



**Wisconsin Wastewater
Operators' Association**

The Clarifier

WISCONSIN WASTEWATER OPERATORS' ASSOCIATION, INC.



Aerial view of Slinger Wastewater Treatment Plant Slinger, Wisconsin

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.

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Season's change bringing warmth to the outdoor fun!

Winter has passed, the snowmobiles have been tucked away, and the time has come to break out the baseball gloves, bikes, and the Harley. As much as I enjoyed and will miss the winter, there are plenty of reasons to embrace the spring and activities outside as the temperatures gradually warm up. There is plenty of wood to be cut and split to prepare for the next heating season. Practicing and playing baseball with my son gets more and more challenging every year as he has surpassed my long toss range. And even with full catcher protection, I must admit, that I'm a little more hesitant every year to provide a target to a hand tingling fastball and some changeups that leave me bewildered on how a baseball can move that much.

Speaking of baseball, how about the Brewers? Is this their year? On the flip side, what about the Twins who really are my favorite! Regardless, baseball is my favorite sport and true sign winter is gone! Last of all, hopefully my garden tilling and planting has commenced and maybe this is the year I can keep the weeds from getting out of control!

Two WWOA co-sponsored events, Government Affairs Seminar and Spring Biosolids Symposium, have passed and those responsible committees have once again provided superb speakers with enlightening sessions. The Technical program for this year's annual conference has been laid out and exhibitor registrations have been coming in and filling in the allotted space provided at the La Crosse Center.

Many of the remaining details of conference events will be decided in April at the Board of Directors meeting. Keep in mind that a round of spring/summer regional meetings are in place on the training calendar and if you would like more information on any of these, you can click on the links in the training events calendar portion of the website to open up associated details and registration forms.

Have I mentioned that this is the 50th Anniversary of this great organization?! A special standalone edition of the Clarifier is being assembled to honor and recognize the building of the organization and associated events through the years. Publication print and distribution is expected to be around the early summer mark. Definitely keep a look out for your copy of this 50 year recap of WWOA!

At this time I would like to just send a shout out of appreciation to all the utility operators. Countless hours are dedicated to keeping the communities collection and treatment systems operating efficiently and effectively. Being

a Wastewater Operator takes a special set of skills. I believe that the public does not give nearly enough credit to those performing the daily activities associated with taking waste and processing it to protect the earth's most precious natural resource, water. Hats off to all of you who dedicate their days working in wastewater facilities across Wisconsin!

Wishing the best to all as the spring biosolids application season passes! 🌱

2016 WWOA President,
Lyle Lutz



Village of Slinger wastewater treatment plant

The Village of Slinger's wastewater treatment plant was originally built on this site in 1980. Upgrades in 1993, 2004, and 2008 have brought the plant to its current process described below. Four operators that work in both water and wastewater departments account for daily operation, as well as one Superintendent and the Director of Public Works. The engineering firm of Ruekert and Mielke has designed all the aforementioned upgrades with the exception of the 2004 headworks building and continues to help us evaluate future needs.

Operators are currently optimizing plant controls and settings to better treat for the new phosphorus limits handed down from the EPA. Change of chemicals, their addition points, new online analyzing equipment, SCADA controls, pumps, valves, and lines are just some of things that are being used to meet the challenge.

Screening

Wastewater screening is accomplished by a mechanically cleaned fine screen. The fine screen consists of a series of perforated plates that are connected to traveling chains. The

plate perforations are 1/4 inch in diameter. Rags, sticks and other debris suspended in the raw sewage are captured on the faces of the multiple plates. The plates travel upwards in a step-wise fashion out of the influent channel and eventually to the upper level to the screening washer/compactor in the Screening Room. Debris is removed from the plates and into the screenings washer/compactor by spray water and the mechanical action of a rotating brush. The screenings washer/compactor washes the screenings and compresses them to reduce the amount of free liquid and then conveys them to a dumpster. The debris is disposed of in a landfill by a contract refuse contractor.

Influent Pumping

Three influent pumps pump the screened wastewater to the grit collector through a 12-inch force main. There are three 6", vertical mounted, dry-pit submersible, solids handling variable speed sewage pumps, each rated at 1,000 gpm (1.44 MGD) @ 45' TDH operating at full speed. Each pump has a 25 Hp, 1800 RPM motor driven by a variable frequency electronic drive unit.

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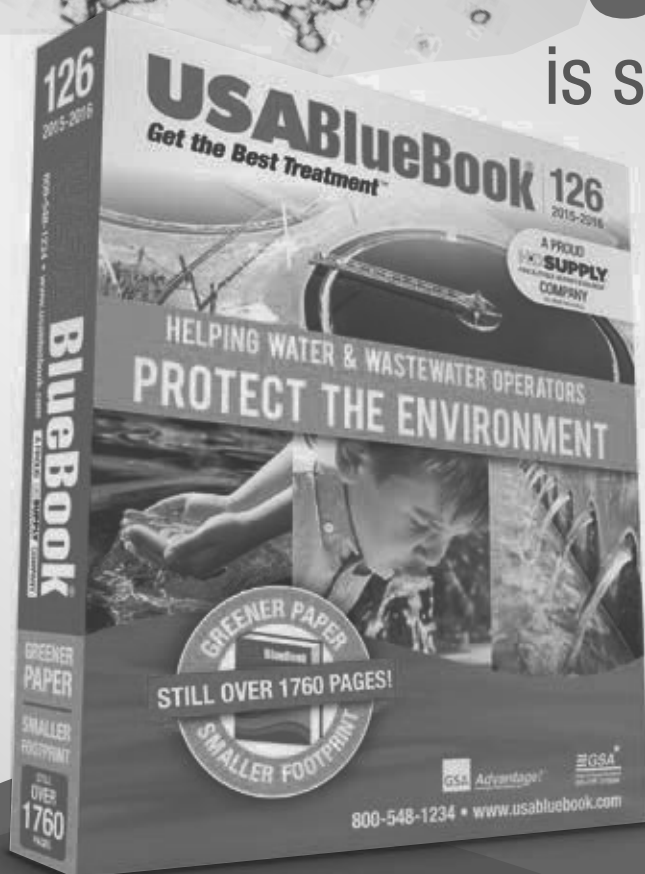
in Wisconsin, ranging from \$100 to more than \$20 million.



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Grit Removal

Grit is removed from the screened wastewater by use of an induced vortex grit collector which utilizes centrifugal and gravitational force to separate and collect grit from the sewage flow. In the grit collector, grit accumulates in the center as the centrifugal force is not great enough to move the grit to the outside with the degritted wastewater. Grit then settles to the bottom of the collector from the center column where it accumulates. Grit is pumped from the grit collector to a grit washer where organics are removed. The grit collector and pump are located in the Grit Room. The grit washer is located in Screening Room. Cleaned grit is then collected in the same dumpster as the screenings for subsequent landfill disposal. Wash water drains to the wet well.

Aeration

The aeration process at the Slinger WTF is a modification of the oxidation ditch type of activated sludge wastewater treatment called the Orbal process. The aeration basin is divided into three separate aerated channels arranged in series. The aeration channels numbered 1 through 3, going from the outside towards the center. The outer aeration basin channel No. 1 consists of a 76' outer diameter endless

loop with a 20' width and a 12' maximum water depth. The middle channel No. 2 consists of a 55' outer diameter endless loop with a 20' width and a 12' maximum water depth. The inner channel No. 3 consists of a 34' outer diameter endless loop with a 20' width and a 12' maximum water depth.

