non phosphate detergent for cleaning glassware 2) use forms / auto calculation benchsheets 3) use mechanical pipets 4) ALL LABS SHOULD REMOVE THERMOMETERS WITH MERCURY IN THEM 5) get rid of asbestos lined ovens as with age the asbestos tends to flake off.
continued from page 31

system which provides surface area for treatment and creates long sludge times. With her system the biofilm supports microorganisms and the diffusers supply the air needed for the organisms and to also help to slough off the organisms when needed. Sludge minimization is accomplished by microorganisms living off each other. EPA estimates that 40-60% of total wastewater budget is in sludge handling and with this product the benefits are 1) organic tss removal 2) nitrification / denitrification 3) sludge minimization 4) industrial pretreatment 5) aids plants with seasonal flows. Jessica then showed 4 case studies that has the product installed.

Jon Butt from Symbiont was the next speaker his presentation was titled “Public/Private Opportunities for Collaboration”. Jon discussed the challenges facing operators today and in the future. Phosphorous limits will be going lower and as operators it is something we need to remove but also its something we need. He talked about OER = Operational Evaluation Report, and then showed what happens to monthly averages when a couple spikes happen in the same month. Source control is a great tool for helping meet new phosphorous limits, finding high strength sources can be tough but the rewards can be huge.

Mike Oldsberg from Fremont talked about Lift Station Odor and FOG Control. Mike said there is 4 main odor sources in collection systems 1) hydrogen sulfide 2) methyl mercaptan 3) ethyl mercaptan 4) diethyl mercaptan. Hydrogen sulfide primarily forms in the slime layer on pipe walls and sludge blankets. Some people can smell hydrogen sulfide at 1ppm and the best odor control chemicals are oil based. FOG treatments consist of solvents which turn hard grease into a liquid which then can be sent down the line. Surfactants will emulsify 2 substances so they look like one. Enzymes are biomolecules that catalyze or increase the rate of chemical reactions. Microbial bioaugmentation breaks down the FOG to a form that bacteria can degrade. Enzymes alone are not a cure all, some wwtps cannot handle high strength loads of soluble fatty acids and glycerides.

The final speaker of the day was Glenn Tranowski from Strand and he discussed the Black River Falls WWTPs upgrades and their permit with regards to phosphorous limits. Plant tour followed his presentation.

Submitted by Joe Beaudry and Dennis Holtz

Conference Registration opened Monday, June 6

Register now for the 50th Annual WWOA Conference

You won’t want to miss this!
Phosphorus monitoring alternatives can save time and improve precision and accuracy

There are options in performing the phosphorus test that can make your life easier, save time, and can actually help improve the accuracy and precision of your test results. If it seems too simple, consider the statistics associated with this test procedure:

Curve Correlation Coefficient: 0.99985-0.99999
Limit of detection: 0.003 mg P/l

Things that you might want to consider employing in performing phosphorus analyses:

Reagent dispensing with pipeters: Another step adding to the time to run the phosphorus test is pH neutralization. Adjustable pipeters can quickly deliver the exact same volume of acid to the samples prior to digestion. That consistency results in the neutralizing being similar for every sample. Another pipeter can be used to quickly dispense a volume of hydroxide (just a few drops less than what’s needed to neutralize the sample). The final hydroxide addition can be added with just a few drops.

Another pipeter can be used to deliver the necessary combined reagent.

Nessler Tubes (or test tubes): Low form Nessler Tubes measure/contain 50 ml. They can fit in a rack and into an autoclave for digestion. The sample can be added to the tube, acid and persulfate added, then put a sheet of aluminum foil over the rack before autoclaving. The aluminum foil prevents any condensate from the autoclave to enter the tubes.

The final mixing is completed by covering each tube with “Parafilm” and thoroughly mixing each tube.

By completing each test in a single tube, there is no issue of spilling or complete sample transfer. As a result, the test precision of the test is improved.
continued from page 33

The autoclave was a good option, because it didn’t require the purchase of a block digester and the ongoing costs of supplies. Simply set the autoclave for “liquids”, …load the autoclave and work on other things. Open the door after the temperature is down to 90 C and complete the analysis.

Replace the spectrophotometer 1 cm path length tube holder with a 5 cm cell holder: The longer the light path in the spectrophotometer, the more absorbance will be measured for any sample.

The increased absorbance is beneficial in lowering the limit of detection for the phosphorus test.

ASTM’s Ascorbic Acid Procedure: American Society of Testing & Materials had a slightly different approach to the combined reagent. The test has the sulfuric acid, ammonium molybdate, and antimony potassium tartrate and water in a single solution that can be stored for a year. Adding 0.5 mg of ascorbic acid to 100 ml of the solution completes the combined reagent.

Call Dean to arrange a demonstration or to get questions answered at 262.225.7298.

Don’t forget to order your 50th Anniversary polo shirt

Official WWOA blue color with the 50th Anniversary logo in goldenrod.

Added logo on sleeve in goldenrod reads: Protecting Wisconsin Waters

Pre order by August 20 and pick it up at the conference in LaCrosse.

Only limited quantities of men’s and women’s shirts will be available for sale at the conference at a higher price.

See page 24 of this issue of the Clarifier for shipping and order form.

Questions?
Call Karen Harter at 608-355-3081 or secretary@wwoa.org

Clariﬁer Deadlines

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