Three 50 Hp (for channels 1 and 2) and three 25 Hp (for channel 3) variable speed aeration devices rotate disc assemblies which are partially submerged in the mixed liquor. As the disc assemblies rotate, they propel the combination of raw sewage and return activated sludge (called mixed liquor) around each channel. They also create a gas/liquid interface for imparting atmospheric oxygen to the wastewater. A minimum velocity of 0.75 feet per second is maintained in each channel keeping solids in suspension. Because the channels have gradual curves, a minimum of energy is expended to keep the liquid in motion, reducing mixing power requirements, thereby permitting a large "turndown" capability to match oxygen delivery to process requirements. Underwater gates allow the mixed liquor to flow from the outer channels toward the inner channel 3, then into the center island where the mixed liquor flows through a weir-type splitter box and to the two final

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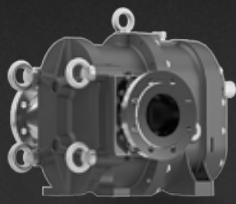
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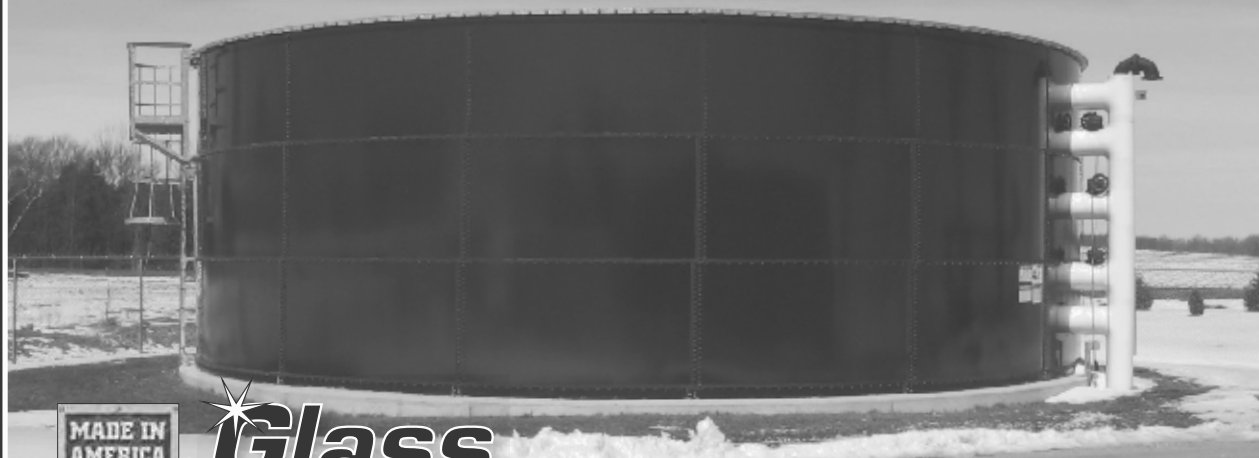
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clarifiers. Valves and gates are provided to allow flexibility in selecting which channels may be bypassed for maintenance or process reasons. However, in the normal mode of operation the sequence will be as follows:

The three aeration channels (numbered 1 through 3 starting on the outer channel) total approximately 1,500,000 gallons of volume which provides an average of 24 hours detention time at the 1.5 MGD design flow rate. The approximate volume of the three channels and their respective hydraulic detention times are as follows:

Channel #	Volume	% of Total Volume	Average Detention Time
1	748,000 gals.	49%	12 Hrs.
2	509,000 gals.	33%	8 Hrs.
3	270,000 gals.	18%	4 Hrs.

Final Clarifier

From the aeration basin, the mixed liquor flows by gravity into the two 60' diameter final clarifiers. Flow enters each

tank through a 16" pipe, up the center column, and out into the feedwell area. From there, the mixed liquor flows slowly down, then radially outward to the surface mounted effluent collection troughs. Mixed liquor solids slowly settle to the tank floor while clarified liquid flows over V-notch weirs, out the effluent troughs, and on to the disinfection process. The settled solids are swept up into a slowly rotating suction header by the action of the return activated sludge pumps. The clarifier center drive mechanism slowly rotates the sludge removal header approximately one revolution per 30 minutes, removing settled sludge from the tank floor. The drive mechanism also rotates a skimmer arm assembly that sweeps floating materials to the scum trough. From the scum trough, scum is flushed back to the influent pumping station wet well.

Disinfection

Disinfection of the WTF effluent is required by the DNR on a seasonal basis. During the period from October 1st to April 30th no disinfection is required. Through the disinfection process, pathogens remaining in clarified effluent are damaged or killed by exposure to ultraviolet

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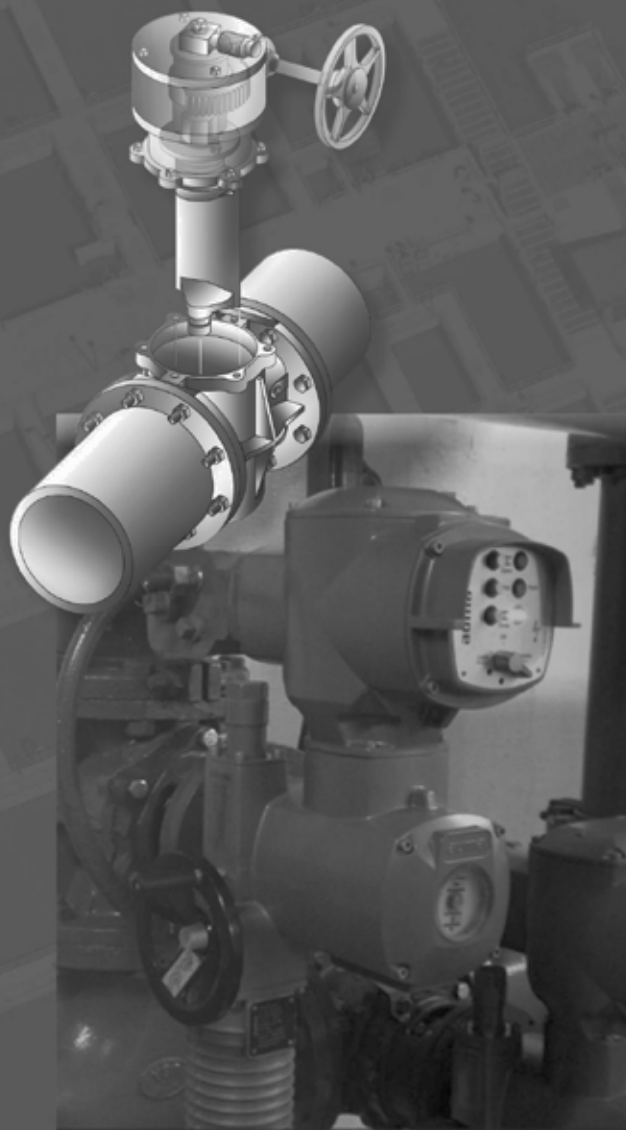
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light. Effluent from the final clarifiers is combined in a single 24" pipe and is routed to the ultraviolet (UV) light channel for disinfection. Wastewater is directed through a chamber containing a bank of four ultraviolet light modules. Each module contains eight bulbs suspended in the chamber with the bulbs oriented parallel to the effluent flow. The output of the bulbs is automatically controlled in proportion to the WTF effluent flow so that the intensity of light output is sufficient to disinfect the effluent without wasting power.

Each ultraviolet emitting light bulb is encased in a quartz tube. The quartz tubes are automatically cleaned on a periodic basis by a wiper mechanism that physically scrapes accumulated solids off the quartz tube and simultaneously chemically dissolves mineral deposits on the outside of the tube. The cleaning system keeps the system operating at peak efficiency.

RAS Pumping

The return activated sludge pumps are located in the lower level of the RAS Building. Each pump draws the settled sludge from the respective final clarifier sludge removal

header and pumps the return activated sludge (RAS) back to the aeration basin. Three variable speed pumps are provided; one for each final clarifier plus one standby pump. Each pump is capable of returning up to 1000 gpm of return sludge utilizing a 7-1/2 Hp motor. Variable frequency drive units allow pump output to be varied as required to meet process requirements. The RAS pumping rate is set to equal the facility influent rate to a maximum flow of 2.9 MGD.



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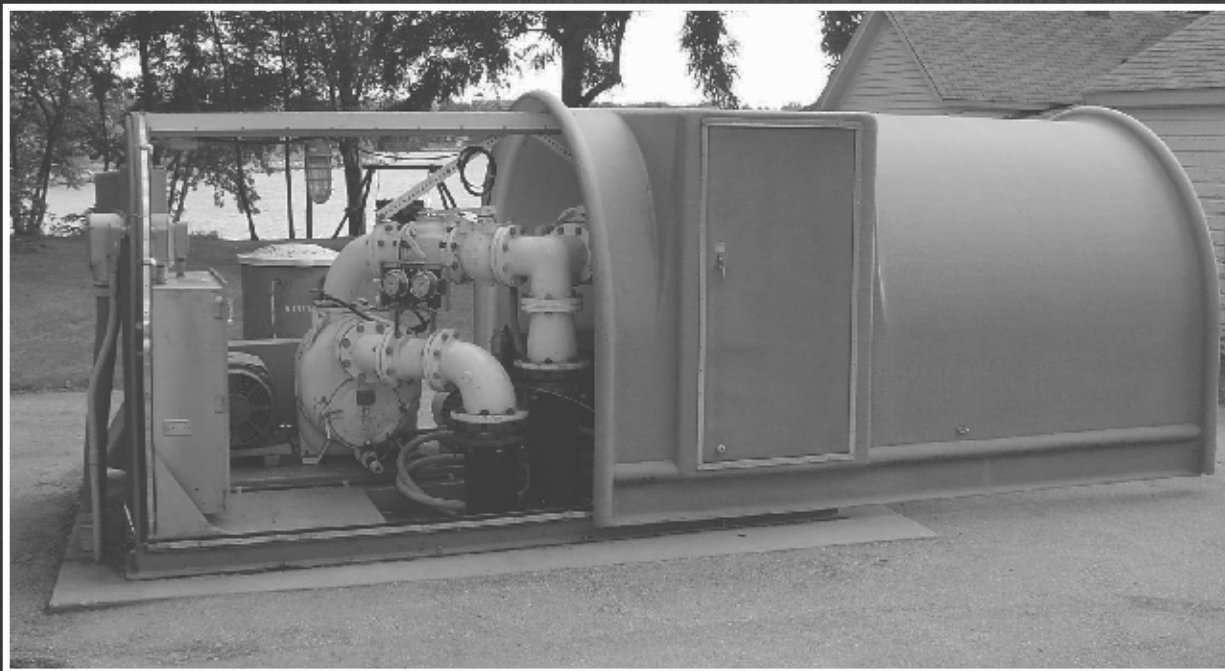


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Solids Handling

Waste activated sludge is introduced to the gravity thickener by the automatic operation of a valve on the RAS line in the RAS Pump Room. The purpose of the gravity thickener is to concentrate the sludge by gravity settling prior to storage. The former north final clarifier was converted to a sludge gravity thickener in the 2008 WTF upgrade project.

The gravity thickener consists of a 35' diameter by 12' side water depth tank. The sludge collector mechanism consists of a bridge which spans the entire thickener and supports the sludge collector drive unit, skimmer and rake arms. Rake arms are supported just above the tank floor, and are equipped with scraper blades to move settled sludge towards the center sludge drawoff hopper. The 6" WAS sludge feed pipe extends from the tank wall to the center feedwell. Scum is moved by the skimmer arms up the scum beach and into the scum box where it combines with the supernatant and flows by gravity back to the raw sewage influent wet well. The influent stilling well is 6' in diameter and is supported by wide flange beams attached to the tank wall. It serves to reduce turbulence to enable waste sludge solids to settle to the tank floor allowing relatively clear supernatant. The gravity thickener is covered by an

aluminum dome to reduce the effects of cold weather on the equipment.


The gravity thickened sludge transfer pump located in the Pump Room of the Administration Building conveys sludge from the gravity thickener to one of the two liquid sludge storage tanks. The pump is a rotary lobe positive displacement type which delivers 300 gpm at 81 feet of pressure.

The east sludge storage tank is 70' in diameter by 22' deep, and has a capacity of 633,000 gallons. The storage tank provides capacity of 211,100 pounds of sludge at 4% solids concentration. The tank has a constant sloped floor from the outside to the center and is covered with an aluminum dome.

The north sludge storage tank measures 84' in diameter by 28' deep. The storage tank provides 1,160,700 gallons of storage volume - enough to store 387,200 pounds of sludge at 4% solids concentration. The tank has a double conical floor sloped downward from the center and outer wall to the half radius point, and is covered by an aluminum dome. The Pump Room in the lower level of the Control Building

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contains two - 1000 gpm @ 81 feet TDH sludge mixing pumps. The pumps are the positive displacement rotary lobe type. Each pump draws sludge out of the north storage tank through a suction line and discharges it back into the tank at high velocity through one or two nozzles located in the tank floor. The nozzles are arranged to induce rotation of the tank contents, thereby assisting in moving the sludge off the floor, and suspending it. Sludge from the north tank can be transferred to the east tank for future disposal at the load-out station using the rotary lobe pumps. 

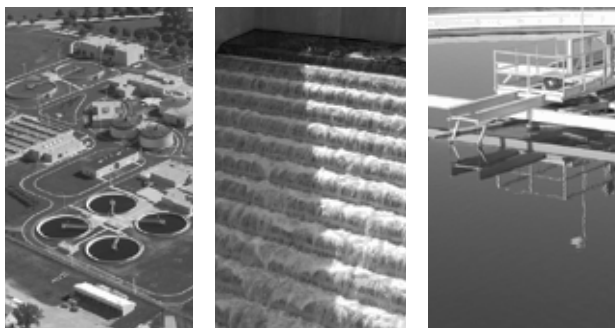


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50th Annual WWOA conference update

The Technical Committee met on Thursday, February 11 at the Marriott Madison West Hotel and Convention Center, in Middleton, WI (the site of the 2017 WWOA Conference). The Committee had a tough time choosing from the 67 outstanding papers presented for review for this year's technical program. Thanks to everyone that submitted a paper. Well done!

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. The Technical Committee deserves a round of thanks for an outstanding job and all of their hard work. This being the 50th Annual Conference, the WWOA 50th Anniversary Committee is working hard to make this a very special event. I know that this will be a conference to remember. More news to come in the next issue of the Clarifier. 

Jeff Bratz, Chair 2016 Technical Committee

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West Central District Meeting February 16 in New Richmond

President Steve Skinner called the meeting to order and welcomed everyone to New Richmond with 28 people in attendance. We have four vendors Commercial Testing Labs, Crane Engineering, Flyght (Electric Pump) and Dorner. Steve informed everyone that individual flyers will not be sent out anymore, please check the WWOA website for meeting information.



Bruce Grindeland

The first speaker for the day was Bruce Grindeland of Starnet Technologies. Bruce talked about Practical Solutions to Lift Station Safety. He started off by stating "Doing your job should not mean putting your life in danger". Common lift station hazards are 1) trips/falls 2) weather related issues 3) confined space concerns 4) arc flashes.

Bruce showed some slides of weather related issues in panels at lift stations, touched on confined space requirements and

electrical accident hazards listed as HRC 1,2,3,4. Potential arc flash hazards include 1) motor starter enclosures 2) transfer switches 3) drive enclosures 4) control panels. 29 CFR Chapter XVII Part 1910 subpart 5 covers electrical safety. Bruce then showed some slides of prepackaged buildings that cover panels and lift stations.

LED Lighting Showcase Apadana LLC. Ahmed Kian President and Ehssan Taghizadeh CEO of the company gave a brief overview of their company and how they have been able to save companies and municipalities money on lighting. They showcased several different type of fixtures for new installations and for retro fitting older style fixtures. The presentation was in a semi darker room and they actually connected the lights to show how bright they get with very little heat given off the fixtures. Ahmad said that 99% of lights that installed previously can be switched over to LED with the payback very quickly and one should expect 70% savings. Rebates from Focus on Energy sometimes would equal 50 % of the cost, Focus on Energy is a statewide agency.



Ahmed Kian and Ehssan Taghizadeh

Jim Miller from Wenck Associates was the next speaker, his topic was The Good The Bad The Ugly (New Technologies). Jim discussed some new technologies like Vertical Loop Reactor, BNR Systems and MBBR Systems. He spent some time on each system and the results and potential problems associated with each system. New concepts: Harvest constituents rather than remove contaminants. Jim said it is always good to try new things, but do your research and ask questions.

Jim Miller was gracious enough to be the first speaker after a great lunch was served. Jims topic this afternoon was Total Nitrogen Trouble Shooting. Jim said that with phosphorus being locked now some plants are concentrating on nitrogen. Nearly all activated sludge plants will remove some nitrogen. The first step in nitrogen removal is to convert the ammonia, then convert the nitrate to nitrite. Ph, alkalinity, BOD/COD, and toxics all important when it comes to nitrogen / phosphorus removal, Jim then discussed the importance and how each work for the removal.

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continued from page 16

Dave Gardeen from Telemetry Process Controls was the next speaker and his topic was Water/Wastewater Control / Alarm Monitoring System. Dave talked a little about his company and what they could do for a municipality. He talked about a typical alarm system and asked "is your alarm system reliable and can you trust the data?" Redundancy contributes to reliability and he talked about the 3 main parameters in a lift station: a) are you in touch with the remote site b) the wet well is not normally high c) the A.C. power source is ok. Preventative maintenance is very critical and without it could cause system failures, Dave then talked about the steps they use to check out a system. TPC offers an annual preventative and corrective maintenance agreement. This agreement consists of 3 major components :



Jim Miller

- 1) Complete on site check over
 - 2) Complete on site corrective actions
 - 3) Includes estimated number of phone support hours
- Dave wrapped his session by talking about the Log Me In security system and the Win-911 alarm system.



Dave Gardeen

The last speaker for the day was Pete Skorseth from D.N.R. He explained that the CMOM report should be finished by August 16th 2016. The CMAR report should be online in a month or so, hopefully by April 1.

Phosphorus limits are still being worked on, the D.N.R. is working on a packet to be sent to the EPA hopefully in a month they will be sent. 🌐

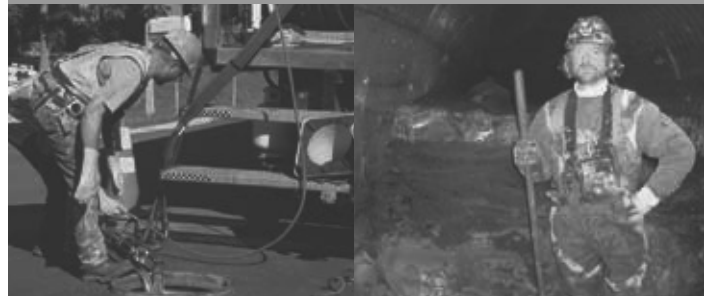
Submitted by Joe Beaudry

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WWOA – LMD Meeting, February 18th, Clintonville

The February 18th Lake Michigan District meeting in Clintonville was another successful event with 81 operators and DNR personnel in attendance, along with ten vendors. A special thanks to Foth Infrastructure & Environment for sponsoring the treats during the breaks.

Lois Bressette, Mayor of the City of Clintonville, welcomed everyone to the City.

Following the welcome by the Mayor, Rick Bartelt of L.W. Allen presented Pumps Built to Handle “Flushable” Wipes. Rick discussed the growing problem of “nuclear strength” wipes found at pumping stations. He explained the how and where the wipe clogging begins. Rick



Rick Bartelt

provided a couple of different solutions to deal with the clogging problem. However, each solution has their own associated pros and cons. Rick finished the presentation by discussing how a submersible mixer could help fight grease problems that develop on the surface of pumping stations.



Adam Hagee

Next on the agenda was Adam Hagee of InfraMap. Adam had a presentation titled GIS Asset Management.

Adam discussed the benefits of having a GIS program of your system on hand. An example of a GIS system was shown to identify possible features that can be incorporated into a GIS system.

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continued from page 20

Jake Becken called the WWOA LMD business meeting to order. Last quarter's minutes and treasurer's report were approved. During the business meeting, Dustin Jerabek assumed responsibility for the position of Chair. Richard Sachs of the WDNR stated the CMOM program submittal deadline is August 1, 2016. Applications for the May 4th exam day are available and the deadline is April 6th. Also, new study guides are available for subclasses A2, B, and C. A slight revision was made to disinfection and advanced wastewater study guides. All study may be viewed and downloaded from the DNR website.

Katie Gruber of B & M Technical Services presented on Preparing for SCADA. Katie described what is SCADA and who typically uses SCADA systems. A diagram was presented showing what makes up a SCADA system. Katie talked about the importance of preparing and designing for a SCADA system before you have it, in order to potentially save yourself a lot of money down the road in upgrades. She discussed the differences between digital and analog signals along the advantages of one versus the other. Katie finished her presentation by talking about remote monitoring and how it allows you to always be connected.



Steve Reusser

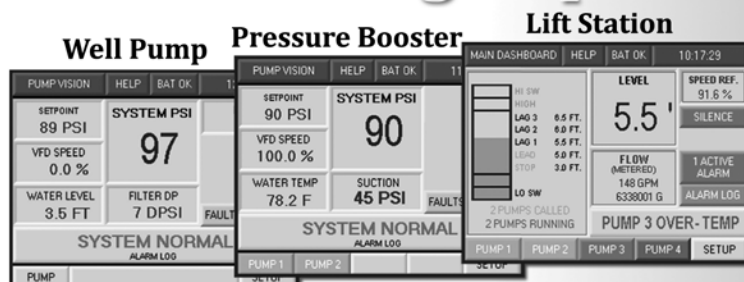
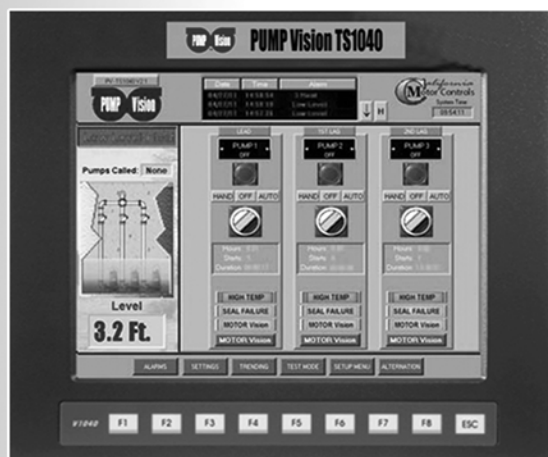
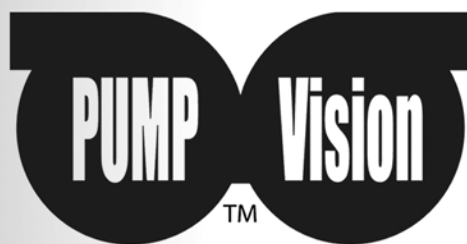
The last presentation was by Steve Reusser of Ayres Associates. Steve's presentation was titled Energy Savings Opportunities in Aeration Systems and Gas Utilization.

The presentation described areas in a treatment plant where energy can be saved or recovered.

The first option is using variable frequency drives and high efficiency motors. An aeration system is the second option where energy can be saved. Steve provided the pros and cons of different blower styles and with using D.O. probes for blower control. Steve discussed the different diffuser styles and their expected efficiencies. The third option discussed was utilizing digester gas. Steve provided

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Peach, Weaver join MSA Professional Services

BARABOO, WI: Kyra Peach, engineer, and Bill Weaver, P.E., environmental engineer, joined the Baraboo office of MSA Professional Services. Both will be part of the firm's wastewater team.

Peach will help complete the data evaluation and report for the 2016 Wisconsin Sewer User Charge Survey. The data collected in this study allows officials to educate the public on the cost of providing clean and safe water, and how their sewer rates compare to other communities.

Peach also will assist with wastewater permitting compliance reports for phosphorus plus wastewater construction administration and observation.

She received her Bachelor of Science degree in Environmental Engineering from the University of Wisconsin – Platteville.

Weaver took a circuitous path to his current role as an environmental engineer. He started his academic career with a B.S. Degree in Environmental Science, but then he took an

unusual detour that maximized his passion for swimming. While earning his bachelor's degree at Ohio State, he was a collegiate athlete and member of the USA Swimming National Team. He participated in the 1992 and 1996 Olympic Trials and missed making the Olympic team by less than a second.

Following his competition career, he became a swim coach for a variety of teams, including the University of Pittsburgh and Purdue University. While at Purdue, he decided to change careers and obtained a Master's Degree in Environmental Engineering.

At MSA, Weaver, who has seven years of engineering experience, will assist clients with wastewater treatment facility projects.

He has planning, design, construction management, and project management experience on multiple wastewater treatment projects.

For more information about MSA, see www.msa-ps.com. 



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efficiencies of the different engine styles used to burn digester gas. Steve discussed opportunities to increase the energy production at a treatment plant and used previous data for reference.

Steve finished the presentation by discussing chlorine versus ultraviolet disinfection and the differences between low pressure versus medium pressure ultraviolet disinfection.

Dave Tichinel with the City of Clintonville and Phil Korth of Foth Infrastructure & Environment gave a presentation on the history of the previous plant upgrades, flows, loading, plant limits, treatment processes, major components and need of the proposed upgrade of the wastewater treatment plant. A plant tour followed the presentation.

The next meeting will be in Kaukauna on May 19, 2016.

Special thanks to Jenny Pagel and the Clintonville WWTP operators for hosting this meeting. 

Minutes submitted by
Josh Steffek
Lake Michigan District Secretary/Treasurer



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Beaver Dam hosts Southern district meeting February 20



Mayor Tom Kennedy

The Mayor of Beaver Dam, Tom Kennedy, welcomed everyone to the quarterly meeting that was held at Old Hickory Golf Club.

The first speaker was Karen Clementi from

Deuchler Environmental, Inc. and the topic was Aquatic Survey Overviews. Karen topics were Aquatic Surveys overview, Why Aquatic Studies, Techniques, Data uses and Results, and Tips and advice. One of the values of aquatic surveys is to provide good information to the public about the receiving streams.

The next speaker was Bryan Viitala from Mulcahy Shaw Water and the topic was Rotary Lobe Pump applications. Key points were low maintenance costs, large flow in a small footprint, reversible operation, no outboard bearings. Some of the applications were sludge, digester recirculation,

dewatering feed, MBR, load out and cake.

The next speaker was Jeremy Cramer from the City of Fond du Lac WWTP and the topic was Cheese to Power.

Jeremy talked about the benefits of cheese powering the plant. Fond du Lac receives wastes from two dairy operations to power their biogas engine. Total annual savings using the cheese wastes is about \$160,000. Jeremy also highlighted some of the pros and cons of generating electricity from biogas including struvite, hydrogen sulfide generation and removal, impact on biosolids and recycle streams.

The next speaker was Lisa Bushby from the Wisconsin DNR and her topic was NR114 Rule Revision. Some of her talking

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Karen Clementi



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points were about why changes were made. Some of the changes were made, because of new treatment technologies, importance of collection systems/CMOM, more operator, and choices for advanced certification beyond exams. The major change were New Subclasses, fewer certifications levels, advanced operator certification point systems and new criteria for facility advanced classification.

Next was the Southern District Business Meeting. Under new business the next quarterly meeting will be held in Watertown. Next was the Treasurers Report and the report was read and approved. There is a balance of 6,809.17 in the account. There was talk about what to do with the money. Some of these ideas were, get a bus to go to WEFTEC, and other ideas were to use the money for college fund for someone. At the next meeting, please bring ideas.

The next speaker was Rob Minnema and the topic was Cheese to Power II: The Beaver Dam Experience. Beaver Dam receives high-strength wastes via a force main from Kraft Foods. Kraft provided the cream cheese used on the morning bagels. The high-strength wastes are screened, go through a dissolved air flotation unit to remove fats, oils

and greases, and then to an upflow anaerobic reactor. Effluent from that reactor is provided final treatment at the Beaver Dam WWTP. Rob talked about the benefits such as minimizes odors, eliminates land application, reduces phosphorus loading and reduces process waste loads just to name a few. He also went into what upgrades were needed such as SCADA/PLC upgrades, added 2 aeration basins, and built new disinfection building.



Jeremy Cramer

The final speaker was Jim Smith from Applied Technologies. Jim gave a quick overview of the Beaver Dam WWTP Facility including the public/private partnership between the City and Kraft. The facility received a significant grant which was a key factor in Kraft making a long-term commitment to stay in Beaver Dam

The meeting ended with a plant tour of Beaver Dam WWTP Facility. 

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Clark Dietz, Inc. Announces Four New Shareholders

Kenosha, WI – 2.29.2016 - Clark Dietz, Inc., one of the Midwest's leading professional consulting engineering firms, today announced the election of four new shareholders: Brian Powers, PE; Kevin Risch, PE; Christel Simonis, CCST; and Diane Thoune, PE. The additions reflect the firm's commitment to recognizing the contributions of staff members who demonstrate a strong work ethic, a commitment to clients, and a dedication to the betterment of the firm.

"Every year, a few exceptional members of our staff are selected to join our shareholder group," said John Boldt, CEO. "It is the professional, and personal quality, of our team members that are the cornerstones of our business. It is a great privilege to have these individuals vested in the success of our firm."

Clark Dietz, Inc. is a recognized leader in transportation, civil, environmental, mechanical, electrical, structural, and industrial engineering with over 110 professional staff in regional offices in Illinois, Indiana, and Wisconsin. 🌐



North Central meeting Feb.17

The winter North Central Regional meeting was held at the Eagle's Club in Marshfield on February 17th and was sponsored by AgSource Laboratories. AgSource provided a hot breakfast of eggs, bacon and potatoes for everyone to enjoy before the meeting started at 8:30. At that time



Steering Committee President Andy Ott officially welcomed everyone to the meeting.

Jean Bernius

Andy introduced

Jean Bernius from AgSource who gave the first presentation on water and wastewater sample collections. Much of Jean's talk focused on the relationship between a contract laboratory and their clients. The importance of the chain of custody form was highlighted as a primary means of communication between the two. Sample collection times, testing parameters, and turnaround times were a few of the items Jean touched on. Jean then explained the AgSource process from the time the driver prepares for their pickup route to how the samples are logged into their system at the lab. She placed special emphasis on temperature checks and time and date stamps.

Jean then talked about the basics of a Quality Assurance/Quality Control program and the different ways laboratories

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Stop hesitating! Get an operators team together now!

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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 our WWOA website.

If you are interested, don't hesitate to call a couple of buddies 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, but don't wait too long, preparation for the competition is already under way. 🌐

Come and join the fun!

Delevan Lake Sanitary District hosts southeast meeting Feb. 11

On Thursday, February 11th, the Delevan Lake Sanitary District hosted the WWOA South East regional meeting at the Lake Lawn Resort. The day started off with coffee and doughnuts, followed by a brief welcome by regional chairman Mike Blazejovsky.

Jim DeLuca, District Administrator of the Lake Delevan Sanitary district, began the meeting with the history of Lake Delevan and the collection system. In 1979 construction began to add the houses around the lake to the collection system and was completed in 1981. Today the district is responsible for maintaining 55 miles of sanitary sewer and 13 lift stations. It is also responsible for the management of 2072 acre Delevan Lake. In 1983 Delevan Lake experienced its worst algae bloom on record and its water quality was ranked poorest in the state. Due to the poor water quality, the Delevan Lake Sanitary District and the USGS began a partnership to improve the quality of the lake. In 1989 a lake rehabilitation project began and was finished in 1993, which turned Delevan Lake into one of the premier watersport and fishing lakes in Wisconsin, resulting in 18,000 boat launches in 2015. During the summer months

the district oversees a full time weed harvest operation. Jim also gave a brief discussion on how instituting the Iworqs system has helped the district improve operation and maintenance, making it much easier for operators in the field, as well as at the shop, to get real time information for anything from pumps to manholes. In 2016 the district has a number of projects in the works, including flow metering at various manholes throughout the collection system.

The next speaker, Tom Steinbach, Operations Manager and Watershed Director for the Oconomowoc Wastewater Treatment Facility, gave an update to the Oconomowoc watershed project called Adaptive Management. Tom began his presentation by giving the make up of the watershed, which is appraised of 46% agricultural, 19% wetland, 14% forest, 11% urban, and 10% water or open land. The watershed begins north of Friess Lake in southern Washington County, then continues through Waukesha County and finally ends where the Oconomowoc and Rock rivers meet in Jefferson County. The project was initiated after the Rock River TMDL watershed study was completed.

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The study concluded that the amount of TSS and phosphorous in the watershed need to be reduced and that three streams were considered to be classified as impaired, or not meeting intended use, because of low oxygen and or high bacteria levels. The study also showed that the phosphorous in the watershed comes from 30% point and 70% non-point. It was estimated to reduce the amount of phosphorous in the watershed, 15 million dollars would need to be spent if the city would not choose the adaptive management approach. With adaptive management the city expects to reduce its costs to approximately 5 million. Tom showed how the Adaptive Management program is moving towards reducing the phosphorous and TSS from non-point sources by educating farmers and land owners as to the benefits of best practice planting and land management.

Following a short break and a visit with the vendors, Keith DenRuyter and Craig Koch from Crane Engineering gave a presentation about coating wet wells. Keith broke down the difference between polyurethane and polyuria coatings, which have a life expectancy of between 7-15 years depending on application. He also gave an explanation of the installation process, including picture from one of

Delevan's wet wells that was done a few years ago. Another good option for wet well coating is using PVC sheets, which are installed in multiple layers and have a life expectancy of 20-25 years. Recently MMSD installed over 16,000 square feet. Keith emphasized the importance of understanding osmotic waster transfer, and how it effects the different coatings. He concluded by inviting all attendees to check out the Crane Engineering Tech Expo 2016 on April 28th at Miller Park in Milwaukee. More information can be found at craneengineering.net

Theera Ratarasarn, South District Wastewater Engineer, gave a DNR update including changes to NR114, updates on new study guides, exam schedules, and a reminder that your CMOM is due on August 1, 2016. Then, Mike Blazejovsky called the Southeast region business meeting to order. Last quarter's minutes and Treasurer's report were approved. Mike then asked for any nominations for secretary. Michael Penkwitz from the city of Plymouth was nominated and elected. Mike Blazejovsky then presented Jim DuLuca a plaque in appreciation for hosting the February 2016 meeting. He also presented Bob Biedrzycki from the town of Lyons with a plaque for his service as South East Region Chair for 2015. Following the business meeting attendees enjoyed a great lunch and view of Delevan Lake while dining in the Geneva Club.

After lunch, Anthony Jarvis and Shawn Chong from Grundfos gave a presentation on the company's products ranging from small lift station pumps to large mixers. The company recently opened and new North American headquarters in Downers Grove, Illinois. Anthony gave examples of how the company sizes pumps and tries to be the best choice for their customers through power and efficiency. He gave various examples of how the company has helped municipalities with new pump configurations.

The final presentation of the day was given by Chad Smeltzer from Duke's Root Control. Chad went through the foaming chemical root control application process, which begins with a line that has not been cleaned or root cut for several months or a year. Cutting the roots before chemical application can cause them to go dormant and the chemical will be less effective. After Duke's service crew applies the root control chemical, the process should be allowed to take effect for at least for 3 to 6 months before cleaning the line, the longer the better. Chad states that the roots will still be in the line, and that sewer crews will need to cut them or they will simply fall off over time. To be effective, the roots should be treated two years of the initial application. After the second application, roots can be controlled with application of chemical about every three years. 

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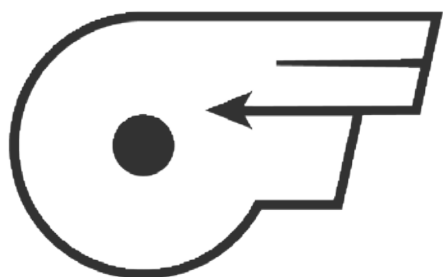
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comply with the DNR's Laboratory Certification Program, including blanks, known standards, and proficiency samples. Jean reviewed the differences between LOD's and LOQ's, and the relationship between accuracy and precision. This sparked a conversation with the audience about how results should be reported on DMR's.

The second presentation was by Jon Cleveland from Superior Analytical. His talk was all about chemical feed pumps. Jon started by highlighting the differences between the two main types of chemical feed pumps, peristaltic and diaphragm. Jon described the physical structure of each type of pump, indicating the benefits and weaknesses of each. Peristaltic pumps benefited from a higher "turn down ratio" than peristaltic pumps, but suffered from a higher degree of maintenance. When talking about diaphragm pumps, special emphasis was placed on the importance and function of check valves, both above and below the pump. Jon's main emphasis was that each type of pump has its place, depending on individual site characteristics. Variables like chemical type, pumping rate, source and destination elevations, pump controls, and application point type are all important factors to take into consideration when selecting the right pump for the job. During the break that followed Jon took some time to address a number of questions from the audience.

The schedule was changed slightly to accommodate a conflict and DNR Basin Engineer Nathan Wells spoke after the break, giving the traditional DNR Update. Nathan reminded us all that CMOM's are due August 1st of this year and that the DNR and the WRWA have a number of training sessions scheduled before then. Nathan also talked about the future Collection System Certification, with the first test to be held in May of 2018. Study guides are available on the DNR's website.

Andy Ott called the business meeting to order at 10:30. Andy thanked everyone for attending and thanked Jean Bernius and the other staff at AgSource Laboratories for hosting the meeting. Andy called for corrections to the meeting minutes from our last meeting in New Lisbon as posted on the website. There being none, the minutes were approved. Andy then presented the treasurer's report as presented by Treasurer Ken Bloom. As of the date of the meeting the region had an escrow account balance of \$744.49 and a checking account balance of \$3090.76. Andy reported on the Steering Committee meeting that was held on December 3, 2015. Elections were held and the officer positions include: Andy Ott-Chairman, Katie Gruber-Vice Chairman, Ken Bloom-Treasurer, and Chris Helgestad-

Secretary. Travis Dulek was welcomed as a new member to the committee. Rich Boden did not seek re-election to the steering committee but he was thanked and presented a plaque for his many years serving on the committee. Andy reminded attendees of upcoming meetings and events: Spring Biosolids Symposium-Stevens Point on March 22nd, Watertown Collection System Seminar on June 9th, Marshfield Northwoods Collection System Seminar on July 21st, and the WWOA Annual Conference-La Crosse on October 10th through the 14th.

Andy continued the business meeting with a call for members to keep award nominations on their minds as we move into 2016. He emphasized that award nominations are due by August 1st, with the exception of Regional Operator of the Year, which is due by July 1st. Andy reminded attendees of the promotional items available on the WWOA website and encouraged attendees to consider the scholarship and tuition reimbursement benefits offered by the WWOA. Andy highlighted the benefits of WWOA membership and call for all non-members to think about joining. He also called for everyone to think about hosting a future meeting.

Andy opened the floor for new business. Joe Gehin stood up to recognize fellow attendee Pete Albers for his instrumental role in reestablishing the importance of regional meetings in the North Central Region when he joined the WWOA. Andy led the group in a round of applause. With a reminder for everyone to like us on Facebook and to connect with us on Linked In, just search for WWOA North Central Region, Andy closed the meeting at 10:40.

Back on schedule, Mike Voss from MSA Professional Services presented a case study on nitrogen removal. The Village of Birchwood has a pond system that discharges to groundwater.

In order to comply with new total nitrogen limits, the Village asked MSA to design a Moving Bed Biofilm Reactor (MBBR). In order to prepare for the new system, both of the existing ponds were covered to aid in heat retention. The aeration system was removed for the second of the two ponds and it was converted into a settling pond. Mike described the MBBR as a series of tanks with "bio-media balls" on which a fixed film of biological growth is allowed to grow. He covered the design parameters of the system,



Mike Voss

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focusing on the need for a supplemental food source to aid in the denitrification process. He also walked us through the performance record of the plant since its startup, and the costs and funding sources associated with the project.



Tom Steinbach

The last presentation before lunch was given by Tom Steinbach of the City of Oconomowoc, H₂S – Pay me now or pay me later. Tom talked about the problems associated with hydrogen sulfide and how

they can be found to some degree in every system. H₂S is both flammable and corrosive, but can be managed proactively to prevent more serious problems in the future. Tom covered the chemistry of H₂S and the causes and effects of its presence in collection systems. He also talked

about the system designs available to reduce H₂S, as well as the control and repair options used to deal with system failures. Tom encouraged everyone in the audience to think about addressing H₂S concerns in industrial sewer use agreements, developer agreements, and in satellite collection systems. Problems related to H₂S can be very expensive. Once a community takes ownership or responsibility of a collection system it may be too late to go back to the original designers or builders and recover those costs.

The first presenter after lunch was Sam Warp from the City of Marshfield. The first of two topics Sam covered during his presentation was Marshfield's "No Wipes down the Pipes" public relation campaign. Sam talked about the problems they were having with non-woven paper products in their collection system. Sam partnered with the City of Beloit to develop an education program targeted at highlighting the problem and offered a simple solution, the only product that should be flushed is toilet paper. Sam encouraged everyone to "borrow" the program and get the word out. More information can be found at the City of Marshfield's website.

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North Central Region Steering Committee Meeting Mosinee, WI March 10, 2016

Andy Ott called the meeting to order at 12:20 PM. Steering Committee Members Ken Bloom, Travis Dulek, Joe Gehin, Katie Gruber, Chris Helgestad, and Andy Ott were present.

Ken Bloom presented the Treasurer's report. The Region had a fund balance of \$3982.91 as of the date of the meeting. Ken highlighted the expenses that have been paid since the last meeting, the majority of which were related to our March meeting in Marshfield hosted by AgSource. Additional expenses included the Regional Charter Fee, Insurance costs, and Website Update costs related to On-line Registration.

Discussion occurred on the success of the Marshfield meeting. A number of positive issues included the success of the breakfast offering, the quality of the presentations, and the tour of AgSource Laboratories. A few areas where improvement is needed are on-site registration, picture taking, and getting the agendas out earlier.

Discussion occurred about our future meetings. Lakeland Sanitary District is scheduled to host our spring meeting with an anticipated date of June 2nd. Joe Gehin agreed to continue to work with Lakeland staff to arrange venue and catering concerns. Joe Gehin and Ken Bloom offered to contact a number of potential speakers about a range of topics including Adaptive Management, CMOM, ATAD, and the Wisconsin Valley Improvement Company. Joe Gehin will also arrange a tour of the nearby Art Oehmcke Fish Hatchery.

Andy Ott reported that he is still working with Wisconsin Rapids to secure our fall meeting site.

Ken Bloom reported that he is still working with NCL Laboratories to set up a special fourth meeting this year. Discussion occurred about potential 2017 meeting sites including NCL Laboratories, Northern Lakes Laboratories, Whiting, and Antigo. A joint meeting with the Northwest Region in Medford was also discussed.

Discussion occurred about our Vender fees. The Steering Committee felt that inclusion of one personal registration fee should be included with the Vender registration fee in order to eliminate confusion about needing to register both personally and as a vendor. Joe Gehin and Katie Gruber

indicated that that is how other regions handle vender registrations. It was agreed to raise the Vender registration cost from \$60 to \$70 and that the new cost would include one personal registration.


Discussion occurred about the rest of our fee structure including non-member fees and late fees. The committee agreed to leave the non-member fee and the late fee at \$5.00 each, with the base fee dependent on actual costs.

Discussion occurred about our policy on sharing meeting information with third parties, specifically vendors. Chris Helgestad reported that the State WWOA shares registration information with vendors as a value added service in consideration of the fee paid by the vendor. The Steering Committee agreed to adopt the State WWOA policy of sharing registration lists with vendors.

Chris Helgestad reported that the State WWOA is in the process of updating their policy handbook and bylaws. He has shared some information with the State WWOA already and will work on our own policy manual updates.

Ken Bloom reported that he has ordered a number of promotional items to use as door prizes at our meetings. The Steering Committee feels that some additional effort can be made to solicit door prizes from our vendors. Chris Helgestad will update our agendas to that purpose.

Discussion occurred about purchasing our own laptop computer and projection equipment. Most of the time equipment can be borrowed from vendors or presenters, but our own equipment could make things easier. Further research is needed.

The meeting was adjourned at 2:05 pm. 

Submitted by
Chris Helgestad, NCR Secretary



**Wisconsin Wastewater
Operators' Association**

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Sam's second presentation was on the rehab work done at their largest lift station. In part done to address the problems associated with the non-woven fabrics, as well as to address age and capacity related concerns, \$550,000 was spent to upgrade the pumps at their Lincoln Avenue station. Sam highlighted the various challenges associated with upgrading an old station with significant site constraints.



Joe Gehin

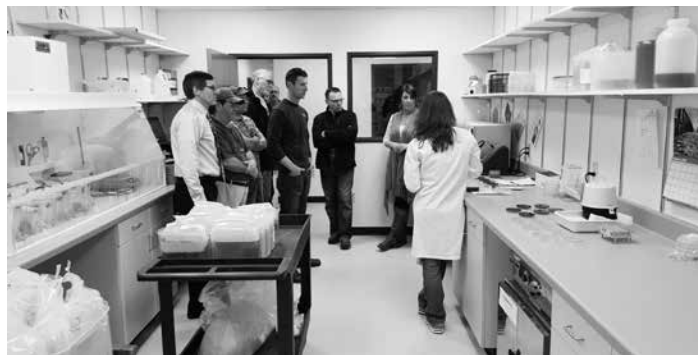
The last presentation of the day was given by Joe Gehin and Joe Kafczynski of Becher Hoppe Associates. With time quickly

running out until August 1st, they gave a CMOM Do's and Don'ts presentation. Joe Gehin focused on a number of the Don'ts he has come across while helping communities prepare their CMOM's. Don't wait until the last minute, don't worry about sending it to the DNR (but do have it on hand), don't get stuck on details like GIS. Joe Kafczynski focused on the Do's and walked the group through the booklet prepared by the DNR. Do address each component

of the booklet, including Goals, Organization, Legal Authority, O&M, Standards, Emergency Plan, Capacity Assurance, Annual Self Audit, and CMAR.

At 3:00 attendees were invited to take a tour of the AgSource Laboratory facility in Marshfield. Small groups were led through the various sections of the facility. The first section was dedicated to milk testing and the 1000's of samples tested each day there. The middle sections dealt with various foods testing, while the last sections handled the water and wastewater testing. Staff was on hand to answer any questions and everyone left the tour with handfuls of cheese donated by AgSource customers. 🧀

Submitted by Chris Helgestad, NCR Secretary.



AgSource Laboratory Tour

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2016 WWOA award nominations – submit one today!

Each year WWOA recognizes the dedication, service, and achievements of individuals in the clean water community. Please think of those around you who have gone above and beyond to improve the treatment processes at their facilities or helped to advance the clean water field. Please review the list of WWOA awards below and submit a nomination for someone you feel is deserving of recognition.

1) George F. Bernauer Award: Criteria include successful plant performance, and/or successful solution of important or complicated operational problems, and/or outstanding contributions in the field of wastewater technology in the State of Wisconsin. The nominee may be a municipal, industrial, or institutional operator, administrator, or educator in Wisconsin. It is not limited to WWOA members.

2) Koby Crabtree Award: Presented to a WWOA member for excellence in technical support provided to others in the field of wastewater treatment. The individual should be a recognized authority in wastewater, share knowledge through presentation, contribute to problem solving, and provide service regardless of compensation.

3) Service Award: Presented to a person who has made an outstanding contribution to the WWOA in the areas of promotion, operation, management, program participation, or education. The nominee should be an active member of WWOA for a period of ten years.

4) Newcomer of the Year Award: Recognizes an operator, support staffer, or environmental technician with less than three years of experience as of August 1st of the year nominated. The nominee should demonstrate higher than average growth in their place of employment, a willingness to learn, innovation on the job, and exceptional enthusiasm for their profession. The nominator should be a supervisor, manager, peer, co-worker, or DNR personnel familiar with the day-to-day efforts of the nominee. WWOA membership is not required, and a two year membership or renewal is included in the award.

5) Regional Operator of the Year Awards: Given out to someone who has demonstrated excellent plant performance, and/or successful solution to a problem, and/or contributions to the wastewater field. It is open to Wisconsin Certified operators of municipal, industrial, or institutional wastewater treatment facilities. The nominee should be a five year member of WWOA.

The nomination form and instructions for all the awards can be found on the WWOA website or by contacting Sharon Thieszen, WWOA Award Committee Chair, at (920) 459-3464 or sharon.thieszen@sheboyganwntp.com. Please note, the Regional Operator of the Year Award nominations should be submitted to the Regional officers listed on the nomination form by July 8, 2016. All other awards need to be submitted to Sharon Thieszen by August 1, 2016 for consideration.

Feel free to contact me if you would like any further information on the awards, the nomination procedure, or if you have a question if a potential nominee meets specific award criteria.

Thank you in advance for taking the time and effort to nominate individuals and allowing WWOA to recognize these deserving recipients! 

Sincerely,
Sharon Thieszen,
WWOA President-Elect and
Award Committee Chair

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Wes Christmas, PE joins Clark Dietz, Inc's Board of Directors

KENOSHA, WI – 02.12.16 - Clark Dietz, Inc., one of the Midwest's leading professional consulting engineering firms, today announced that Wes Christmas, PE, has been elected to the firm's 2016 Board of Directors.


Mr. Christmas is an accomplished civil/environmental engineer with over 15 years of experience serving municipal clients. He is currently the Manager of the firm's Southern Indiana operations and actively supports the Indiana Water Environment Association and American Council of Engineering Companies, Indiana. His civic responsibility is exemplified through his involvement with One Southern Indiana and the Southwest Indiana Chamber of Commerce. Mr. Christmas earned his BS in Civil Engineering from Purdue University and he is a licensed Professional Engineer in Indiana and Kentucky.

"Wes is a highly competent and dedicated individual, with a deep appreciation for his profession and the livelihood of our firm," said John Boldt, CEO. "He joins a very strong leadership group, who share a commitment to advancing our firm for the benefit of our clients, employees, and a sustainable future."

Re-elected board members include: John Boldt, PE, FACEC (Chairman, President and CEO); Charles Craddock, PE (Executive Vice President); Jerry Payonk, PE (Executive Vice President);

Hans Peterson, PE (Senior Vice President/Treasurer); Al Staron, PE (Senior Vice President/Secretary); Nancy Hiner (Senior Vice President); Mustafa Emir, PhD, PE (Vice President); and Jon Howaniec, PHR (Vice President).



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Wastewater facilities store renewable wind energy

Several European wastewater treatment facilities are currently demonstrating a new biological process for production and storage of renewable energy. (Allendorf Germany and Copenhagen Denmark). Power-to-Gas (P2G) is a process being developed for storage of renewable energy. Catalytic biological methanogenesis appears to be an elegant solution for storing power as renewable natural gas. The process captures carbon dioxide and combines it with hydrogen to form renewable methane or RNG. While many different sources of CO₂ can be utilized, wastewater treatment facilities with anaerobic digestion are a favorable location for sighting P2G since a source of CO₂ is readily available in the existing biogas and the process byproducts of oxygen and heat are readily usable. Most biogas contain 35% to 45% CO₂.

As more of our energy comes from renewable sources which are often intermittent, methods of storing that intermittent energy are needed so that it can be available when the sun is not shining and the wind is not blowing.

You may have driven by a wind farm and seen turbines not turning. Turning off the turbines when the energy is not

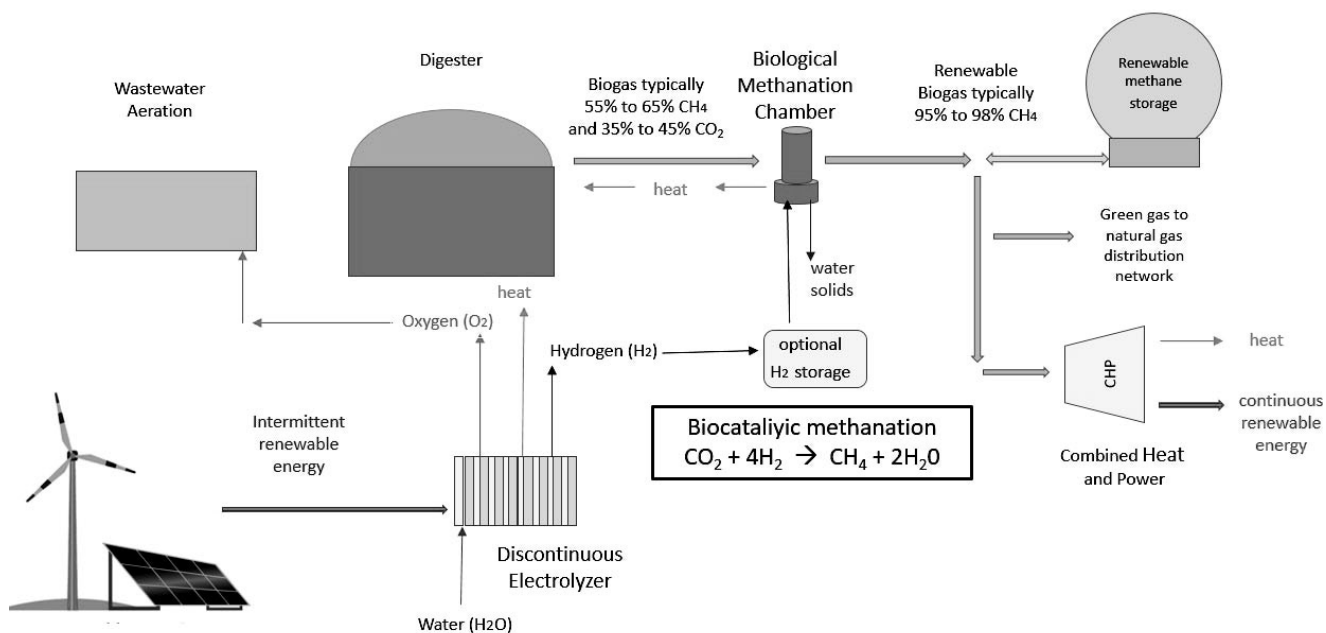
used is referred to as curtailment. Currently in the U.S. wind energy curtailment occurs at a rate of 4% to 10%. In certain areas of Europe the rates of curtailment can be much higher. How it works: Excess renewable energy is used for electrolysis, generating hydrogen and oxygen. The hydrogen is combined with the biogas stream in a small aqueous anaerobic biological reactor. In the reactor the biological organisms (Archaea) catalytically combine CO₂ and H₂ to form CH₄ or methane. The basic reaction is (CO₂ + 4H₂ → CH₄ + 2H₂O).

What are Archaea? The March 2013 issue of Scientific American states: "Microbes have been found living deep inside crust at the bottom of the sea. The crust is several kilometers thick and covers 60 percent of the planet's surface, making it the largest habitat on Earth. The microbes inside it seem to survive largely by using hydrogen, formed when water flows through the iron-rich rock, to convert carbon dioxide into organic matter. This process, known as chemosynthesis, is distinct from photosynthesis, which uses sunlight for the same purpose".

The biological energy storage process under development also provides several byproducts which are beneficial to

continued on page 38

Increase WWTF Biogas value by 50 to 75% with new bio-methanation



Renewable energy available from conversion of CO₂ to CH₄ with bio-methanation

1,000 kW → 200m³ H₂ + 100m³ O₂ → 50m³ CH₄ (about 500kW + O₂ + heat)

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the waste treatment process. Electrolysis generates heat and pure oxygen in addition to hydrogen. The waste heat can be used for digester heating and the oxygen can be used to supplement aeration process reducing aeration energy requirements.

One of the unique advantages of this process is the fact that it can be operated intermittently when low cost energy is available. It can be left idling for hours and days at a time and then restarted in minutes. Pilot tests and demonstrations have shown the organisms are self-sustaining for weeks.

The process has been suggested as a direct biogas upgrading method since it had demonstrated benefits such as significant hydrogen sulfide reduction, however it is not cost effective unless there is a source of low cost renewable energy or hydrogen available.

In the U.S. a lot of research is being done on hydrogen as a fuel for the future. However methane or RNG (renewable

natural gas) offers many advantages over hydrogen. Methane energy is four times denser than hydrogen and methane can be distributed through the existing natural gas network. Currently many fleet vehicles are using CNG (Compressed Natural Gas) in the transportation sector. RNG used for transportation is currently an attractive option as the U.S. EPA Renewable Fuel Standards (RFS) qualifies biogas used as a transportation fuel for RIN credit subsidy.

In the future it may be possible for many wastewater treatment facilities to have carbon neutral operations. With intermittent renewable energy CO₂ in biogas can be captured and converting it to bio-methane used to power the plant operations. Excess bio-methane can be pressurized and sold as RNG or used as transportation fuel.

The U.S. Department of Energy, Advanced Research Projects Agency has announced a potential FOA (Funding Opportunity Announcement) funding work on this concept later this year. Interested parties should consider applying.

For additional information contact:
ray.grosch@gmail.com 

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